

EPA JOURNAL

Earth Day '80

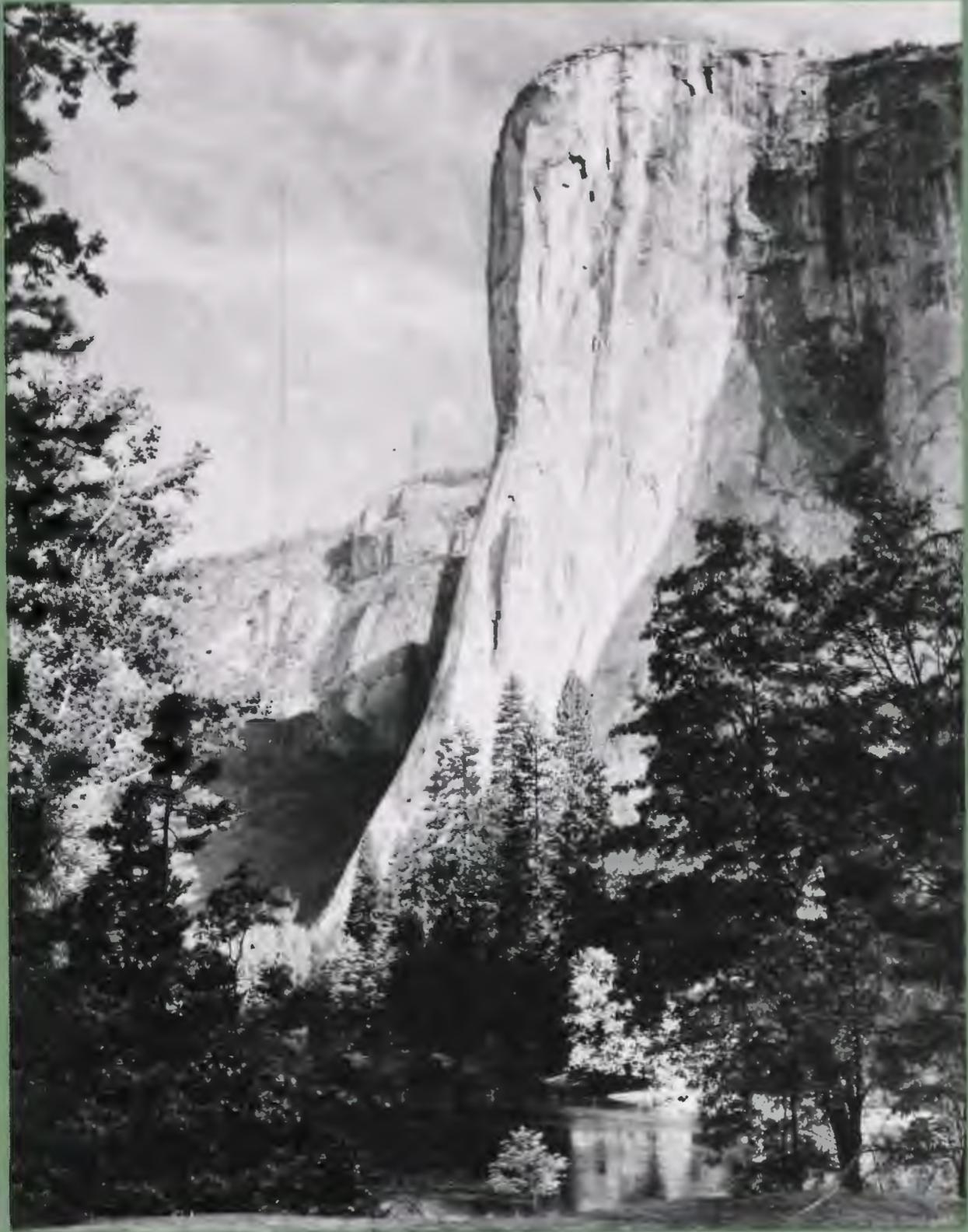


Photo of El Capitan, granite cliff in Yosemite National Park, by Ansel Adams



Earth Day '80

Earth Day, which will mark its 10th anniversary on April 22, ignited a national citizens' movement which has had a revolutionary impact, providing the creative energy to win new landmark laws and to make environmental quality part of our daily affairs.

In this issue, EPA Journal focuses on the significance of

Earth Day and the future of the air, water, and land which support us all.

EPA Administrator Costle gives a global view, pointing out that the planet's environmental problems have common causes that call for cooperative international efforts.

Also, the Administrator reports in an interview on his recent environmental agreement with China.

In an Earth Day proclamation, President Carter asks special attention to community environmental activities and educational efforts. Meanwhile, U.S. Senator Gaylord Nelson describes what the first Earth

Day ten years ago meant and explains why he proposed it and what it accomplished.

A special report in this issue profiles 28 citizens who have gained environmental victories by individual or group initiatives. These people from across the country, of different races and occupations, have a common goal—a wholesome environment.

The principles for gaining environmental success at the grass roots level are explained in an interview by EPA Deputy Administrator Blum, who learned valuable lessons while winning protection for the Chattahoochee River.

The purpose of Earth Day '80 is explained by Byron Kennard, head of the group sponsoring the anniversary celebration. Future environmental chal-

lenges are analyzed by Daniel Lufkin, an environmentalist and prominent businessman in New York City, who helped lead Earth Day '70. Denis Hayes reviews the past Environmental Decade, including victories that seemed impossible and problems that were worse than they first seemed. Hayes was coordinator of the first Earth Day.

The role of a special science, ecology, in future environmental quality is discussed by teacher and writer Eugene Odum in an interview.

In the third article in an EPA Journal series on major American rivers, Truman Temple reports on the mighty but ailing Colorado. □

EPA JOURNAL

Douglas M. Costle, Administrator
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Articles

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 Photo by Ansel Adams of El Capitan, a granite cliff sculpted by glaciers. Located in Yosemite National Park in California the cliff was named El Capitan the chief by U.S. Army soldiers who discovered Yosemite Valley in 1851.

Opposite Celebration of the first Earth Day April, 1970 in New York City's Union Square (Article on P. 6)

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A Global View

By Douglas M. Costle

A decade ago, when the first Earth Day was held, the international contours of the pollution problem were just beginning to come into focus. Since then, the continued buildup of environmental contaminants—combined with advances in our scientific knowledge—have cast the nature of the threats to our global commons in much sharper relief.

Some common threads run through environmental problems in both the industrialized and developing countries. First is the recognition that air, land, and water are finite goods . . . limited in amount. They always *have* been, of course; there is no more water on the globe today than there was when the first humans emerged three and a half million years ago. As long as the *number* of human beings remained relatively small, however, the finite quality of natural resources posed no serious problems for our survival.

That balance has been severely disturbed by rapid population growth—itsself a product of agricultural advances and improvements in public health measures. This recognition that we can eat ourselves out of house and home constitutes the second thread running through environmental concerns today. The industrialized world, in general, has its rate of population increase well under control. Progress is being made in developing countries, but in some of them, the old reliance on large families—both for labor supply and as a form of social security for parents in their old age—impedes efforts to slow the increase in human numbers.

A third common thread is the recognition that valuable technologies, ranging from the construction of large public works to

the production of chemicals, can have serious, damaging side-effects. In the United States, we have our Love Canal; Third World countries have had their share of large and small chemical disasters, too.

I am not certain whether our new environmental perception has arrived soon enough to protect us from massive, irreversible damage to life-support systems. But I *am* certain that the spread of environmental ideas has carried them far beyond any supposed coterie of the elite into all corners of the world, and into all forms of government.

Moreover, I am certain those ideas are here to stay. Environmental protection will undoubtedly suffer some setbacks in the years and decades to come. For that matter, we don't always have the right answers to every problem. Yet the understanding that economic growth cannot any longer be divorced from environmental health will remain a permanent feature in future human thought and action.

It undeniably will be expensive to direct our national and international actions to reverse the damage already caused by our pursuit of economic goals separate from environmental values. Yet deferring the necessary investment now can require vastly larger spending in the future.

So far, for example, the clean-up at Love Canal has cost the New York State government \$24 million; had the proper environmental controls been in place, an investment of \$2 million would have made that site secure.

As a matter of prudence, all nations must make sure that environmental investments pay their way in terms of avoiding risk and providing benefit. But we must also do our best to prevent inadequate concepts of "cost" and "benefit"—based on deficient economics and biased in favor of resource-depletion—from reversing the repair work we have begun on our global home. We can pay for that repair work now, at substantial economic cost and international convenience. Or we can pay for it later—at much greater cost.

This is not an empty piety, substituting sentiment for common sense. Fred Kahn, the Administration's anti-inflation chief and an economist, put the matter well in a recent speech. "The popular conception that we must make choices between 'economic welfare' and environmental protection or energy conservation," he said, "is simply wrong. Environmental values *are*

economic values: it is in principle just as important, in the interest of economic efficiency and therefore economic welfare, and inflation control, to conserve our limited natural resources, to make wise and sparing use of our limited clean air, water, and living space, as it is to economize in the use of labor, capital, and energy supplies."

Such environmental concerns—taken together with many others that I might have cited—confront us with a challenge that is without historical precedent. We must, somehow, find the means to carry international cooperation to a new plane. We must learn to act quickly and forcefully on matters where action by a single country—or even a handful of countries—will not be sufficient to protect our global commons.

To help me keep this in mind, I have hanging behind my desk a photograph of the Earth that was taken by the astronauts on the Apollo 17 moon mission. In the brilliant blues of the oceans, the white, swirling forms of the clouds and the rich earth tones of the continents, it is almost a work of art.

Jim Fletcher, a former head of NASA, saw that photo upon Apollo 17's return and said simply, "On the way to the moon, we discovered planet Earth."

There's more to the impact of this view of Earth than simply its breathtaking beauty, however. The photograph also brings home in a dramatic way the fact that the Earth is an isolated lonely object in space—a place that must husband its resources with the greatest care because, in the words of Astronaut Jack Schmidt, "It's all we've got."

It is a fragile craft. Just how fragile has been shown only too painfully by the revelations in recent decades about how we have harmed it. The damage continues. But there is a new awareness now of how we have misused the Earth and also, of the care needed to preserve both it, and us. □



Earth Day '80

Earth Day '80 symbolizes the past, present, and future. It is a reminder of the 1970's, when an upwelling of citizen concern laid the foundation in the Nation's laws for protection of the environment and human health. It stands for the present, when issues such as energy are calling for a creative response in environmental protection. The need for fuel for a mobile society must be matched with the need to wisely manage natural resources. Earth Day '80 also symbolizes a future when changing American values will produce greater respect for the land, the air, the water, and wildlife. In addition, initiatives by citizens, groups, and communities will shape fresh approaches in recycling, pollution control, energy conservation, transportation, and urban growth.

In the following articles and interviews, various leaders give their interpretations of Earth Day. They include the President; a U.S. Senator; EPA's Deputy Administrator; the coordinator of Earth Day '70; the head of Earth Day '80; an ecologist; and a business leader. A key part of this issue is a series of brief articles profiling 28 citizen environmental leaders—the people who have played the crucial role in this country's environmental awakening and who are building an environmental ethic for America's tomorrow.



President Proclaims Earth Day



President Carter, declaring that the Nation "must achieve another decade of environmental progress," issued a proclamation designating April 22 as "Earth Day."

It will be the 10th anniversary of the first Earth Day, which environmentalists now hail as having opened an era of activism and progress in fighting pollution, preserving natural resources, and safeguarding public health.

In his proclamation, the President asked that special attention be given to community activities and educational efforts directed at protecting and enhancing the life-giving environment.

President Carter said that in celebrating the new Earth Day, we should "rededicate our-

selves to our great goal—freeing the people of this Earth from disease, pollution, and the spread of toxic chemicals; from the lack of basic necessities; and from the destruction of our common natural and cultural heritage."

He added: "Let us rededicate ourselves to the creation and maintenance of safe and healthy surroundings, to the wise husbanding of the natural resources that are a pillar of our well-being, and to the protection of free-flowing streams, majestic mountain forests, and diverse cityscapes pulsing with life."

The text of President Carter's proclamation follows:

"Ten years ago, the United States turned over a new—and greener—leaf. On the first day of the new decade, the National Environmental Policy Act became the law of the land. This law is one of our Nation's fundamental charters: it is a pledge from each generation to the next to protect and enhance the quality of the environment.

"Through the National Environmental Policy Act, which created the Council on Environmental Quality, the Nation affirmed the fundamental importance of the environment to our well-being. Our environment shapes our lives in endless ways: it can be dangerous or it can be safe; it can produce a bounty to sustain us or it can be laid bare; it can frustrate our relationships with nature and with other people or it can provide opportunities for seeking peace and harmony.

"As the United States enjoyed the advanced technology, mobility, and material prosperity of the postwar period, we seemed to take for granted the resources on which our prosperity was built. By the beginning of the last decade, the damage to our environment had become a clear threat to the Nation's general welfare. Citi-

zens and legislators alike awakened to the challenge.

"On April 22, 1970, not long after NEPA became law, the Nation experienced one of the most remarkable 'happenings' of recent times. Millions of people across America celebrated the first Earth Day by participating in teach-ins, clean-ups, bill signings, and scores of other activities to demonstrate their concern for the environment and to learn more about nature, ecology, and broader environmental concerns. Earth Day 1970 was a watershed in citizen understanding of environmental issues.

"In marking the anniversaries of the National Environmental Policy Act and of Earth Day, let us rededicate ourselves to our great goal—freeing the people of this Earth from disease, pollution, and the spread of toxic chemicals; from the lack of basic necessities; and from the destruction of our common natural and cultural heritage. Let us rededicate ourselves to the creation and maintenance of safe and healthy surroundings, to the wise husbanding of the natural resources that are a pillar of our well-being, and to the protection of free-flowing streams, majestic mountain forests, and diverse cityscapes pulsing with life.

"We have now begun to make a serious investment in the quality of the environment at home and abroad. The Earth is a fragile asset. The return on wise investments in our environment will be reaped not only by ourselves, but by generations of our descendants. We must achieve another decade of environmental progress." □



Earth Day '70: What It Meant

By U.S. Senator Gaylord Nelson





ronmentalism. It is asserted that public interest has waned, that new worries have captured attention, that inflation, the energy crisis, and international conflict have superseded if not wiped out public concern over environmentalism.

Those who write that view are uninformed and far removed from the environmental scene or the politics surrounding it. In fact, the politics of environmentalism are so pervasive, from the grass roots to the national capital, that it is hard to believe even the most casual observer could miss it. To anyone who has paid attention, it is clear that the environmental movement now is far stronger, far better led, far better informed, and far more influential than it was ten years ago. Its strength grows each year because public knowledge and understanding grow each year.

How Did Earth Day 1970 Change the Nation?

My primary objective in planning Earth Day was to show the political leadership of the Nation that there was broad and deep support for the environmental movement. While I was confident that a nationwide peaceful demonstration of concern would be impressive, I was not quite prepared for the overwhelming response that occurred on that day. Two thousand colleges and universities, ten thousand high schools and grade schools, and several thousand communities—in all, more than twenty million Americans—participated in one of the most exciting and significant grassroots efforts in the history of this country.

Earth Day 1970 made it clear that we could summon the public support, the energy, and commitment to save our environment. And while the struggle is far from over, we have made substantial progress. In the ten years since 1970 much of the basic legislation needed to protect the environment has been enacted into law: the Clean Air Act, the Water Quality Improvement Act, the Water Pollution and Control Act Amendments, the Resource Recovery Act, the Resource Conservation and Recovery Act, the Toxic Substances Control Act, the Occupational Safety and Health Act, the Federal Environmental Pesticide Control Act, the Endangered Species Act, the Safe Drinking Water Act, the Federal Land Policy and Management Act, and the Surface Mining Control and Reclamation Act. And, the most important piece of environmental legislation in our history, the National Environmental Policy Act (NEPA), was signed into law on January 1, 1979. NEPA came about in response to the same public pressure which later produced Earth Day.

As the Council on Environmental Quality's retrospective introduction to their tenth annual report states:

Continued on page 38

**NOW
OR NEVER
POLLUTION
KILLS**



Ten years ago this month, the environmental issue came of age in American political life. When April 22, 1970, dawned, literally millions of Americans of all ages and from all walks of life participated in Earth Day celebrations from coast to coast.

It was on that day that Americans made it clear that they understood and were deeply concerned over the deterioration of our environment and the mindless dissipation of our resources. That day left a permanent impact on the politics of America. It forcibly thrust the issue of environmental quality and resource conservation into the political dialogue of the Nation. That was the important objective and achievement of Earth Day. It showed the political and opinion leadership of the country that the people cared, that they were ready for political action, that the politicians had better get ready, too. In short, Earth Day launched the Environmental Decade with a bang.

Now, ten years later, it has become popular in some circles to write the obituary of the environmental movement, to refer to the passing of the "golden era" for envi-

Earth Day '80, Its Purpose

By Byron Kennard

In 1970 Earth Day was organized primarily by students. It occurred largely on campuses and was mostly about the need to control pollution. The event was a manifestation of the times, a period of intense social and political activism. In 1980, what is Earth Day to be?

First of all, we environmentalists have a lot to celebrate. Ten years ago, before the first Earth Day, hardly anyone could tell you what the word "ecology" meant. Now virtually any schoolchild can define it. This is a profoundly significant change. We may not have yet rescued the physical environment from threats to its health and stability, but certainly we have equipped society with many of the tools needed for the task. I am not just talking about the legal, political, and institutional advances of the past ten years, important as they are. To me, the rock upon which our movement is truly built is the steady, ever-growing public commitment to a clean, safe, healthy environment which Earth Day 1970 helped to inaugurate. Earth Day '80 will celebrate and reaffirm that commitment.

Earth Day '80 also will demonstrate that environmentalism is not only alive and well, it is mature and diversified. From our historic and much-honored roots in classic conservation to the demand for clean air and water which swept the country on April 22, 1970, right up to the present moment, we have continued to grow and change, incorporating new knowledge and perspec-



tives constantly. Today, the environmental movement is a huge tent embracing many themes and causes: cancer prevention, energy conservation, workplace safety, neighborhood preservation, transit reform, alternative technologies, and labor-intensive economic development, to name only a few. And on top of this, we have provided the steam for much needed creativity and growth in the American economy. Hundreds of thousands of new jobs have been created by the movement for environmental protection, and thousands of new businesses, many of them small, have grown up as well. This socially-mandated market for pollution control is one of the most productive, constructive forces in the economy. It deserves applause and on April 22, 1980, it will get it.

In keeping with the diversity of the environmental grassroots origins in 1970, Earth Day '80 will focus on local and regional scales of endeavors. This April 22, we hope to direct the Nation's attention to the extraordinary amount of community-based innovation and initiative now occurring in America in an effort to protect and enhance the quality of life. Earth Day '80 is planned to be a great display of this grassroots ferment and experimentation. By no means have Americans lost their skill and zest for ingenuity and innovation, and revival of this old know-how and confidence in local communities around the theme of social

and technological alternatives is one of the most hopeful signs around. Just when a lot of people were about to write off the American environment as a lost cause, neighborhood, civic, and voluntary associations of many kinds began devising and promoting new ways of planning and doing things, often with the help and support of gutsy, change-oriented public officials.

These constructive changes take many forms, from efforts to improve the quality of food and nutrition to holistic health programs which conceive of individual well-being in the context of the total environment; from efforts to revive existing downtown centers to the preservation of existing housing stock in older neighborhoods; and from efforts to protect remaining farmland and open space surrounding the cities to the protection of the vast Alaskan wilderness.

This new wave of citizen and community actions is not restricted to actual physical improvements in the environment or to the creation of new technological hardware, however socially "appropriate." It also includes a tremendous amount of social innovation: improved governmental processes, better planning techniques, new research methodology, such as technology assessment, and novel models for political and community action, such as citizen networking. For example, look at the rise of demand in the 1970's for more citizen participation in the conduct of government. Participatory democracy, the politics of the 1980's, is actually becoming more than a slogan as politicians and administrators alike confront the necessity to review social mandates for public institutions and programs. In some places, in some ways, the movement for citizen participation (spawned in part by environmentalists) is

producing markedly better policy outcomes. Renewing the legitimacy of social institutions through the medium of citizen participation in governmental processes is a bright hope in the 1980's and a further cause for celebration.

Earth Day '80 is a way of parading all these new, small, brave efforts so that everyone can see them. Of course, not for a minute do I or anyone I know assert that these efforts have succeeded in rescuing the environment from the peril that confronts it. As Buckminster Fuller once observed, commenting on the human predicament, "What we have here is a nip and tuck situation." It is too early to tell if community-based innovation and initiative is equal to the task of redeeming the species from its self-inflicted wounds. But the important thing is that these efforts exist. They may be small signs, but they are vital ones. Certainly, they are widespread throughout the country. There are even solar houses in Alaska! To me these efforts are the most hopeful signs on the landscape of the future. They deserve support and recognition. They deserve to be celebrated. Along with the congratulations we can extend each other for having endured and advanced so far since 1970, Earth Day '80 is about our shared human potential for building a good life on this beautiful little planet. □

Byron Kennard is Chair of Earth Day '80, the organization sponsoring the event.



Gaining Environmental Success

An Interview With
Barbara Blum
EPA Deputy
Administrator



Q You helped lead the successful attempt to protect the Chattahoochee River in Atlanta. How was this accomplished?

A First, we thoroughly defined the problem. Atlanta had a rare resource: Its water supply, the Chattahoochee River, was also the last remaining wilderness river in any urban area in the United States. There was a need to quickly protect both the water supply and the beauty of the area from rapid urban development occurring in the new South.

Secondly, we methodically pursued a very broad base of community leaders who, in turn, influenced their constituencies. We "sold" the problem and the solution.

Third, we became very involved in the political process. We helped to defeat a Senator who was the major opponent of our initial legislation. We took

then-Governor Carter and other leaders on canoe trips down the river, and they volunteered to help us in every way possible.

At every step of the way, we involved the public. We held town hall meetings. We met individually and in groups with Chattahoochee property owners.

In short, today there is a Chattahoochee National Recreation Area because citizens of the city and the State let their elected officials know what they wanted.

Q Have local environmental issues changed since the first Earth Day 10 years ago?

A Earth Day 1970 was primarily students on campuses talking about the need for pollution control. Today, environmentalists can be found everywhere—in Congress, in the White House, in State government, in every community, every walk of life, and every age group.

In 1970, environmentalists were worried about what comes out of smokestacks. Today, we are concerned with everything from the decision-making process in corporate boardrooms, to enforcing laws and regulations on the books, to the harmful effects of a whole range of new pollutants in the food we eat, the water we drink, and the air we breathe.

We've come a long way. We've institutionalized the environmental ethic in the law, in the lab, in corporate decision-making, in the neighborhood.

Q With changed environmental problems, do grassroots approaches need to change?

A Yes and no. There will never be a substitute for the nitty-gritty work of community organizing—licking the stamps, researching and writing testimony, and knocking on doors. The need for this kind of effort will never abate. Fortunately, many grassroots groups have learned how to do all of this and do it well. This must continue.

However, I feel strongly that the time has come to forge new coalitions with the urban

dweller, with labor, with the farmer who loves his land. A few years ago, some friends of mine started a group called Environmentalists for Full Employment. Its purpose was to form an alliance around jobs and economic development, on the one hand, and to preserve the environment and worker health and safety, on the other. The Urban Environment Conference, a coalition of environmentalists, labor leaders, and urban minorities, has successfully laid the blocks for yet another strong, viable bridge between people who hadn't before realized that they had deep and abiding common interests. A year ago, EPA, other Federal agencies and three national organizations took the partnership another step forward by sponsoring a conference on major social, economic and health issues associated with the quality of city life. In many ways, the conference was a "first," giving rise not only to a consensus on many issues but a new commitment at the local level to resolve them.

Q What are some principles citizens could use in working for a cleaner, safer environment?

A Several things, I think, are critical.

First, get involved with organizations who share your concerns and objectives.

Second, once you're in a group, push for imagination and creativity in recruiting allies. Your agenda and priorities are important, but so are those of others. Forge strong, new alliances. Learn from other people. Build a broader constituency, and increase the chances of winning.

Third, get involved in the political process at every level of government.

Fourth, pursue more and more programs and strategies that integrate environmental protection with other ecologically desirable goals like energy conservation and economic development. Take the Blue Hills housing development in Kansas City, Mo., for example. Sponsored by a neighborhood asso-

ciation working with a community-based credit union, the group has designed a low-rise 250-apartment building for low-income persons that is entirely run on passive solar energy. It's efforts like this—doing more and more to integrate environmental protection with other community needs—that is so essential.

Remember: Nothing happens unless you work to make it happen.

Q This Earth Day is being described as community-focused. Should more of the environmental job be done at the community level as opposed to EPA and State agencies?

A I think we'd be kidding ourselves to say it should be more one than the other. The fact is that all of these efforts are critical—and if one or the other is a weak link in the chain, the net effect is bad for all concerned.

Saying that, let me add that a healthy citizen movement at the community level is absolutely vital to getting the cleanup job done. These groups monitor the work of government agencies and local businesses. They bring to bear viewpoints and facts that otherwise could be overlooked or never taken in the decision-making process. They perform research and analysis that can be more to the point, more timely, and more daring than that of others. They educate the public on significant issues, helping them to be better citizens, wiser shoppers, and so on. In other words, these community groups are catalysts and critics, in the best sense of the word. It is difficult to imagine that our country would have come this far environmentally without a high level of community concern and action.

Q Are there some environmental problems that can't be solved at the grassroots level? Toxic substances, for example? Or energy-environmental issues?

A I'd have to borrow on the theme of my answer to the last question. Not all environmental problems are given to

complete solution at the grass-roots level. Many are. But there is no problem we face that does not require, indeed demand, public support in order to arrive at a meaningful solution. Take toxics, for example. Here's a highly complex issue—one that requires tremendous technical expertise and sound regulation by government agencies. But solving the problem also requires a heavy dose of grass-roots involvement in the legislative and regulatory process and in educating the general public.

Q What further steps could EPA take to promote environmental understanding and participation at the grass-roots?

A The record so far indicates that EPA does a better job of this than almost any government-agency. We place a priority on public participation and understanding of the issues. We're insisting, for example, that major regulatory actions be accompanied by a plan that details how critical public viewpoints will be plugged into the decision-making process. We're making small grants to citizen groups around the country who, without a financial boost, would be unable to testify on important matters that merit their involvement. A major theme of EPA's effort is to hold agency managers accountable for identifying, up front, those publics that stand to be affected by virtually every major issue we face and then to make certain these viewpoints are heard long before decisions are cast in cement. EPA, in other words, is moving to spend our public participation dollars alongside our program dollars.

What more can we do? First, work this program into the roots of the Agency. Beyond this, I believe that Regional Offices should spend more and more time discussing environmental issues with civic and church groups, with community leaders, and with executives in a non-adversarial setting. A two-way dialogue is a key, and that means we're going to have to listen carefully, not just talk.

Q Some critics say that environmentalism doesn't have the support it once had because of the energy crunch. Do you believe this is true?

A No, most emphatically no. By most standards that gauge public sentiment, there is strong commitment to environmental protection. People, understandably, also are concerned about resolving our Nation's economic and energy difficulties. But these goals are not mutually exclusive. It's not only possible—it's absolutely essential—to have a clean, healthy environment and a stable, productive economy plus the energy we need. Environmentalists recognize this—in fact, they were among the first to do so.

This is not to say the job of reconciling these interests is an easy or overnight matter. It's just not. But there is undeniable evidence that the Nation's energy needs can be met in a way that doesn't destroy the environment or endanger human health and safety. This is an important goal of the Carter Administration, and at EPA, we are doing everything to see that power plants convert from oil to coal in an environmentally sound way. We are helping to expand the use of solar energy and other forms of energy that are environmentally benign. We're in the forefront of the effort to encourage energy conservation. And we're actively involved in helping companies develop technological innovations to assure that this Nation meets our energy needs without endangering human health or the environment. These are not the kinds of activities that should repel anyone. They should attract more and more public support, and I believe they are—if for no other reason than they add up to a common-sense approach that serves everybody's interests.

Q Would you predict what Earth Day 1990 will be like? Will we even need it?

A I think we'll need it. There will continue to be plenty of cause for celebration and for renewing our commitment to environmentalism. Environmen-

tal protection is not a passing fad or fancy. It is not something that warrants only a year or 10 years of intense work, only then to be forgotten. It is a continuing venture—one that requires constant vigilance and new approaches to meet current needs.

I have no crystal ball. But by Earth Day 1990, I envision that our Nation will have come closer to achieving a society that places equal priority on economic and environmental values, that does a far better job of weighing not only the costs but the risks inherent in every decision we make, that restores small business to its proper place in the American way of life. I see, too, a society that has generated vast new technological innovations in producing our food, providing our transportation, and heating our homes in a manner that is environmentally sound. All of this will be cause for celebration. But in 1990 just as in 1980 there will be need to recommit ourselves to the fundamental premise of environmentalism—that is, recognizing the interdependence of human beings and the planet Earth and staving off any irreparable damage that can be done to either.

Q Are you encouraged by environmental cleanup progress so far? Has a good beginning been made? Are we halfway?

A It's trite to say that we have made significant progress, but that we have a long, long way to go. It's also true.

With conventional pollutants, we have striking progress. We're more than halfway home in applying solutions. Much of the pollution control machinery is in place; now it will take some time to determine if it really works as everybody intends.

With other issues, however, we are only on the threshold of solutions—for example, dealing with the full range of chronic health effects, the ozone problem, the build-up of carbon dioxide, the issue of acid rain, underground water contamination, and so on.

I am encouraged, in any case.

We've got a better handle on these concerns than we once did. There's a broader appreciation of the need to face up to the issues early and a broader understanding that the right remedies must be applied.

Q Environmentalism traditionally has been nature-oriented. Are human health conditions now receiving more consideration?

A If we've learned anything in the last decade, we've learned that it's quite impossible to separate the two. The environmental movement may have started with a heavy emphasis on nature, but today its focus has broadened. We've learned a lot about the health effects of pollution—cancer, for example, and birth defects. What we've learned has intensified our concern about the damage pollution can do to not one, not two, but all forms of life.

Since 1977 when Doug and I joined EPA, we've insisted that our staff recognize this and take steps to deal with it. No other course of action is realistic, not only in terms of the laws we administer but also in terms of the threat pollution poses.

Q Is there any special message you would like to give?

A As we begin the decade of the 1980's, environmental efforts at every level of government and in every community deserve strong support as never before. There are those who denigrate environmental concerns in the name of what they see as more pressing issues—energy and the economy, to name only two. Others believe that environmentalism has gone as far as it can and that to press for more would somehow not be in keeping with the national interest.

As you can tell, I reject both philosophies. They misinterpret the message that environmentalism conveys. They misrepresent the true options that are before us. And they deny a growing body of evidence that suggests that if we don't protect the environment now, we will suffer the consequences and pay a steep price for our national neglect. □



Land use pattern in Oregon,
with Mt Hood as a backdrop

Earth Day Plus Ten: The Unfinished Agenda

By Dan W. Lufkin

In the course of a decade, the environmental movement in the United States has drastically changed our way of thinking about the way we use the resources of our planet. On a superficial level it has introduced into the national vocabulary such terms as "ecology", "biodegradable", and "environmental impact." On the deepest levels of consciousness and conscience, it has altered our basic perceptions of our relationship to the earth, the water, and the air—the life support systems on which our species, not merely our Nation, depends for survival.

The simple realization that natural resources are not infinite—and that we are nearing the end of the cycle for many of the most essential of them—has produced a result more chilling than the ominous existence of the hydrogen bomb. For as Robert Frost so prophetically put it—now we know that the world can end either in fire or ice; the fire of our geo-political passions; or the ice of our indifference to the fragile, finite balance of nature—the delicate web of our interdependence with the world around us.

Since the first Earth Day in 1970, the ardor of that small, pioneering group of environmentalists may have cooled somewhat, but it has by no means disappeared. Very properly, the fervor of the "movement" has given way to the more mature and pragmatic process of translating idealism into legislation, regulation, and enforcement.

The challenge has been not only to maintain the *desire* to improve the quality of the environment but to devise and install the means for the prudent development, management, and utilization of our resources. The drama of confrontation has

given way to the more plodding, step-by-step process of implementation—both at the national level and in States and communities across the nation. Grandiose notions of a massive environmental victory to be won in a single battle have been deflated by the reality of a thousand lesser skirmishes on scattered local fronts.

But even more significant has been the gradual trend away from military rhetoric and confrontation tactics to the far more productive strategies of cooperation and mutuality of purposes and objectives.

Not that every interest and constituency has been won over to environmental priorities. By no means. Given our present mix of high inflation and impending recession, this would require a degree of objectivity and altruism of which our society is not yet capable.

And yet, we are making progress. Many of the most intensely feared aspects of environmental protection are now accepted practice. While we may hear complaints of "overregulation", the principle of regulation itself, on national, State and local levels, has not only been accepted but is generally recognized as having salutary economic as well as ecologic benefits. Sensitivity to the hazards of water and air pollution, toxic substances, noise, and other environmental problems is no longer confined to a small intellectual elite.

The principles of environmental protection are now deeply ingrained, not only in our national consciousness but our national character. We may differ as to priorities, means, and timetables—but there is general agreement concerning objectives.

As a Nation, we have over the past decade rethought our notions of who we are and what we are doing. We have instinctively incorporated the environmental impact into every consideration of new processes, products, systems, methods of transportation and modes and forms of habitation. We may reject one conclusion or another, but, at least we chew it over carefully before we either swallow it or spit it out.

As national policy I believe we recognize that we can no longer satisfy our short-term needs to the long-term detriment of our environment. We understand that we must take long-range effects into consideration in the activities of our personal, business, and institutional lives. If at times we lack the vision and the courage to do what is needed, it is not that we reject the goals but that we draw back from the painful process of reaching them.

There is, however, one critical area of environmental protection about which I cannot be quite so sanguine. And it is the foundation upon which all other environmental resolves must be built—the

intelligent planning for our land—before, not after, the fact of its misuse.

Nowhere is our weakness of nerve more apparent than in our abject failure to come to grips with this most urgent and essential aspect of environmental protection—*land use planning*.

For the past decade—at every level of government—we have marched bravely up to the brink of legislation, regulation, and decision-making regarding one of the most finite of all our natural resources. And then, we have turned back or thrown up our hands, or what is even worse, produced a policy and then walked away from it, leaving the false impression that we have somehow addressed the problem, whereas, in fact, we have done nothing.

Land use decisions go far beyond issues of zoning, open spaces, farmlands, industrial growth, or airport and power plant siting. Every other element of environmental protection or degradation is at some point or other connected to the way we use our land. Decisions to encourage suburban sprawl, to build highways, to tax farmlands, to harvest timber, to zone for industry, to site sewage and waste treatment facilities, to permit housing developments, all impact not only on the land itself—but on the purity of the air and water, on the practicality of mass transportation, on the availability of housing, on intelligent solid waste management, on the survival of agriculture, and of wildlife—in short, on the total quality of our lives.

Yet almost nowhere are rational political decisions being made to preserve and manage the uses of land in such a way that they will enhance a style and quality of life that most of us could agree is not only desirable but indispensable to our ultimate survival in harmony with our resources.

Whereas many other environmental considerations have been woven into the fabric of our everyday lives—in pollution-control devices on our cars, in biodegradable detergents, in the burning of low sulfur coal, in the installation of industrial scrubbers, in non-aerosol propellants, in primary and secondary sewage treatment—land use planning is still a territory considered too wild and unfamiliar to tame or even explore.

One major exception to this record of national neglect is the State of Oregon, whose statewide policies, plans, and processes are living proof that land use planning is capable of a rational and balanced approach which can unify, and not polarize, the diverse interests of a State.

No other State has a land use planning program like Oregon's. In no other state is there a State agency with both grant issuing and enforcement powers to create stringent conservation zones for farm and forest land and place boundaries around every urban area beyond which urban uses cannot occur.

The heart of the Oregon land use program, which is administered by a State

agency, the Land Conservation and Development Commission (LCDC), is the establishment of urban growth boundaries by the communities themselves. These lines are not rigidly drawn around current city limits but allow for reasonable expansion and growth by the year 2000. Outside the urban boundaries land already committed for non-farm uses can proceed as scheduled, but all other land must be zoned for farm, forest, and recreational use.

Inside the perimeters, communities can plan for the most expansive possible development of housing, industry, mass transportation, and other urban uses. Thousands of acres of under-utilized land exist in our cities, and the Oregon program rests on the belief that growth should take place in these more concentrated areas before being permitted to spill over randomly into the countryside.

This makes irrefutable sense. Within these boundary lines the facilities are already in place to support human populations; water systems, sewers, solid waste disposal, railroad lines, mass transit, shopping areas, hospitals, schools and so on. Such centers of housing and business are energy efficient and resources conserving. Environmentally, they are far easier on land, water, and air than are the incursions that are taking place into our remaining open spaces.

As one measure of the economic rationality of the Oregon program, many major business interests, including the State Home Builders Association, have defended the program against attempts to repeal the State planning powers. That such planning is politically popular is indicated by the 61 percent affirmative vote it received when the issue was again placed on the ballot in 1978, in a defeated recall motion.

Many opponents of land use planning claim that what works in Oregon cannot possibly be duplicated in the more crowded, industrialized States of the East and Midwest or the new burgeoning megalopolis of the Sunbelt.

This is nonsense. Oregon is not some pastoral Brigadoon which comes up for air every 100 years but is otherwise quaint, rural, and changeless.

While still largely rural, Oregon has one of the most rapid growth rates in the country—over 17 percent since 1970 compared with California's 12 percent. There is considerable industrial expansion anticipated in the State and tremendous demands on the land from all forms of agriculture and development as well as housing.

With more than 800,000 people projected to be added to the State's census by the year 2000, the land use program

is clearly designed to accommodate, not exclude, this projected growth, as well as to guarantee the economic, transportation, housing and recreational amenities that are at the core of every State's quality of life.

Why Oregon, then? Are Oregonians so uniquely unselfish and altruistic—so unworldly that they are handcuffing themselves in the event of future population or industrial booms?

Not at all. This program has succeeded because Oregonians have had a vision of the kind of State they want to have in the future—and the bi-partisan political courage and leadership to make the hard choices necessary to guarantee that vision.

This is Earth Day, 1980. Where will we be as a Nation on Earth Day, 1990? If we do not begin to do some coherent land use planning in every State and local community, we will be well on the way to either chaos on the one hand or centralized authoritarian regulation on the other. Neither of these alternatives is acceptable.

If we want to solve the problems of air and water pollution, if we want to conserve energy, if we want to slow down and eventually halt the destruction of irreplaceable natural resources, including the land, we will take another long look at Oregon and learn how its example can be transplanted to the soil of our own backyards.

This kind of self-discipline will not be easy to impose. Already, we see intense pressures to reverse much essential environmental regulation in the name of energy needs, or economic incentive, or freedom of choice, or industrial growth.

We can't afford to let such issues, important as they are, obscure the central facts of our times in the last quarter of the 20th Century. If there is to be a future for our Nation and its people, we must begin now to use our vanishing landscape far more wisely. We must have cities that work; intelligently planned, located, and constructed housing for all; jobs convenient to that housing; transportation which will not consume all the world's oil; water that is clean and in assured supply; air that is not destructive of life; fields and forests to maintain our agricultural contributions to the world; and land for recreation, for beauty, and for planned growth.

This is not an impossible dream. Yet it is the forgotten objective of the environmental movement's unfinished agenda. For all our wondrous works, soaring visions and earnest plans, we sometimes forget that we depend for life itself on six inches of soil and the fact that it rains every now and then. □

Lufkin, a prominent businessman in New York City, is former Commissioner of Environmental Protection, State of Connecticut, and one of the original nine-member steering committee of Earth Day, 1970.

Ecology and the Future

An Interview With
Dr. Eugene P. Odum

Ecologist Eugene Odum doing research in the field with small animal trap



Q You are on the Advisory Board of Earth Day this year. What is the value of this event to public education?

A It could be a time to reassess successes and failures in regard to maintaining and improving environmental quality. It's a good ten years since the first Earth Day. Is the road ahead any clearer than it was ten years ago? That's the question. At the time of the first Earth Day there was a vague feeling that things were getting bad but it wasn't clearly understood then that environmental deterioration was connected in with many of the other ills of mankind, such as waste of energy, the gap between the rich and poor in undeveloped countries, etc. So I think that 1980 is a very opportune time to reassess, to see what the next decade will present. Of course,

in my opinion, the 1970's were the years of awareness, and the 1980's will be when we really begin to do something about the long-range problems.

Q With efforts such as the first Earth Day and environmental education, has the foundation been laid for an environmental ethic in this society?

A Surely. An environmental ethic as an extension of personal ethics was laid out many years ago by Aldo Leopold in his famous essay, "The Land Ethic." Usually, ethical behavior follows, or has to go along with some actual political and economic action, which serves to back up public opinion once it has formed. Ethics, as yet, has not had a big influence on preservation of environmental quality because environmental values that benefit the public rather than the individual, such as the life-support value of air, water, wetlands, and forests, are not in the economic market system. Our big problem for the next decades is how to get the goods and services of nature properly coordinated with the goods and services that are man-made. Our present economic system, of whatever political stripe, tends to put a really inflated value on anything made by man and almost no value on equally important things made by nature. Obviously, a general acceptance of Leopold's environmental ethic will help correct this inequity, but I don't see it happening until non-market values and esthetics become part of economic and political ethics as well.

Q How do you account for the limited support for land use planning, certainly at the national level?

A You understand, of course, that there is a lot of support in Europe and in the more crowded parts of this country. I think it's simply that in the U.S. as a whole we are still in the pioneer stages. The development of society, as well as nature, goes through stages. First in the development sequence is the pioneer period

when you exploit and you have more resources than you can use. There is no incentive for any kind of conservation. Nature behaves in the same way at the beginning. If you put some few organisms in a new pond, they grow like mad and they use up everything they can. When they encounter limits, they start conserving, using energy efficiently, and recycling vital materials, and this signifies the beginning of the mature or second stage of development. So, it's simply that the U.S. is just beginning to enter the phase of being a mature society which has to put more and more of its energy and economics into maintenance, planning, and growth in quality, and less into promoting sheer growth in size. The commonly heard argument about growth vs. no-growth is not very rewarding. A better subject for discussion would involve by what means do we make the transition from haphazard growth to differentiated growth that maintains quality and equity. Or, to put it in the developmental context, how to make the transition from pioneer to mature stage—a transition that must involve serious planning because society, unlike most natural systems, is so highly charged, energy-wise, that it will tend to overshoot bounds rather than adjust naturally to them unless overshoot is anticipated and strong negative feedback control instigated well before the crisis.

The Colorado Front Range is a good example of how quickly attitudes can change in a region. A decade ago no political leader in Colorado would dare mention the phrase "land-use planning" if he expected to remain in office. But after 10 years of haphazard mushroom growth, air and water pollution, loss of agricultural land, threatened water shortages, and the prospect of losing the highly valued "western lifestyle," the Governor of Colorado now has enough public backing at least to establish a State planning commission, even though it, as yet, has no power. So a start is made. In New England, of course, this shift in attitude

occurred earlier, so it's fairly safe to talk about environmental planning in that region. I predict at least a start on this will be made at the national level sometime in the 1980's.

Q What is a good example in Europe where land use planning seems to work?

A Well, England, and the Low Countries (Belgium, Luxembourg, and the Netherlands) are good examples. There is an established tradition in these countries for preserving villages, for keeping cities livable, for providing green belts and parks in urban centers, and so on. People are already adapting to living in the steady state in the sense that they are not bucking for huge increases in population or on the laying down of endless concrete. We should not only profit from European experience, but also get a little ahead of the job because the transition in Europe didn't start soon enough to avoid some environmental stress. I believe Americans can now begin to realize that planning is good business and not something that's radical or un-American, and that the public good and the private good now have to be matched.

Q Do you see any big gaps in the American public's understanding of the natural environment and its importance?

A Yes. The big gap is that the public, as well as many technologists, does not understand that very large areas of natural systems and agricultural systems are necessary to provide the life-support for high-energy urban-industrial systems. Too often environmental problems are looked upon as cases to solve one at a time or after the fact. We must move rapidly from looking only at impacts on trees, as it were, to looking at the forest as a whole. The theory that the whole is more than the sum of the parts is not only an ecological paradigm, but common sense wisdom as well. Everybody knows it's true, but scientists, technologists, and bureaucrats, in

general, do not practice it because they are so wedded to the reductionist approach and laboratory science that they miss the real world, which is not made up of uncoordinated pieces and cannot be studied in a laboratory.

Q I thought they were starting down that road in cleaning up the Great Lakes.

A Yes, this is a good example where dealing with the whole watershed system does pay off; in fact it's the only approach that will work. It's just that we shouldn't wait until things get so bad before we act. The fact that the Great Lakes proved to be a remarkably well-buffered system, able to take a great deal of stress and then recover when given half a chance, is in itself proof of the tremendous resilience of the natural environment.

Q Related to this, why should the average citizen take the trouble to know anything about ecology and natural systems?

A That's the beauty of it. When you come to looking at the whole, the public already knows a lot. I once wrote an article called "Common Sense Ecology," which points out that most all the basic principles of ecology can be expressed in age-old common sense wisdom. For example, the energy laws, as they apply to man and nature, can be expressed in a simple common sense statement: "Haste makes waste." When you've got lots of cheap energy (as we had for a short period in this century), you haste and you waste. But when supplies get short and expensive, you'd better stop hasting in order to stop wasting. For example, we don't need to rush into panicky energy development programs that cost billions if we stop wasting the already available energy. The new sources will come in time. Atomic energy, for example, needs more time for removing the flaws. It's not ready now. The public can un-

derstand this. Another common sense dictum related to ecological concepts is: "Don't put all your eggs in one basket." It's dangerous to depend only on automobiles for transportation. It's dangerous to depend only on one strain of corn for the entire agriculture. Monoculture, in general, invites boom-and-bust and that's not hard to understand; you don't have to be a technologist to understand that some reasonable amount of diversity and choice is desirable. It is simply that our obsession with fancy technology has blinded us to the overall truth about life, the truths then transcend all that is artificial and superficial.

Q In terms of meeting the energy needs of this country, I gather that you see conservation as first priority.

A Yes, but I just wrote an article called "There Is Some Good News About Energy" which suggests that "conservation" is the wrong word to use. It puts people down. When you say "conservation" the man on the street says, "Well, you mean I gotta do without." Professionals define conservation to mean "wise use of resources" but to the public it means, "do without." So, I believe we should talk about "energy thrift" instead of energy conservation—that is, reducing waste and becoming more efficient. "Get more dollars out of a BTU" would be a good slogan for a national goal. If we do this we won't have to do without anything that is really important. The U.S. gets only half the money (GNP) out of a unit of energy as does West Germany and Japan. We can become more efficient and easily reduce per capita consumption from the present highly inflated level and thereby reduce the need to import energy, and at the same time have a strong economy, less inflation, and a better environment since reducing waste reduces pollution. All this is well documented in the recently released landmark National Academy of Sciences study titled "Energy in Transition," soon to be available in paperback.

Let's take gasohol. I believe anyone can see that in the long run making alcohol out of high-grade food is inefficient. Food is too valuable to burn! It's like throwing your furniture in the fire to warm your house temporarily, knowing you are going to need that furniture for other purposes later. Now if alcohol can be made from waste agriculture or forest products then it can contribute to stretching petroleum. Converting corn grown with a high expenditure of fossil fuel is obviously a short-term political expedient that offers no lasting solution since you are in effect using up more high quality energy than you gain. And this is an important principle—there must be a net energy gain or the process will not survive in either man's or nature's realm. These are not difficult principles to talk about. It's simply that energy source minus energy used to convert it must be a positive number. It doesn't require knowledge of all kinds of little animals or details of biology or details of physics to comprehend this. The holistic part of ecology is, in this context, easy, perhaps 3rd or 4th grade level. And I'm pleased to see that EPA is moving to put more holistic principles into practice; just recently EPA's Washington office has issued a notice asking for proposals from universities for establishing an "Ecosystem Research Center."

Q During Earth Day 10 years ago some scientists voiced the fear that we were an endangered species. Is there greater optimism about us and the environment today? Are you optimistic?

A I'm more optimistic because of progress we've talked about and the changes in public attitudes that are evident. The short term dangers such as nuclear war, climate changes, and the like are very serious, of course. And I think waste-prone civilization is already endangered and will gradually be replaced by more efficient and prudent societies. In the last decade, authors and learned committees who write speculative books about the future have attracted much at-

ention. These range from Herman Kahn who promotes a glorious future for everybody to Edward Goldschmidt who says the world is already overcrowded and must depopulate. The series of "Club of Rome" reports issued over the past 10 years is, I believe, the most interesting and thoughtful analysis of the "predicament of man." The first report entitled, "The Limits to Growth" had a tremendous impact. There was much hand-wringing, denying, and misinterpretation, but it was really intended to show what might happen if we didn't make some changes, and not a prediction of doom as such. The later Club of Rome reports have tried to answer the question, "How can we prevent the boom and the bust?" What kind of procedures? How can we plan a little or create a mood to plan on a global level?

Q What do we need to do to insure that civilization will survive?

A The latest Club of Rome report, prepared by social scientists and philosophers, is called "The Human Gap." It simply points out that the greatest threat worldwide is the widening gap between rich and poor. The deleterious environmental and social effect of this widening gap is tremendous and very frightening. Democracy cannot work if the rich-poor gap is very large—Iran is a good example—because the masses of people, if poor, will not vote for a democratic government. They want a dictator to redistribute the wealth down to them. It's a direct challenge to the widespread Western belief that wealth will trickle down and that technology will eliminate every limit in nature. Intense, energy-consuming civilization can only exist if we maintain the quality of the oceans, the air, and the masses of the natural vegetation like tropical forests since these are the buffers, sinks, and recyclers that keep things orderly despite the disorder that is inherent in man-made creations. There are no known technological substitutes of these life-supporting "goods"

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The environmental movement is democracy at work. It was born at the grassroots and it continues to find its nourishment and inspiration there, from the neighborhoods, the town hall, the urban park and scenic countryside.

Here EPA Journal profiles 28 individuals—environmental citizens they might be called. They have two things in common: they are concerned about the environment, often for very personal reasons such as health or love of nature. And they have used the democratic process to get results, frequently with surprising success.

Otherwise these citizens have diverse interests. They are from many walks of life and sections of the country.

It is people like these who have made the environmental cause a powerful force. They have made a healthy environment an increasingly important American value since the first Earth Day.

Many of these individuals became environmentally concerned during Earth Day, 1970. A few have since been named to high environmental posts in government, responsible now for finding answers to questions they may once have raised.

Some of these environmentalists are innovators—conceiving of new laws, new cleanup techniques. Others have become expert at making the law work, prodding, researching, testifying. Some have taken lonely stands, insisting on action when others questioned whether there was even a problem.

In this feature EPA Journal reports on a sampling of these environmentalists, with the help of writers and researchers in EPA Regional Offices, and sometimes interviews with the citizens themselves. The Journal's purpose is to show how an individual or group can have a significant impact on the environment. The experiences of these people who undertook the challenging job of trying to protect their environment may help inspire others.

Environmental Citizens

Hattie Carthan under a Magnolia tree she saved. (see page 22)

Mountain Monitor

While environmental activists are rarely paid for their work, few knowingly endure financial hardship in order to participate in environmental activities.

One of these rarities is Rick Webb, who is project coordinator for the Mountain Stream Monitors, a citizen water quality monitoring project



in West Virginia. Normally a construction worker and part-time farmer in central West Virginia, Webb found that he could not continue his regular work and lead the monitoring program at the same time.

"Since I've started Mountain Stream Monitors, my other jobs have gone on hold," says Webb. "I get a small salary as head of the project, but it is really only a part-time salary for full-time work. The result is that my family and I live in a half-built house.

"Mountain Stream Monitors was formed because we have seen how coal mining has degraded water quality in other parts of West Virginia, and we wanted to make sure the same thing didn't happen here."

"We're not against mining. We only want it done in an environmentally acceptable manner. If we fail to control acid mine drainage at the start, the result is perpetual acid drainage and a perpetual problem."

One of the major problems, Webb felt, was a lack of accurate data on the effects of mine drainage on water quality. "A centralized agency like the State Water Resources Administration cannot efficiently collect the data," says Webb, "but

citizens living around the State can do the job."

Webb and other interested persons sold the idea of the monitoring program to both the State and to EPA. In order to help them get started, EPA awarded a grant for the project to purchase water monitoring and analytical equipment. Further grants have helped defray some of the administrative costs of the project.

Work started on the Little Birch watershed in central West Virginia. Volunteers took water samples from 50 locations along the stream. The samples were used to identify areas of high pollution, which were further investigated in order to locate exact sources of mine drainage. Volunteer monitors then undertook long-term sampling at permanent locations near the pollution sources. A similar procedure has been used on the Little Kunawha, the Salt Lick, the Elk and the Gauley Rivers.

"The results of our work are turned over to the State," says Webb. "The data have been used to support Section 208 (of the Clean Water Act) water quality management planning, the issuance of discharge permits, and management of the Federal Surface Mining Act.

"Our goal is to insure that any official decision which will result in environmental harm will be made with full public understanding of the consequences."

According to Webb, the monitoring data have been instrumental in ending or preventing pollution on several occasions.

When asked why he does it, Webb replies, "I believe citizens should take a stewardship role in protecting the environment."

The results suggest that for West Virginia streams Webb might well be one of the chief stewards.



A Citizen's Grit

For people living on an island near Portland, Ore., air pollution from the nearby Carborundum plant had always been a nuisance. Airborne grit would accumulate on window sills and porches, and would be tracked onto rugs inside the mobile homes where most of the island residents live. On Hayden Island, in the Columbia River between Vancouver, Wash., and Portland, pollution from the plant was something you just had to live with. No one liked the situation, but no one—or so it would seem—was willing to do anything about it.

That all changed when one Hayden Island resident, Mrs. Douglas Kemper, thought to herself, "If the air pollution is dirtying my porch and my rugs, what is it doing to me?"

From that moment on, Kemper became an environmental activist.

It was a role for which Kemper had no preparation. She was not a member of any environmental group, she had no experience with citizen activism, and she didn't even know which agencies enforced pollution control regulations. As one government air pollution compliance officer later remarked about her, "You couldn't have found anyone who knew less about it than she did."

All Kemper knew was that it seemed wrong that her fellow residents of the Hayden Island mobile home park and people using the adjacent pleasure boat marina should have to endure the fallout of particulate matter from the Carborundum plant.

One problem Kemper had to overcome was that she and the other people on Hayden Island lived in Oregon, but the Carborundum plant was in Vancouver, on the Washington side of the Columbia River. Thus, the source of the problem in one State was harming people in another State.

After learning all she could about the situation—familiarizing herself with applicable laws and regulations, studying ambient air quality data, reading about emission control tech-

nology, and reviewing pollution control work already undertaken by the Carborundum factory's management—she played a major role in setting up a series of productive meetings with the Kennecott Corporation, the owner and operator of the Carborundum plant, and State and local air pollution control agencies on both sides of the Columbia.

By now people were listening to Kemper. She had not only done her homework, she also demonstrated to Kennecott and to the government agencies that she had the support of more than 800 other persons who had signed a petition she had circulated. The petition prompted the Oregon Department of Environmental Quality to offer comments on clean-air strategies being developed by the neighboring State of Washington for control of air pollution in the Vancouver area.

Kemper's efforts helped spur a recent announcement by Kennecott Corporation that it will spend \$8 million to control particulate emissions from the plant in Vancouver.

Kemper was right: pollution is something you don't have to live with.

Clearing a Way



In recent years there has been a growing awareness that in many instances people can make more progress by working with nature instead of trying to completely master natural forces.

An example is the work of George R. Palmiter, who last

year received a \$10,000 Rockefeller public-service award for his long-standing and successful demonstration of how some rivers clogged with debris and subject to damaging floods can be controlled without being destroyed.

Palmiter, a 50-year-old railroad brakeman, hunter, and fisherman who lives in Montpelier, Ohio, began to experiment with his technique on northwestern Ohio's St. Joseph River during a duck-hunting trip in 1959. The river, he recalls, was so jammed with trees that had fallen into it that he could not get his canoe through. He began carrying a bow saw with him to clear passages, and in the following years he noted that the river had begun to enlarge the cuts he had made.

In 1971 the St. Joseph and the neighboring Tiffin River became plugged with fallen elms killed by the Dutch elm disease. With a group of canoeists and hunters he had organized, Mr. Palmiter opened the worst jams on the St. Joseph, and in 1975 persuaded local officials to try his approach on stretches totaling 80 miles along both streams.

Stream channelization was the alternative, an expensive process of straightening and deepening streams with heavy equipment. The process often turns into little more than a sterile ditch a stream abounding with fish and providing habitat for a wide variety of life in woods and shrubbery along its banks.

With an \$80,000 grant from Federal Soil Conservation Service funds, Palmiter hired 44 unemployed workers and completed the job. The rivers were still in their natural, meandering state, and the farmers along the flood plains, as well as fishermen and hunters, were happy.

Palmiter's method of flood control costs about \$1,000 a mile; stream channelization can cost 100 times that.

The success of the St. Joseph-Tiffin project resulted in Palmiter's supervising a

similar cleanup of 53 miles of Ohio's Blanchard, the river that inspired the nostalgic song, "Down by the Old Mill Stream." That effort was paid for with a \$32,000 Federal grant (Comprehensive Employment Training Act), and the workers included 16 high school dropouts.

Getting Results

EPA Region 5 officially recognized David Comey's work in 1974 when he was given the First Annual Environmental Quality Award "for services that have immeasurably improved the design and safety review of nuclear reactors." At that point he had been active in the environmental movement for six years. In 1968 Comey had assumed leadership of a New York group, the Citizens Committee to Save Cayuga Lake. The organization was founded to deal with the proposed siting of a nuclear reactor on the lake by New York State Electric and Gas.

Comey's first maneuver as chairman gave a glimpse into his creative and aggressive way of dealing with his "opposition." Comey located the children of the power company's board of directors by searching through the attendance rosters at all the prestigious eastern prep schools. He began meeting with them, furnishing them with reports on the possible environmental problems that could be created by siting a power plant on the beautiful Cayuga Lake. An army of convinced environmentalists arrived home for Christmas, Comey got a meeting with the board directly, and within two months the utility withdrew its application.

New York State Electric and Gas revived the plan ten years later but quickly abandoned Cayuga Lake as a possible site when Comey threatened to

move back east. He had moved to Chicago in 1970. Comey became Director of Environmental Research at Businessmen for the Public Interest, a Chicago public interest law firm. In this position he assembled a crew of summertime students of law, science, medicine, and engineering who collected data on scores of major Lake Michigan polluters. The resulting reports led the way to a toughening of the discharge permits that were just beginning to be issued by EPA. He also began to focus on toxic substances, a subject which appeared on the agenda of other organizations years later. Comey always seemed to be asking the important questions about issues long before they were considered by environmental decision-makers. His early concern for the still unresolved question of nuclear waste disposal testifies to this foresight.

Throughout his environmental career Comey remained concerned and active in the nuclear power controversy. He zeroed in on nuclear safety, emergency core cooling systems, pipe welds, etc. Comey's next target was the permissible level of radioactive discharge; then waste disposal; and finally the jugular vein of the industry—the cost effectiveness of nuclear power compared to conventional power plants.

He was chairman of EPA's Carcinogen Policy Work Group, and he served on many key government scientific advisory panels.

On Jan. 5, 1979, Comey was driving on icy roads in Wisconsin. He accidentally swerved into another lane of traffic and met an untimely death at age 44. As his eulogy stated, "We are all saying David will be missed. We are all understating."



Noise Concern

Frank Sordyl's involvement in the war against noise pollution was prompted by an extreme, personal irritation. Soon after he moved into his home in suburban Maryland, he found that he was living under the flight path for aircraft using Washington National Airport. The disruptions caused by the air traffic made it difficult for him either to enjoy the stereo system that he built himself or to relax and watch television. Furthermore, his job as a biologist at the National Institutes of Health required that he keep up with current literature in his field, and he found it virtually impossible to concentrate on his reading because of the bothersome noise.

Aside from the personal aggravation caused by the overflights, Sordyl was also aware of the harmful effects excessive noise can have on humans. These concerns moved him to action. Because Maryland did not have a citizen's organization of its own, he started working with a group called Virginians for Dulles, which, among other things, pushed for a more evenly divided use of the two major airports in the Washington, D.C. area.

Sordyl also began to realize the need for a Maryland organization that would demonstrate the concern of its residents on this issue and could quickly respond to pronouncements made by the Federal Aviation Administration and area officials. Acting as one of the prime movers in the development of just such a volunteer organization, he was instrumental in forming Maryland Citizens Concerned About Aircraft Noise.

While working on the formation of the volunteer group, Sordyl's vision of the enormity of the noise problem expanded. In essence, what he initially saw as only a personal problem at the local level suddenly became everyone's problem at the national level. No longer was it solely aircraft that disturbed him, but everything infringing upon peace and quiet. There was, as he saw it, a need for a national citizens' organization

devoted to the protection of all Americans from excessive noise.

A major breakthrough came in May, 1979, at the Community Noise Symposium in Washington, D.C., which was sponsored by the National Information Center for Quiet. The symposium brought together people from all over the country who were involved in public efforts to reduce noise levels. Together with these concerned citizens, Sordyl formed an ad hoc committee charged with the mission of organizing a national volunteer organization against noise. As chairman of that committee, he immediately began to develop the structure of such a group and in August the National Alliance for Quieter Communities was incorporated and he was named Treasurer.

Although Frank Sordyl has not yet been successful in curtailing the aircraft traffic over his Maryland home, he still believes that his volunteer efforts have had a significant effect on his personal growth and development. He remarks, "I used to view myself as somewhat of an introvert who was uncomfortable dealing with large numbers of people. My involvement with noise control groups has made me more assertive, more confident that I have something of substance to contribute."

After he retires from the National Institutes of Health in the spring of 1980, he says he plans to devote his full time to volunteer work. His immediate concern will be to arrange the first conference for the National Alliance for Quieter Communities. Always the fighter against what he calls the "What can I do alone?" syndrome, Frank Sordyl will continue to spend as much time and energy as needed to motivate people to protest excessive and unnecessary noise.

Defending a River

In the early 1960's, the press called her "the fiery housewife from Micanopy." An associate says, "She has turned arm-twisting into an art form." The "she" referred to is Marjorie Carr, a defender of the environment and champion of free-flowing streams. Largely through her efforts, the Cross Florida Barge Canal, called the "wicked ditch" by some, is discredited and about to be abandoned. Work on the canal was stopped in 1971 when President Nixon ordered a complete halt to canal construction, saying the free-flowing Oklawaha River would be irreparably damaged and the canal lacked economic justification. The Florida legislature voted in May, 1979, to terminate the project. The U.S. Congress has before it a bill to deauthorize the barge canal. Approval of the measure would mark the end of a long, hard-fought battle begun by Carr in 1962. The canal—nearly one-third complete—would be dismantled and the Oklawaha restored and made a part of the National Wild and Scenic Rivers System.

It all began at an Audubon Society meeting in Gainesville in November, 1962. A speaker from the Florida Game and Fresh Water Fish Commission was discussing the route of the proposed canal. It was the first time Carr had heard that the beautiful Oklawaha lay right in the canal's path.

Immediately, she sent a letter to the U.S. Army Corps of Engineers. The reply declared her fears were groundless—that the river would "be left intact except the part between Sharpes Ferry and Rodman Dam."

"It was like saying that one is just going to cut off the rooster's tail—right behind the head," Carr said. "That 45-mile stretch was the heart of the river."

Moving quickly, Carr organized a "Save the Oklawaha" group within the Alachua County Audubon Society. The members copied maps of the canal route and mailed them

throughout the State of Florida. They wrote their Congressmen and State officials.

The only thought at first was to reroute the canal and save the river. But an examination of the Corp's predicted cost-benefit ratios prompted the group to attack on other fronts.

"The more we looked," Carr said, "the more we knew that the canal would not be justified from an economic or any other standpoint."

The movement grew. At a public hearing in Tallahassee in 1966 more than 350 persons representing every major environmental organization in the Nation were on hand. And, perhaps the first time in Florida conservation history, people from the Florida Keys were talking to persons from the Panhandle and discussing the formation of a united front.

By now, however, the dredges were chewing their way up the Oklawaha Valley. The Rodman Dam closed on a 15-mile stretch of the river and great trees which had been washed into the muck of the valley popped to the surface. Others left standing in water began to die. Water weeds spread over the stagnant, rising pool. These scenes of environmental destruction were relayed to the people of Florida by the news media and public opinion clearly was on the side of the canal opponents.

By this time Carr and her colleagues had drawn support from the Environmental Defense Fund. The EDF filed suit in Federal court charging the Army Engineers with violating the constitutional rights of the people of the United States by destruction of natural resources.

Others would ally themselves with Carr and her successful cause.

Marjorie Carr would be the first to say she didn't do it all. But she was the catalyst. She put together the Florida Defenders of the Environment (FDE) in 1969, a volunteer organization that has prepared and presented hundreds of spe-

cial reports on the barge canal project. It was she who brought together scientists and environmental experts from Florida and the rest of the Nation to successfully combat the canal. Soon, it is hoped, the Oklawaha once again will run free. But Marjorie Carr can't relax. Other rivers—the Apalachicola, the Withlacoochee, and the Suwannee—all need her help.

Grassroots Clout

One of the biggest events in Oregon in the 1970's was the State's enactment of the "bottle bill," and when Oregonians began looking around for someone to congratulate for the accomplishment, one man didn't want to accept any credit. He was Rich Chambers, the Salem businessman generally acknowledged to be the person who in 1968 first advanced the idea of requiring deposits on all beverage containers.

"I am in no way qualified for such an award," Chambers declared when he learned he was being considered for public recognition. "Don Waggoner . . . should receive primary consideration."

It was more than modesty that prompted Chambers to recommend Waggoner for Oregon's highest award for environmental achievement.

Don Waggoner, as the president of the Oregon Environmental Council, was responsible—said Chambers—for organizing grassroots support and providing "bottle bill" advocates with the ammunition needed to get the measure enacted into law. Waggoner had organized a well-documented litter survey that showed most of Oregon's roadside trash was made up of beverage cans and bottles. Those findings were more convincing to State legislators than the testimony of bottlers and representatives of the container industry who had descended on the State Capitol to argue against the legislation.

Observers who closely followed the situation can say that Waggoner's litter survey was the turning point in securing

In each of these areas, a uniform research approach is being pursued. Sources of causes of these problems are being investigated to see how pollutants interact with the Bay's ecosystem. Systems are being set up for collecting, measuring, and managing various types of environmental and other related data. Finally, control methods and alternatives for correcting the problems are being investigated.

Providing the framework for the optimum use of research results is the Environmental Quality Management Study. For each of the three technical problem areas, it is describing the management network currently in place on the Bay. That is, the roles and responsibilities of government agencies in the management of submerged aquatic vegetation, nutrients, and toxics are being defined. Later the Bay management agencies will be reviewed and catalogued, and the effectiveness of existing Bay management mechanisms will be analyzed. The



The great blue heron is one of many wild creatures who find refuge in the marshes of the Chesapeake Bay.

effort is to assure that all the related components of the Bay Program work together smoothly and efficiently to achieve the objective of a better Bay. The management program includes tasks to support and refine the existing management strategies and to analyze alternative scenarios for Bay management.

Another aspect deals with public participation. The Program has several organizations under contract to raise the level of public awareness about the Bay, to increase public understanding, and to involve the public in the Program.

The EPA has awarded grants to Maryland, Virginia, and Pennsylvania for program coordination and management. The States participate in the Program's decision-making and provide staff support on working groups that develop technical work plans.

Vanishing Underwater Plants

The decline of submerged aquatic vegetation is a principal area of concern because so many species depend on these plants for food and shelter. Not only do young striped

bass and shad make use of the vegetation for their habitat, but also the famed blue crab needs the shelter when it is molting and vulnerable to predators. Beds of submerged grasses are a significant source of food for waterfowl, shrimp, and fish, and also play an important role in reducing wave action and the speed of currents, allowing sediments to settle out of the water.

The Chesapeake Bay Program has a number of institutions under contract to look at different aspects of the aquatic plant problem. The Virginia Institute of Marine Science and the American University, for example, are gathering information for an inventory of the vegetation throughout the Bay.

Johns Hopkins University is charting the life cycles of vegetation over the past few centuries, using core samples from the Bay bottom. The purpose is to find any changes in the cycles that may be linked to human activities.

The Virginia Institute of Marine Science is also under contract to look at the role of eelgrass, an important factor in the ecology of bluefish, sea trout, weakfish, and the species they prey upon. In another project, it is examining some aspects that deal with the planting of new eelgrass beds.

Are toxic herbicides contributing to the problem of disappearing underwater aquatic vegetation? The Center for Environmental and Estuarine Studies of the University of Maryland is trying to find the answer under another EPA contract. Part of the study is to learn about the pathways and mechanisms by which herbicides and sediments travel through the Bay. Finally, the Migratory Bird and Habitat Research Laboratory of the U.S. Fish and Wildlife Service has the task of pulling together the data from these and other studies to find the relationship of the underwater plants to migratory water fowl, and to present a broad picture of the vegetation, trends in its distribution, and causes for its decline.

Excessive Nutrient Enrichment

The process of nutrient enrichment, frequently called eutrophication, is a natural process by which nutrients are supplied to bodies of water. However, excessive quantities of plant-nutrient minerals, especially phosphorus and nitrogen, have been entering the Bay from a variety of sources. Enriched by these minerals, algae thrive in a number of areas, but when they die, they rob the water of dissolved oxygen necessary for the survival of other marine life. Green scum floating on the surface of the water is one symptom, and massive fish kills can also result. Low levels of dissolved oxygen have been observed in certain parts of the Bay and its tributaries, notably the Potomac River.

Scientists are now studying historical

data to identify trends in the Bay's water quality and how the problem relates to an estuarine system. They also are gathering data to provide a clear picture of current eutrophic conditions there. From this body of information and from projections of population growth and urban, rural, and industrial development, researchers expect to correlate nutrient loads with water quality conditions. If so many acres of land are to be developed in a given area, for example, what changes can be expected? What will this do to the Chesapeake?

The answers will be the tools that the public and government officials will need to make informed decisions affecting the future of the Bay—not only in its water quality but in the economic and social future of the region. Among those institutions under contract to examine the eutrophication problem are the Chesapeake Research Consortium, looking into historical data and defining needs for future research on the Bay; the Maryland Department of Natural Resources, evaluating available tools for predicting eutrophication and comparing costs and accuracy of various models; the Virginia State Water Control Board, engaged in similar work in its area; and the Hampton Institute, evaluating water quality by means of a helicopter-borne sampling system and correlating measurements with observations made by Landsat satellite.

Toxic Chemicals

Some substances such as trace metals occur normally in nature, but the vast majority of toxic substances are by-products of industrialized society. Many pesticides, herbicides, chemicals in industrial waste streams, organic chemicals, and petroleum-based products are all potentially toxic.

These toxic chemicals enter the Bay the same way nutrients do, from either point sources such as industrial discharges, spills from vessels and shoreline storage facilities, or from non-point sources such as farmland and paved area runoff or atmospheric fallout.

Research is focused on obtaining information about the sources, pathways, and final destination of toxic substances in the estuary. From such studies, strategies can be designed to reduce the environmental hazards and protect the health of the Bay.

Among the approaches to the problem, scientists will use an inventory of industrial sources of toxicants to identify compounds and test their potential for being absorbed by Bay organisms. The Virginia Institute of Marine Science under one contract will identify toxics in sediments and oysters at various sites. (Where oysters aren't found, they'll substitute the brackish water clam.)

Three particular areas stand out as monuments to Wayburn's efforts:

1. California's Redwood National Park. Wayburn initiated the effort to gain national protection for California's coastal redwoods (*Sequoia sempervirens*) in the early 1960's and fought for the establishment (in 1968) of and the enlargement (in 1978) of the Redwood National Park.

2. California's Golden Gate National Recreation Area. This 110,000-acre urban park began as a Wayburn dream in the late 1940's. For more than 25 years he worked to guarantee the protection of the Marin Headlands, Mt. Tamalpais State Park, the Point Reyes seashore, and ultimately the 110,000 acres which start in San Francisco and stretch northward to form one of the country's finest urban parklands. Wayburn, as much as any individual, was responsible for the establishment of the Golden Gate National Recreation Area.

3. Alaska's Federal lands. Wayburn initiated the conservationists' efforts to guarantee protection for some of Alaska's most magnificent wild lands and wild animal populations. Following Administration action, Congress is now making final the extent to which Federal land in Alaska will be protected for the public. Wayburn is continuing to spearhead the drive to achieve maximum protection for this significant national treasure.

It was during a wilderness hike in the Sierra Mountains in 1946 that he became aware of "meadows eroding, trails deepening, shorter grass and garbage pits—a frightening change from pre-war trips."

Awareness and a profound concern for future threats to the Nation's shrinking open spaces led him to volunteer leadership in environmental causes.

He started in 1953 as president of the Federation of Western Outdoor Clubs and has chaired or headed nearly a dozen major conservation organizations or causes since then.

Pioneers in Recycling

Ten years ago, when Cliff and Mary Humphrey started one of the Nation's first citizens' recycling centers in Modesto, California, they were pioneers. What started out as a drop-off yard has grown into a two-acre site handling over 400 tons of recovered materials each month.

But the road to resource recovery has been difficult. Aside from a few Federal and State grants and some publicly-financed employees, Humphrey's Ecology Action recycling center has been operating on donations and volunteer labor. And persistence.

"We are beginning to make a dent in the throw-away philosophy, but there is still less recycling in the country now than there was 35 years ago during WWII," comments Cliff Humphrey. "It hasn't been easy to hang in there for these past ten years, but markets are now opening up. The wine bottle washing plant of Encore (Environmental Container Reuse) in Berkeley is a good sign, as are the plants that make insulation from recycled newspaper."

The official name of Humphrey's organization is the Ecology Action Educational Institute, a non-profit, educational corporation. The Institute's major project is the operation of their multi-faceted recycling service in Stanislaus County. Ecology Action was one of the first groups in the country to initiate the recycling of separated domestic items such as bottles, cans and newspapers. In ten years of operation, Ecology Action has recovered over 20,000 tons of recyclables at a market value of \$750,000.

The Humphreys first began their recycling efforts in Berkeley in 1968, with a Saturday drop-off yard program. When they moved to Modesto in 1970, they set up a 24-hour drop-off yard, and soon after developed ten drop-offs at supermarkets throughout Modesto. (A drop-off is where people can leave materials to be recycled.)

When it appeared that Ecol-

ogy Action had reached a participation plateau, Cliff Humphrey and his staff decided to experiment with curbside collection in hopes of increased participation.

Ecology Action assured the public through an annual door-to-door campaign and city-wide mailing that collection vehicles would come by their houses on a certain day. This technique has proven very effective. Ecology Action also sponsors various events—a bikathon, canoe races, and picnics—both for publicity and to raise funds for the recycling project.

Over the last ten years, Ecology Action has received approximately \$70,000 in donations from the community. Over the same period of time, they have received two environmental education grants from the Department of Health, Education, and Welfare, and one EPA implementation grant totaling \$80,000. Before they received the \$100,000 grant this year from the State of California, Ecology Action was operating on a \$20,000 emergency grant from the City of Modesto (the first of that sort) as well as donations from a community fund-raising campaign.

There is an air of optimism from Ecology Action's recycling center, although the hard work and dedication are still needed. For Cliff and Mary Humphrey and the Ecology Action staff, the rewards of running the recycling center—sticking with it for ten years—have been tremendous. It is still functioning, and growing in terms of the quantity being recycled. This growth is attributable to Cliff Humphrey's persistence, and the public's acceptance. For many citizens of Modesto, recycling has become a part of their lifestyle.

Cliff Humphrey is also working as a consultant for the city of San Francisco on an implementation plan and pilot project for recycling. His interests in future recycling include the return of the organic part of solid waste to the land and the reuse of construction and demolition debris.

Volunteer Lobbyist



When the Washington Environmental Council last year acclaimed Tom Wimmer as the State's "environmentalist of the decade," the Council could just as easily have cited him as being the "environmentalist of the last quarter century." It was at least 25 years ago that Wimmer, a Seattle businessman and an avid sports fisherman, began working as a citizen activist to improve the State of Washington's ability to clean up water pollution and protect water quality.

Today, in 1980, people in Washington are still enjoying the benefits of the work started by Tom Wimmer in the 1950's.

Success was slow in coming. One of his first campaigns—to block Tacoma City Light's plans to dam the Cowlitz River for hydroelectric power—was unsuccessful. But his work drew recognition and, more importantly, converts to the cause of conservation.

In 1955, as chairman of the pollution committee of the Washington State Sportsmen's Council, Wimmer helped draft a bill that would amend existing State pollution laws. The bill was the work of Wimmer and two or three other individuals who wanted some answers.

"We just wanted to clarify what pollution was, and asked for a permit for anyone discharging pollution into the water," Wimmer recalls. "And we wanted to define 'pollution.' What was it? . . . We wanted to define the term."

The bill emerged from the Legislature in the State Capitol in Olympia as a statute that

required, for the first time, permits from anyone discharging pollutants into the waters of the State.

After that early triumph, Wimmer devoted increasingly more time to being a volunteer lobbyist in Olympia. Throughout the 1960's and into the 1970's Wimmer was responsible—probably as much as any single person—for passage of bond issues, statutes, and initiatives that have given Washington its strong foundation of environmental law to deal with preservation of water quality. One statewide initiative allowed taking unreclaimed gasoline taxes to purchase marine shorelands for public use. Two bond issues were passed for construction of water pollution control facilities. Statutes were enacted that set unlimited liability for oil spills, that created a water resource management program, and set up funding for the wildlife management of non-game species. The Legislature enacted the Water Resources Management Act of 1971, the State's Forest Practices Act, the Marine Mammal Protection Act, and the State Wild and Scenic Rivers Act.

In the early 1970's, Wimmer—who in 1968 had become a founder and the first president of the Washington Environmental Council—provided the push that led to the enactment of the Shoreline Management Act as the result of a State-wide initiative in 1972. Regarded by environmentalists as one of the achievements of which they are most proud, the Shoreline Management Act set up State guidelines for the development of shoreline property throughout the State.

Joan Thomas, the current president of the Washington Environmental Council, says this about Tom Wimmer: "The dedication of a man who got involved initially because he loves to fish for steelhead trout is an example that has inspired two generations of environmentalists in the State of Washington."

A City's Trees



Hattie Carthan describes herself as "just an old lady born with the century" but to the people of Bedford-Stuyvesant in Brooklyn she is a dream maker and a dream fulfiller.

In 1964 Carthan noticed her block of Vernon Avenue was deteriorating and decided to meet the challenge of revitalizing a neighborhood. She began her work by talking to her neighbors and forming a block association. Carthan's first plan to plant trees met with little enthusiasm but through perseverance her idea took hold. Then people on other blocks, witnessing the success of the Vernon Avenue Association, decided to organize. The spirit implemented by Hattie Carthan continued to mushroom and the Bedford-Stuyvesant Beautification Association was born. By 1970, there were close to one hundred block associations and the original planting of 12 trees grew to more than 1,500.

Carthan's love of trees grew out of a special affinity she holds for a forty-foot, 80-year-old Magnolia grandiflora which she watched blossom in spring, sprout cones in autumn, and grow gracefully old with her. Ten years ago a Model Cities project threatened to bulldoze Carthan's tree. Single-handedly this seventy-year-old woman decided progress did not mean destroying nature and so she fought to stop the large tractors from pushing it down. Carthan convinced the city that this magnolia, a rarity in the northeast, should be declared a landmark. The city concurred with Hattie Carthan and her tree still stands proud in Brooklyn.

"That magnolia stands high and mighty and beautiful for us, but I want children to love all trees," Carthan explains. In 1973 an environmental group named the Magnolia Tree Earth Center was incorporated as a non-profit organization. It came about through the determination and dedication of Hattie Carthan and her fellow Brooklyn dreamers. This group, consisting not of scientists or sociologists but of neighbors, has grown into an environmental force. The Center includes programs such as school talks on gardening and nature, after school activities for pre-teens and teenagers exploring natural resources through arts and crafts, senior citizen projects in container gardening, and a resource library with environmental exhibits. The Center provides job-training programs for people interested in the environmental field, summer job placement, and a career planning service. The fulfillment of Hattie Carthan's dream is also helping others to dream.

This spring the Magnolia Tree Earth Center will move into a new home. Three adjoining brownstones, which protect the Magnolia from the north wind, are being renovated to form one building which will house workshops, classrooms, exhibit halls, offices, and a library. The construction has been made possible by a \$250,000 Community Development Act III Grant. When work on the new center began Hattie Carthan said: "I'm in seventh heaven. I'm so gloriously happy."

Today interest in nature is being nurtured in the Bedford-Stuyvesant section because of Hattie Carthan's dream.



Prairie Camera



Patricia Duncan lives in Kansas City, Mo., near the Flint Hills, the largest remnant of American tallgrass prairie. She's within an easy drive of the Hills—an arrangement that gives comfort to those who love tallgrass country. Duncan can no more stay out of the prairies than can plovers and larks, and her camera is always with her.

"The Hills have become my studio. As an artist, I cannot help feeling personally responsible for their preservation and thus I have become involved, not only esthetically, but also scientifically, historically and politically," says Duncan.

Pat Duncan's photographs of the tall prairie are perhaps the finest ever made, wrote a recent reviewer of her work. They are the result of a lot of travel in the prairie in all weathers. She has defined and captured the racing cloud shadow, the depths of the grasses, the low orange light of evening and bright gold of early morning.

Her grandmother introduced her to the prairie when Duncan was a child visiting from Arkansas. It was the buffalo-grass-covered prairie of the Texas panhandle. "I never forgot grandmother's face, her voice, her house, and, most of all, her wide-open landscape," says Duncan in her recent book, "Tallgrass Prairie: The Inland Sea."

Now, "everything about the prairie is an event for me, and I seem compelled to soliloquize about the wonder of it. I'm always feeling my way along, detecting new bugs, new flowers, lizards, grasses, as if no one else had ever seen them. I

am an excited child on an Easter egg hunt."

In 1976 an assembly of Duncan's photographs entitled, "The Tallgrass Prairie: An American Landscape" began touring the United States as a major exhibition of the Smithsonian Institution, and is still on tour. Additionally, her works have appeared in books and national publications including Readers Digest Books/Life Nature Annual, and the New York Times.

In Duncan's recent book, she paints word pictures with the same skills and sensitivity she shows with the lens. Duncan spent five years living and traveling the last vestiges of the once mighty prairie empire to gather material for the book.

One of Duncan's convictions is that a tallgrass prairie national preserve should be created to permanently protect the Flint Hills. She appeared with her photographs on the NBC-TV Today show to make the case. A small group called "Save the Tallgrass Prairie, Inc." has for years worked for such a preserve.

The Flint Hills of eastern Kansas are the major survivor of tall prairie in America, an anachronism of rolling grassland about 50 miles wide and 200 miles long from north to south. It qualifies as genuine tallgrass prairie whose dominant grasses include big bluestem and Indian grass, and owes its survival to beds of flinty chert that lie too close to the surface to permit plowing. But for that, the Flint Hills would today be corn and wheat-fields instead of excellent rangeland.

With her camera and pen, Duncan is a personal ambassador, a lobbyist, a promoter, a seer of beauty for the prairie. Said Stewart Udall, former Secretary of the Interior: "Long ago America's mountains found their champion in John Muir. The sea found its interpreter much later in Rachel Carson. And now, *give thanks*, what some have called the *inland sea* has at last acquired its own authentic voice in the person of Patricia Duncan."

She studied photography for 4 years at the Kansas City Art

Institute and is a graduate of the School of Fine Arts at Washington University in St. Louis. She and her 20-year-old son Donald recently held a parent-son photographic exhibition. Pat Duncan's husband is an architect.

Duncan is not a trained ecologist. However, in her long association with prairie experts, she has learned. She relates the facts with simplicity and directness. She knows and loves the tallgrass prairie, and in so doing, communicates to hundreds of people the values of this natural treasure.

Pollution Patrol

For the past nine years, William Thomas Green has been patrolling several Baltimore streams looking for pollution. If he finds it, he makes a report to the appropriate State or local agency and then makes sure that officials follow up on his call. His advice is usually followed by the professionals.

"I get along well with the city people, and have gotten good cooperation from both them and the State Water Resources Administration," says Green, of Baltimore, Maryland. How has he managed to do this?

The answer appears to be that he understands the problems facing the officials responsible for pollution clean up. "The city water department (Baltimore's) is understaffed and underbudgeted," says Green. "They just don't have the manpower to monitor all the potential trouble spots."

Green's understanding of such problems is due, in part, to personal contact; his father worked for Baltimore's water department for 40 years.

Green explains that many years ago Baltimore built major sewer interceptor lines along several urban streams. Because of their age and overuse, the lines often overflow.

When city officials are unable to respond, Green tries to help. At least once a week in warm weather, and every other week in cold weather, he inspects the trouble areas along a three mile stretch of Herring Run, a stream near his home in

northeast Baltimore. He covers a shorter stretch of the stream several times a day while walking his dog.

Not content with just this, Green also skips lunch and looks for pollution along Stoney Run, a stream which flows near Johns Hopkins University where he is an electronics technician.

"Some of the areas are so wild, that they are almost inaccessible. Sometimes I've actually had to lead inspectors and repair crews to the proper place," says Green.

Both the city water department and the Baltimore County (where the interceptor originates) water department have tried to help. They have provided Green with detailed plans of their sewer systems so that he can pinpoint problem areas more easily.

Green's efforts have also been recognized in a more official manner. He has been a part of the mayor's Herring Run Advisory Committee since its start, and he has also been asked to join a special committee which will study Baltimore's water supply streams.

But more important to Green than the recognition is the actual cleanup that has been accomplished. "I have seen minnows and crayfish in Herring Run that weren't there before," he says. "Although there are still some problems, it's much better than some of the streams in the city which do not have people interested in them. They are grossly polluted."

What made Green start his anti-pollution patrols?

"To tell the truth," he says, "I just hate to see things abused."

Winning Cooperation

In 1977, Barry Kohl, Vice President of Orleans Audubon Society, discovered that a 110-acre tract of cypress-tupelo swamp had been surrounded with levees and was being drained by a pump belonging to Jefferson Parish, a south Louisiana county.

Parish officials ignored inquiries on the drainage sys-

tem, which was rapidly converting a valuable wetland to dry land marginally suitable for private development. Kohl sought volunteers from the Audubon Society and Fund for Animals, another environmental group, and formed a team with biological, legal, and political expertise.

This coalition, under Kohl's direction, discovered that the drainage system had been constructed by the Parish at about the same time that the owner of the tract had sold an adjacent piece of property to local elected officials. The group discovered that the work had also been done without required Federal permits.



With these facts, Kohl contacted EPA and the Army Corps of Engineers urging enforcement action. After the parish government defied Federal agency demands for restoration of the swamp to its natural state, Kohl successfully urged the Federal Government to initiate enforcement litigation against the parish.

He also convinced the Orleans Society and the Fund for Animals, groups which had historically opposed Corps of Engineers projects, to intervene in the suit to support the position of the Federal agencies.

During the course of the protracted litigation, Kohl communicated daily with Federal officials, advising them of new and relevant facts uncovered by his team.

This coordinated effort of the Federal Government and private public interest groups resulted in the first court-ordered restoration of a fresh water wetland and payment of

a \$20,000 civil penalty by Jefferson Parish.

This favorable legal result enjoyed great popular support, largely because Kohl had supplied the press with accurate factual information refuting local officials' claims of Federal harassment.

Environmental Achievement

Jackie Swigart, an outspoken environmentalist, became Kentucky's top environmental officer recently.

Gov. John Y. Brown Jr. named her Secretary of the State Department for Natural Resources and Environmental Protection, fulfilling a campaign promise to include a woman in his cabinet.

Mrs. Swigart moved into environmental projects as a professional only after years as a citizen activist.



She became an environmentalist as a housewife. She was active in the League of Women Voters, citizen representative on the Kentucky Air Pollution Control Commission, and an occasional project leader.

In 1969 she led a march against air pollution. She wore a sign around her neck and a gas mask on her face to symbolize the problem.

Now Swigart will run the regulatory agencies she addressed as a citizen in dozens of public hearings over the years.

"I've had a lot of people say it's nice to be able to say the system works—that someone

can come from a citizen background and be appointed to what is considered a high position," she said recently.

Swigart said that both she and Governor Brown intend to enforce environmental laws.

She noted that the legal framework to solve environmental problems—most of it handed down from the Federal level—is already in place.

The task, she said, is "for all of us—citizens, industry and elected officials—to work together to decide where the balance is between economic development and environmental protection."

Swigart became a professional environmentalist in 1974 with her work on a massive water-quality study for a four-county area.

Last year she completed the second phase of the study and began to coordinate plans for the counties to carry out the study's recommendations.

Those who have worked with Swigart over the years say she has the knowledge, skills, and patience to carry her end of the debate—not only on strip mining, a major environmental issue in Kentucky, but on the variety of other environmental issues likely to face Governor Brown. In the methodical tradition of the League of Women Voters, Swigart is known for her willingness to study issues in detail.

"She does her homework," said Oscar Gerald, a Lexington attorney and vice chairman of an advisory panel Swigart has headed. "All of us get stacks of reports and technical papers. But she actually reads them."

Her patience, exhibited in hours of work on environmental study panels, is almost legendary among industry, government, and citizen-group leaders.

Ken Hart, a coal-industry lobbyist and editor of *The Kentucky Coal Journal*, attests to Swigart's willingness to compromise. "I've sort of softened to her in the last three or four years," he said. "She seems to be pretty fair."

"I've got to overcome the fears of a lot of coal people

who don't know me," Swigart said. "I'm not out to shut down the coal industry."

"I suspect that environmentalists will be the group most disappointed with me. They expect a lot of me. I'm hoping that they've worked with me long enough to know how I think."

Swigart traces her concern for the environment to her childhood in Excelsior, Minn., where she was born Jacqueline Irons on Jan. 26, 1931. The town is on the southern edge of Lake Minnetonka, 15 miles from Minneapolis in what was then countryside.

"Growing up on a beautiful lake," she said, gave her a passion for clean air, clean water and unspoiled land.

In 1950 Swigart got a bachelor's degree in medical technology from the University of Minnesota. She moved to Louisville in 1951 when her husband, Dr. Richard H. Swigart, was offered a teaching job at the University of Louisville School of Medicine.

In 1952, Swigart recalled, she joined the Louisville League of Women Voters. She has served on almost a dozen environmental study and planning groups.

Puerto Rico

Keeping Puerto Rico's reputation as the Isle of Enchantment has been the goal of Dr. Alberto Hernandez.

As president of the San Juan Lions Club's environmental committee, Hernandez launched a three-pronged program geared towards providing a healthful environment. The program includes a cleanliness and beautification campaign, a campaign to preserve the scenic town of Dorado Del Mar, and an anti-smoking campaign. All three elements have received wide support.

Hernandez's dogged efforts are best exemplified by his clean up endeavors for "La Perla," a slum located on



the beach of San Juan just east of El Morro. A poor community of approximately 3,000 inhabitants housed in 884 wooden structures it is located on 15 acres of land. It is one of San Juan's poorest communities. Few children from this district attend school and there is a chronic shortage of water as well as poor sewerage facilities.

The Lions Club, spearheaded by Hernandez, organized a clean-up campaign that included the cooperative efforts of private industry and government agencies. In addition to beautification programs local residents were told how to care for their community.

A "clean-up week" was sponsored in La Perla and a series of activities were undertaken to obtain widespread citizen involvement. The people, particularly the children and teenagers, responded. "We succeeded because people came together," Hernandez explains. "The young people worked hard and the Lions rewarded them with sports equipment, clothing, and games donated by local business. Private concerns also provided scores of gallons of paint for the homes." Radio, television, and cars equipped with loud speakers promoted the effort. Lions Club members wrote and distributed flyers and canvassed the community giving talks about the program. The Humane Society and Police Department intensified their efforts to pick up stray dogs and cats. Large trash containers were distributed throughout the community as the streets and beaches were swept clean.

Follow-up talks and contests are held periodically in the schools and visits are made throughout the neighborhoods in a concerted effort to keep La Perla clean.

Hernandez can't solve all of La Perla's problems but he has made it a pleasanter place to live.

The "Bird Lady"

One day in 1966, Midge Erskine and her husband were walking around Whalen Lake in West Texas when they noticed a rare Whooping Crane dangerously near the oil-marred body of water. This incident made them instantly aware of a serious pollution threat that plagues this part of Texas. Increasingly on later walks she sighted oiled and salt crusted birds. She acted to do something about it.

Affectionately known as the "bird lady," Midge Erskine has almost single-handedly brought national attention to the problems associated with brine disposal in West Texas lakes.

Large volumes of salty brine are produced during oil and gas operations in this leading energy-producing State. These hazardous wastes threaten not only surface water but also groundwater—the main source of clean water for area citizens.

Erskine began her fight by contacting the Department of Interior about the problem. When she learned that there was only one agent for the area, she voluntarily began to make twice-weekly checks on Whalen Lake to care for damaged birds

and to gather invaluable information and data.

Some time later, with the support of the Audubon Society, she obtained a permit from the Department of Interior for her work and became officially recognized. She continued her one-woman crusade to protect the birds that inhabit the Whalen Lake Area, while calling attention to the pollution threat.

Trying to enlist additional help and support, Erskine contacted various environmental and civic groups and mostly ran up against lack of interest. She didn't give up. She continued on her own.

Slowly, the worth of Midge Erskine's work became evident. Her carefully kept records were the basis of her testimony before three grand juries and the Texas Railroad Commission investigating the situation.

Meanwhile, an investigative reporter wrote a story about the problem that hit the Associated Press wire. Erskine contacted another environmental group—the Defenders of Wildlife in Washington. The group sent a reporter for its magazine to Texas and featured a story on the pollution problem in its April, 1978, issue. Later, articles were written by United Press International, the Los Angeles Times, and the Dallas Morning News.

Erskine spends her own money for the total operation of the bird sanctuary without funding of any kind. She cares for up to 50 birds at a time—everything from hummingbirds to eagles. While she is set up to care only for birds, from time to time she also cares for fawns

for the Texas Parks and Wildlife Department because there's no one else to do it.

Erskine doesn't waste words. She says, "Birds in West Texas are being threatened and people must realize that birds can be rehabilitated and saved. The work needs to be done." She added that the toxic threats to birds eventually affect human beings as well.

Summing-up her fourteen years of effort, she says, "Having fought so long, I understand how people get discouraged. People need to know that they CAN make a difference if they will just try, and not give up."

The Pine Barrens



A vast ecological treasure. The most exciting biological area along the East Coast north of the Carolinas. A 970,000-acre oak forest covering 17.7 billion gallons of pure groundwater.

These are some of the phrases that have been used to describe the New Jersey Pine Barrens. The effort of Carol Barrett to protect them is an excellent example of what citizen activism means: vigilance, hard work, coping with frustration, and finally earning the satisfaction of a victory.

A life-long resident of Camden County, N.J., Barrett's involvement in civic and environmental organizations started in 1971, when she joined the Newton Creek Conservancy, a watershed association. The Conservancy's priority was acquiring an 86-acre natural

woods for the Green Acres program.

Through that effort, which proved successful, Barrett met environmental leaders in her community, attended conferences and seminars, and educated citizens on ecological systems and how to become constructive public participants in the governmental process. She realized that environmental issues were of universal concern.

"I was determined to bring a stronger voice to southern New Jersey; the small volunteer groups locally were having a rough time surviving. Most of the time we felt impotent and as realization grew of how exceedingly important public involvement was, I sought a way to bring more 'clout' at home," Barrett said.

"Although I was a member of the Sierra Club, there was no group active south of Princeton. In 1975 I asked the New Jersey Chapter/Sierra Club to start a group in the southern part of the State. They responded by calling a meeting of the members of the area, and, finding a positive reaction, established our group."

Her election as temporary Chairperson was soon changed to a full two year term.

The group's territory covers the whole of southern New Jersey. It includes most of the Pine Barrens.

Consisting of 1,500 square miles remaining of originally 2,000 square miles of pine-oak forest, the Barrens is the largest wildland tract in the mid-Atlantic seaboard region. It comprises one-fifth of New Jersey and is within easy reach of 50 million people, many of whom live in suburban Philadelphia and New York. Its recreational, educational, and scientific assets are tremendous. The scientific community has given world-wide attention to its biota, including its dwarf forests.

Barrett explained that preserving the Pines had been considered a local matter. "I made the decision that I would enlist the support of all of the public groups and organizations I could discover, to raise the



public consciousness of the danger to this natural resource. Considering this was a 970,000 acre area, it had to be more than a local concern."

"Using the resources of the Sierra Club—local, State, and national—I sent as much information out as possible and called for gatherings and meetings for action. I used recreation activities to conduct serious business, camping trips, for example. For two years, I arranged meetings, both public and private, talked to government agencies and political officials, worked with Congressmen and their staff, developed good contacts with the news media.

"I did everything I could think of in order to spread the message of Pine Barrens preservation instead of exploitive development."

She founded the Pine Barrens Coalition which helps provide some of the "clout" she mentioned, while always keeping to her goal. "There was never any doubt in my mind that this ecosystem belongs to us and the future generations for its intrinsic values."

A recent recipient of the EPA Region 2 Certificate of Merit, Barrett was credited by her nominators for mobilizing vast numbers of individuals in support of the State Senate Omnibus Park Bill of 1978 which contained her Pine Barrens recommendations translated into a moratorium on development permits. Later that year, Barrett shifted her attention to Washington, where protection for the Pine Barrens was incorporated into the U.S. Senate Omnibus Parks Bill.

The Barrens aren't Barrett's only interest, of course, "I am constantly involved in the basics of environmental problems; water quality, solid waste management, air pollution, sludge disposal (not the ocean, please), open space, as well as ocean and coastal management and the plight of the urban areas," she says.

Congressman James Florio summed it up: "Her enthusiasm, idealism and fire, tempered by her understanding

of political realities, have resulted in the success of many of her activities in the face of seemingly overwhelming odds."

A Personal Reward



During World War II, Elaine Szymoniak was assigned to a U.S. Army hospital. Trained in vocational rehabilitation and audiology, her experience working with soldiers whose hearing had been permanently damaged by exposure to excessive noise had a profound effect on her. So profound, in fact, that she has since dedicated much of her time to protecting others from suffering similar fates.

This sense of dedication was clearly in evidence when, as the Ward 4 representative to the Des Moines City Council, she assisted in the development of a comprehensive noise ordinance for the city. Her efforts on behalf of the ordinance must be seen as one of the major factors that led to its adoption in January, 1979.

Many of Szymoniak's noise control activities, however, have not come as an elected official, but as a volunteer. Much of the volunteer work that she has done has been in conjunction with the Iowa Speech and Hearing Association and has been aimed at educating the general public on the physical and mental effects of noise on health. During the 1960's and 1970's, she spent considerable time addressing civic and fraternal organizations, and schools on the noise

problem. She also helped set up and staff clinics to provide free hearing tests for children and adults.

Szymoniak gets a great deal of personal satisfaction from seeing something good come out of her efforts. She cites, as an example, her work in the early 1960's to protect people from noise caused by jet aircraft at the Des Moines Airport. At the time, few people knew how dangerous the high-pitched roar of jet engines could be to hearing, and as a result, airport officials allowed people waiting for passengers to stand out near the runways as the jets taxied in. Working with others concerned about this situation, Szymoniak put pressure on officials to eliminate this practice, and, once convinced of the dangers, airport officials no longer permitted people outside the terminal while the aircraft were arriving.

"When you become involved in volunteer efforts, you do not always know from where the rewards will come." Szymoniak related the story of the time she and her husband were having a house built in Kansas. They anxiously awaited the arrival of a set of cabinets but were told that it would be weeks before they could be delivered. Shortly afterwards, to their amazement, the cabinets arrived. The contractor, it seems, had a deaf daughter and was aware of the voluntary work Szymoniak had done to help those with hearing afflictions; to show his appreciation, he rushed the order to her. "The happiness I felt from this kind gesture has never been forgotten and has many times pushed me to work harder."

As a councilwoman and volunteer, Szymoniak will continue to work hard to protect the citizens of Des Moines from noise. Des Moines is presently attempting to become a model city in the area of noise pollution awareness.

Guarding Eagles

Greenleaf Chase, a wildlife biologist with the New York State Department of Environmental Conservation, discovered a golden eagle's nest in the remote Adirondack lake country in 1957.

Now 66 and retired after 34 years in the Adirondacks with the State, Chase became concerned when the property which hides the nest from human eyes changed hands recently. The nest stood only about a quarter of a mile from an International Paper Company logging operation which was moving in its direction.

Chase, an advisor, consultant and a member of the Board of the Adirondack Conservancy, a committee of the national non-profit Nature Conservancy, has had major input into the Conservancy's 18 land acquisition projects in the area which now total over 95,000 acres of the State's six-million-acre Adirondacks Park. He coordinated a park-wide inventory of all the unique biological, botanical and geologic areas in the park and served on the State Commissioner of Conservation's Advisory Committee on Protected Native Flora. With Chase's special knowledge, the Adirondacks Conservancy had been able to convince the State to purchase an area known as Bear Pond, habitat for the only *arethusa*, an orchid, known to grow in the Park.

In his enthusiasm for the protection of the birds, Chase conducted the first negotiations for exclusive Conservancy access to the eagle nest for study purposes. The impetus for the protection of the eagle nest at Bog Lake, sparked by Chase's observation and advice, led to Conservancy negotiations with International Paper Company for a 3-year lease on 500 acres which now protect the nest. The Conservancy is now negotiating with a neighboring timber company for the \$250,000 purchase of a complete nesting area, one of the most viable nesting sites in

the northeast today.

With this land deal, "Greenie's" magnificent eagles will continue to soar over the Adirondack wilderness.

Joining the "Establishment"



Peg Garland: an ex-World War II pilot, mother of two grown sons, and Chairman of the Vermont Environmental Board. She is clearly a part of the environmental establishment, but has never forgotten her own beginnings in the environmental movement or the importance of grassroots involvement in environmental planning, management, and regulation.

The Vermont Environmental Board is charged with carrying out Vermont's pioneering land use law—Act 250. Garland was named Chairman of the Board in April, 1977. Joining the regulators was a watershed experience. However, Garland's philosophy as well as her administration of the Board are geared to welcome citizens in the environmental regulatory process.

Garland's interest in the environment grew first from her outdoor experiences in her native North Carolina, and later birdwatching and watching the seasonal changes on the family's small farm in upstate New York.

As her children grew and she had more time to pursue her interests, Garland joined the League of Women Voters and became involved in water issues, notably an evaluation of a sewage treatment plant in Lenox, Mass., where she also lived.

That was the beginning. From there she went on to serve as President of the Vermont League of Women Voters and a member of the national League's Land Use Committee; Chairman of the Vermont Natural Resources Council; Vermont Co-Chairman of the Lake Champlain Committee; Clerk of the Vermont Lung Association, and Vermont member of the National Board of the American Lung Association; member of the City of Burlington Planning Commission and Chairman of the Chittenden County Regional Planning Commission; a member of the New England Energy Policy Council; and in many other capacities.

From these roots, Garland learned the dedication, commitment, and energy of private citizens who donate their time and services for a cause in which they believe, and she has used this knowledge in bringing citizens into the environmental decision-making process.

Also, from her vantage point in the ranks, Garland has seen the environmental movement grow and mature in the last 10-15 years. She believes that citizen environmentalists have become much more knowledgeable about the technical and political situation in which they must operate. In fact, one of Garland's most important acts at the Lung Association was the establishment of a technical committee to advise on air pollution issues.

Garland believes that the environmental constituency has become broader as more people have come to appreciate the importance of environmental integrity. She attributes this to improved public information programs—particularly increased use of media. In 1974 as a representative of the League of Women Voters she was instrumental in bringing about a "town meeting of the air"—a program on land use issues aired on the statewide educational television station. In April of last year, through the Lung Association, she helped to arrange the broadcast on public television of the public hearings on Vermont's State Implementation Plan for air quality. Garland thinks it is very important to use these kinds of public

information techniques to reach as many citizens as possible and to stimulate as much public involvement as possible in regulatory decisions.

Energy and economics have obviously had strong impacts on the environmental movement in the last five or so years. However, Garland has not found that her views on environmental protection have been altered by these considerations, largely because her own perspective has included what she calls the "total environment." In addition to the natural environment, this encompasses the socio-economic environment, provision of food and shelter, etc.

She also believes that these items are not mutually exclusive, and that one who pursues concern for one fragment of the total environment to the exclusion of all others does a disservice to one's own cause.

Garland believes that the State regulatory system of which she is now a part and the larger Federal regulatory structure are necessary to protect the public health, safety, and welfare, that these are proper concerns of government, and that the free enterprise system cannot be relied on to protect these concerns. However, she feels that there is a need for regulatory reform to eliminate overlapping regulations and to provide coordination among regulatory bodies.

She also salutes the concept of delegation of authorities to State and local bodies, because she feels that people need to perceive that decisions affecting them personally are being made at a more responsive level and not by some faceless machine at the Federal level.

Particularly, she is pleased with EPA regulations requiring public participation in Agency activities and with the small grants available to groups who could not otherwise participate in Agency decision making.

Garland feels that this is a real sign of good faith that agencies intend to provide real balance, right down to the grassroots levels, in their decision making.

Vermont is still a highly rural State. Many people still work

the land and have what Garland calls a "stewardship philosophy." She recognizes that this sense of ownership of and responsibility for the land is the most important aspect of any program of environmental protection, and that without it, no environmental program can really hope to succeed. Garland has had the perception to recognize this and the ability to tap this very basic grassroots sense and turn it into action.

Virgin Islands

What do you call a woman who teaches, writes books and a newspaper column, creates environmental studies programs, and lobbies for legislative action, to name just a few activities. "Busy" and "energetic" would be likely descriptions for her, but as Doris Jadan herself points out, she is constantly inspired by her surroundings—"a remarkable husband and an island that people dream about."



Doris Jadan lives on St. John, the smallest of the U.S. Virgin Islands—19 square miles (about the size of Manhattan) with a resident population of about 2,000 people. Although the location brings to mind a tropical paradise, problems do exist there—periodic floods, frequent droughts, and chronic water shortages. "As far as human beings are concerned, only Arawaks and Africans have ever managed to live in harmony with our Island ecosystems," Jadan notes. "But because our problems are often simpler and more direct, there is more urgency to deal with them."

And deal with them she does. A resident of the Virgin Islands for 25 years, Jadan and her husband Ivan believe in the broadest definition of environment: everything surrounding us and everything that we surround. This has led to their involvement in most aspects of Virgin Islands life.

Doris Jadan has just issued an update of her *Guide to the Natural History of St. John*, and published a new cookbook using local foods, emphasizing proper nutrition, a problem on the island. She and her husband are involved in a naturalist study of local fauna, including the Antillean crested hummingbird, and a resident octopus in an adjacent bay, to compare data on the animals' activities with data collected in aquarium studies.

Perhaps Doris Jadan's greatest impact, though, is the environmental studies program which she began a decade ago. Originally developed as a pilot for classes of elementary students on St. John and neighboring St. Thomas, it has grown to the point where 13,000 school children have participated in the program.

"Children weren't having any instruction compatible with the way they actually lived," Jadan explained, "We had to develop material aimed at the Virgin Island child, relating it to the environment he or she actually knew." The classes involve teachers, parents, and students together, avoiding a standard kindergarten-to-12th grade approach which is often designed for all and applicable to none.

Jadan is currently involved in the political and administrative details of actions which may see as many as 9,000 of St. John's 12,000 acres eventually included within the boundaries of the Virgin Island National Park.

But whatever the specific issues, Doris Jadan keeps in mind the insight and outlook of Job, whom she describes as one of the early environmental educators, who counseled on where to place one's focus:

"Go and ask the cattle,
Ask the birds of the air to
inform you,
Or tell the creatures that crawl
to teach you
And the fishes of the sea to give
you instruction."

Contributing Talent

Talent and professionalism coupled with dedication to the environment gave TV producer-writer-director Linda Moulton Howe an important role in her field. The products of this engaging, Idaho-born Denverite have gained international acclaim and educated and stimulated millions.



Howe's interest in the environment was, in part, a result of exposure to the health hazards attributed to air pollution.

Although a successful career was opening, she was facing a real dilemma. Professionally, everything was rosy, but the effects of air pollution in Los Angeles were taking their toll. Linda Howe and her husband were becoming increasingly aware of the fact that unless they moved from Los Angeles, she might always suffer respiratory problems and skin irritations. But were they willing to move to a better environment and risk sacrificing what they had worked so hard for?

Howe felt that if only she were involved, they could stick it out for a while longer. But fortunately for those who have benefited so much from her work, Linda Howe and her husband moved. The decision was strengthened by the pending birth of their daughter.

Howe remembers agonizing

over the pollution she witnessed daily. Factories belched out plumes of smoke, autos spewed out their emissions. Possibly subconsciously, Howe remembered her upbringing in a relatively unpolluted Idaho. "We can't bring our child up in this cesspool of air pollution," she declared.

From 1974 to 1976 Massachusetts was home. While her husband completed his graduate work, Howe was a producer at WCVB-TV in Needham. Hard work and dedication were reflected in her projects. Two programs, "House Call," a weekly call-in focusing on medical problems, and "Sunday Open House," a weekly two-hour public affairs program, were included in the 1976 Peabody Award citation for programming excellence.

Since 1976 Howe's concern and knowledge about pollution has grown steadily. As producer, writer, and director at Denver's Channel 7, she has been involved heavily with producing 15 major projects, the majority of which involve health or environmental issues.

Two half-hour documentaries, "Poison in the Wind," about carbon monoxide air pollution in Denver and "A Sun-Kissed Poison," dealing with ozone air pollution in Denver and Los Angeles, were honored in the finals of the 1979 National Emmy Award for Community Service. They placed very high in the 1979 Colorado Broadcasters' Association Awards and were finalists in the Rocky Mountain Emmy Awards for best documentary category. EPA purchased prints for national distribution among Federal agencies and educational institutions.

Cherishing the Land

In 1905, William Henry Browne, a lawyer who had left New York City in 1877 and settled in Jacksonville, Fla., turned to his son, sixteen years old on that day, and told him the land they were standing on was from that day forward to be his. "Now you look after it. And don't let

the hunters in here." Sixty-five years later, Willie Browne, in his 80th year, could recall that he had kept his pact with his father. He had not ever let the hunters in.



Willie Browne never married. His parents died during the '20's, and in 1953 his brother Saxon, who had lived with him on this land along the St. Johns River died. In a sense, Willie Browne had become a recluse. In the small frame house he and his brother had built, there was no electricity and no telephone. Fifty years had passed since he had last bought a suit of clothes. But if Willie Browne lived almost a hermit's life, he nevertheless remained abreast of what was happening in the world, especially as it related to the woods and marshes he owned and loved.

He has never been overly possessive of his land. Only the ravagers have been unwelcome. Archaeologists from the University of Florida have for many years done extensive explorations of the Indian ceremonial mounds and kitchen middens found on the property. The Indians who dwelt here are believed to have been forerunners of the Seminoles and the Timucuan. Several years ago, Mr. Willie, as he is known to the many young friends he has made over the years, donated part of his tract to the Campfire Girls so that they could experience real wilderness.

The time came when Willie Browne began to consider the disposition of his land, to seek the means by which he could maintain into the foreseeable future the pact he had made with his father. He knew that all over the United States there are housing developments and

industrial complexes sprawled atop what once had been glorious natural areas prized for generations by families who finally had been forced by one event or another to relinquish their hold. Browne was determined that no such fate would overtake his land.

The Federal government and the Florida State government were approached, but neither would accept the condition he insisted upon, that the land be preserved in its natural state, without alterations. Neither would a famous private agency, whose help he sought, commit itself to abide by Browne's conditions. Then, through a friend in Jacksonville, Willie Brown learned of The Nature Conservancy. The response of the Conservancy to his inquiry was immediate and enthusiastic. This was precisely the sort of thing the Conservancy was set up for. And that was ten years ago.

On November 15, 1969, Willie Browne signed the deed transferring his 361 acres on the south bank of the St. Johns River to The Nature Conservancy. The land is valued at \$1,000,000. Willie had nothing else. This land had been his entire estate. At a small salary contributed by a member of the Conservancy, he would stay in his little house, taking care as he always had of this lovely land.

The nationwide publicity that resulted from his act, so incredible to a world in which nearly everyone seems bent on finding the legendary million rather than giving it away, left Willie Browne a little startled, a little like a deer caught in a searchlight's glare. His first reaction, quite naturally, was annoyance, the annoyance of a man whose privacy had always been inviolate and who suddenly finds himself on front pages of newspapers from the Pacific Coast to New England.

Quickly though, he realized that the publicity, offensive as it might be to his privacy, could turn out to be inspiration to other people. For others to know what he had done might provide occasion for re-evalua-

tion of closely held beliefs, for example, the assumption that if one holds land worth a million dollars one reaps the dollars regardless of consequence to the land. So he stood patient in the glare of publicity and hoped that somewhere someone else might from his example find the courage to sacrifice the dollars instead of the land.

Then the letters began to arrive. From all over the country they came, addressed to Willie Browne, Jacksonville, Fla. One had his picture, taken from the newspaper, pasted on the envelope just to make sure it reached him.

"Thanks for caring," wrote a young woman in Nashville, Tenn. And from Mandeville, La., a woman told him. "Every time I go camping, I will think of you and thank God there are such people left in the world." A Santa Barbara woman wrote. "It was a thoughtful, generous, unselfish, farsighted act of which you should be very proud. Not many of us I am afraid would have the moral courage to turn down a huge sum of money to do the thing he felt was right at such cost."

With the help of a friend, Mr. Willie answered every one of his letters, first of all those from people who misunderstood the story and thought that Willie Browne is a man with so much that to give away a million dollars is nothing. But only one letter, he says, was from a real crackpot, a man who fussed because he felt the land should have been given to him.

"Yes," said Willie Browne. "This is a nice place. I hope it will be kept this way." Willie Browne died December 14, 1970.

Saving a Swamp

Nancy Anderson's conservation interest was triggered by a story in the local paper in Reading, Mass., that said the town was considering turning part of the 500-acre Great Cedar Swamp into a dump. The swamp is inside of Reading.

Anderson contacted local officials, known as selectmen, who told her that the idea had been aired merely as a suggestion. But Anderson feared that

to let a trial balloon float might be just short of giving approval. Furthermore, waiting until the last minute to raise questions might only add to the hassles and frustration of redrawing plans later.



Anderson believes that it is every citizen's duty to speak up "It can bring results, once the seeds have been planted," she says. Following this policy, Anderson was one of the first to speak out against the construction of Interstate Highway 66 in Northern Virginia when she lived there during the 1950's.

Her concern about the fate of the swamp in Reading was based on her research as a member of the local chapter of the League of Women Voters on such resources as swamps, marshes, and bogs. She understood the importance of these areas in flood control and water purification. Swamps, in particular, cleanse and recharge water stored naturally on the way to rivers and eventually the sea. The Great Cedar Swamp was the source of the Bare Meadow Brook which flowed into the Ipswich River, from which 15 to 22 local towns got their drinking water supply.

Anderson made an appointment with the selectmen to discuss her concern about using the swamp as a dump site. During the week before she was to see them, she and friends recruited other people in the neighborhood, making them aware of the danger as she saw it. With the aid of some of her neighbors she held several community meetings to discuss strategy in making the selectmen aware of citizens' discontent with the

idea of converting the swamp and to plan what to do if it became apparent that the town government was going to support the dump proposal.

When the time for the meeting came, Anderson took along others who felt the same way she did. Approximately 250 supporters went with her. The meeting had to be moved from the selectmen's office to a local auditorium and in the end, the idea of turning part of the swamp into a dump was dismissed.

The selectmen later appointed Anderson to the local conservation commission where she served for three years as a volunteer. With the assistance of local townspeople, she was able to get a zoning ordinance passed to protect the swamp and all of the other wetland areas within the boundaries of the town. The commission was able to get the town to vote to set aside an additional 780 acres of land for recreational purpose only. Also, just before leaving the commission, Anderson and several friends persuaded the town, which by now had become very environmentally conscious, to provide money in the budget for a geologist to act as the administrator of the commission and a part-time secretary.

The campaign to save the swamp had started in 1964. By 1970, with State aid, the town bought the land in question. The public ownership would further protect the area as a swamp.

Today Anderson is President of the Massachusetts Association of Conservation Commissions, an organization of 2,500 local officials charged with protecting the natural resources of the State. There are seven members in each town across Massachusetts with quasi-judicial powers including authority over how wetlands can be filled. She is also involved in the environmental program at Tufts University where she is the coordinator of Environmental Affairs for The Lincoln Filene Center for Citizenship and Public Affairs. In that capacity, she is active in putting together the New England Environmental Network, composed of citizens who

share common environmental concerns.

"Government officials are anxious to respond," said Anderson, reemphasizing her belief in speaking out. "They need citizen input if we are to continue to be a government of the people, by the people, and for the people."

Reporting the Facts

High Country News, a tiny environmental newspaper with a powerful following, has outlasted adversity to become a respected and heeded voice in the ongoing debate over development of the vast energy resources in the West.

A biweekly tabloid located in unpretentious space above a dress shop in the central Wyoming town of Lander, the newspaper is a fixture in the offices of decision makers in State capitols in the Rocky Mountain region and in Washington

Surrounded by Wyoming's mountain beauty and vast mineral riches, a staff of young persons working for subsistence wages has thrust the paper prominently into the debate over industrial and energy development in the West.

Its central theme, for more than a decade, has been the threat of development that could trample the area and overcrowd the rugged but fragile high plains.

"I think open space is at a premium these days," said Joan Nice, the paper's managing editor. "Some people come out here in search of that and they end up destroying it."

"This is beginning to touch the general populace of the region and they are trying to figure out what to do about it," she said. "We are trying to provide some answers."

Every State in the Union is represented in the High Country News' 3,500-card subscription file, and more than a third of the subscribers live outside the Rocky Mountains.

"It doesn't reach many people, but it seems to reach the right ones," said publisher Tom Bell, who is in the process of selling the paper to its staffers.

Kathryn Fletcher formerly with the Environmental Defense Fund in Denver and now a Washington resident and one of President Carter's chief environmental advisors, is one regular reader.

"It reminds me of home," she said. "I like the feel of it. It's very accurate and it rings true. I find that it often has more complete reporting on Western issues than the other things I pick up to read."

A list of High Country News firsts is long and impressive.

The newspaper warned eight years ago that coal development could turn Western prairies into crater fields if stringent reclamation laws weren't adopted. While it wasn't alone in that warning, the fact is that State and Federal laws were enacted requiring energy companies to restore strip-mined coal lands.

Ambitious plans to convert oil shale into petroleum and coal into natural gas were examined by High Country News in 1974, five years before syn-fuels reached the headlines of daily newspapers.

Exploration of the hot, underground lava surrounding Yellowstone National Park was reported by High Country News in June. "Could Old Faithful Falter?" the paper headlined. Park officials responded with angry opposition to any geothermal development that could endanger Yellowstone's glories.

Disaster hit the paper in August, 1978. In a car accident the news editor was killed and three other staffers seriously injured.

Contributions to pay health bills came not only from the newspaper's environmental loyalists but from energy companies as well.

Don McSparren, manager of Atlantic Richfield Co.'s environmental operations in Denver, said he suggested ARCO's \$200 contribution.

"They serve a purpose," McSparren explained. "We don't always agree with everything they print in their paper,

but I think they appear to try to present both sides of the story. It certainly lets us know what the other side is thinking."

Protecting the Tortoise



Dr. Kristin H. Berry of Ridgecrest, Calif., is called the protector of the desert tortoise. Since the early 1970's, when she conducted a study for the State Department of Transportation on relocation of tortoises from a proposed freeway corridor, Dr. Berry has conducted a relentless campaign to gain protection for the species. It led to creation by the U.S. Bureau of Land Management of a Desert Tortoise Preserve, which Dr. Berry has fought to have enlarged and properly managed.

In 1974, just before joining the BLM, Dr. Berry formed the Desert Tortoise Preserve Committee, a citizen group that has actively raised funds for land acquisition. She also helped establish the Desert Tortoise Council and serves as program chairman. The group focuses on threats to the tortoise in a four-state area.

Dr. Berry is a biologist for the Bureau of Land Management. She has dedicated herself to the goal of wise management of desert resources. She has gained recognition as an innovator in the field of wildlife management, whose work is set-

ting trends for other scientists.

Dr. Berry explained how she became involved in protecting the tortoise. "Although I grew up in the western Mojave Desert and had several desert tortoises for backyard pets as a child, we didn't really become acquainted until I was almost finished with graduate school. I was writing my dissertation on the ecology and social behavior of another long-lived desert reptile, the chuckwalla lizard, when the Department of Transportation asked me to take on their Desert Tortoise Relocation Project. The project involved removing wild tortoises from a freeway corridor and locating new home sites for them.

"One thing led to another, and within a year, I was enmeshed not only in research on the behavior and ecology of wild tortoises, but launched on a campaign to preserve one of the prime remaining desert tortoise populations in the United States."

Dr. Berry was awarded a 1979 American Motors Conservation Award for her work with the desert tortoise and for her wildlife inventories in the desert. □



By Denis Hayes

The Environmental Decade



We are all ten years older now than we were on April 22, 1970—the first Earth Day. We have more facts at our disposal than we had a decade ago, more data. The important question is whether we have more wisdom.

Many of our fears of ten years ago have been borne out. America's declining oil production has had an even more dire impact than we had predicted. The carbon dioxide produced by fossil fuel combustion is producing a planetary greenhouse effect. Nuclear power is now conceded to be more inextricably linked to weapons proliferation than was admitted in 1970.

Some of our fears were overstated. The impact of high-flying supersonic aircraft on the ozone layer is now believed to be much less harmful than early experiments had led us to predict. On the other hand, we were then unaware of the extensive damage to the ozone layer that could be caused by

freon and other chlorofluorocarbons.

Some important changes have occurred since 1970. We have made more progress than I expected, but much less than I had hoped for.

For example, belching smokestacks are harder to find now than they were a decade ago, but the industrial pollution problem did not end when smoke disappeared from sight. The principal pollution-control efforts have gone into solving those problems that appeared most solvable, and large, visible particles in industrial smoke are now routinely removed. But small, submicron-sized particulates—often heavy metals and carcinogenic hydrocarbons—are still emitted in large quantities. The "tonnage" of pollution has thus decreased dramatically, but much of the danger remains.

On the other hand, urban smog remains a serious problem and in many cities continues to worsen. The advent of pollution controls on new vehicles has had, to date, no obvious effect on urban smog. And now we must examine the tradeoff between the benefits of direct combustion of wood as an energy alternative and the impact of wood-burning on atmospheric pollution.

Huge investments have been made in attempts to control water pollution. But this money has mostly flowed in the wrong direction—toward large, energy-intensive systems that mix industrial waste with human sewage. The resulting mixtures are not amenable to anaerobic digestion to produce methane, and the residual sludge often contains toxic materials that can pose problems if recycled on farmland. In a cruel irony, large pollution-control expenditures were made before polychlorinated biphenyls (PCB's) and other chlorinated

organic compounds including kepone and mirex were known to be hazardous. When commercial fishing was banned in the Hudson River in late 1975 because of PCB fears, more than \$3 billion had already been spent on sewage treatment plants that were not designed to remove these materials.

The tragedy at Love Canal, N.Y., produced widespread visibility for the problem of toxic waste. Yet little has been accomplished thus far toward the elimination of the hazard. The U.S. still has 32,000 potentially dangerous chemical dumps, of which more than 600 may pose imminent hazards to human health. Fifty years ago, arsenic was the only metal known to be a carcinogen. Today it has been established that cancer can be caused also by beryllium, cadmium, chromium, cobalt, iron, lead, nickel, selenium, titanium, and zinc. The most attractive control strategy, of course, would be to keep such metals in circulation as useful products, rather than discharging them into the environment. The current effort to substitute ethanol for lead in gasoline as an octane booster is an encouraging and important step toward eliminating the widespread atmospheric dispersion of a highly toxic material.

One of the major disappointments of the last ten years has been the lack of official support for recycling. The central theme of the first Earth Day was replacing the planned obsolescence of our throwaway culture with products that could be repaired, re-used, and recycled. This year, the average American still uses more than 15 tons of minerals, virtually all of which make a one-way trip from the mine to the dump. More than two-thirds of these materials could be kept in useful circulation without changes in American lifestyles. Yet we have found it nearly impossible even to pass legislation requiring that beverage

containers be returnable. After ten years of effort, meaningful laws have been passed in only a few States.

Today, energy conservation is a much more popular theme than when we began promoting it in 1970. Nonetheless, meaningful progress—except in the industrial sector—remains a goal rather than an accomplishment. Americans will waste more fossil fuel this year than two-thirds of the world's people will use. Most of our cars remain oversized and our homes under-insulated. But at least this wastefulness has now been officially recognized, and remedying it has become a centerpiece of national energy policy.

It is for all these reasons that Earth Day '80 is being organized. We don't need an event to inform people that some important indices show that the quality of life is deteriorating. Indeed, poll after poll shows that the American people are far ahead of their elected leaders in their awareness of this decline. My major concern about the American mood today is its pervasive feeling of helplessness. Earth Day '80 must convince people that things can be better, and that we have viable, attractive alternatives to our current unsustainable course, both as a society and as individuals. Earth Day '80 must remind people of what we can do as a society, and of what we must do as individuals.



Scenes from Earth Day, 1970.

Much of the environmental progress of the last ten years is now under attack by misguided advocates of frontier economics. Earth Day '80 is a counter-attack. It is being organized by people who recognize that the frontier is gone, and that we must learn to live—and share—within boundaries. Earth Day '80 is based on the assumption that most Americans think we have done too little—not too much—to protect the ecological integrity of the biosphere. I believe that most Americans place a very high value on health, on environmental resilience, on freedom, on full employment, and on an approach to our natural environment that stresses harmony, balance, and sustainability.

Earth Day '80 will not be a doomsday event. It will candidly acknowledge our problems, but it will focus on their solutions. Earth Day '80 will educate people about the prospects for solar energy and energy conservation. It will tell them about a sustainable materials policy, about the easy elimination of water wastage, and about ecologically sound agriculture. Earth Day '80 will show people how to improve their own neighborhoods by avoiding many of the environmental maladies and societal pitfalls of modern urban life.

Ten years have passed since the first Earth Day. Many of the original Earth Day activists have children now. That means we care even more about sustainability, which will be a central theme of the event this year. If, as a species, we begin to behave more sensibly with respect to the biosphere, human civilization has the means to enter one of its periods of greatest achievement. Earth Day '80 is being organized to help point the way. □

Denis Hayes was coordinator of Earth Day, 1970, and is director of the Solar Energy Research Institute near Golden, Colorado.

Wild Eagles Nesting

"Her power dive was so fast he was unable to avoid it, but at the last instant she opened her wings, primary tips upward, spread her tail, and shot past just touching him. Then she wheeled back, coming in on his level. This time he was ready for her. They met in midair, locked talons and somersaulted downward. Sometimes he was on top, sometimes she was. They tumbled down until it seemed sure they would hit the ground, but barely before the impact they both spread their wings and hung almost motionless. In slow motion they separated, each did a wing over while scarcely seeming to move, and went up again. They were not flying but floating, carried by an updraft and the vacuum suck over their huge sails. Steadily they rose until they were thousands of feet above the ground."

—*The Last Eagle* by Dan Mannix

These dramatic aerial acrobatics mark the courtship of bald eagles everywhere, including those nesting now in the Chesapeake Bay region, one of the main breeding areas on the East Coast for this magnificent bird.

About 80 active eagle nests are found each year in lofty trees in isolated locations in the bay area. These huge nests made up of twigs and branches are sometimes as much as eight feet in circum-

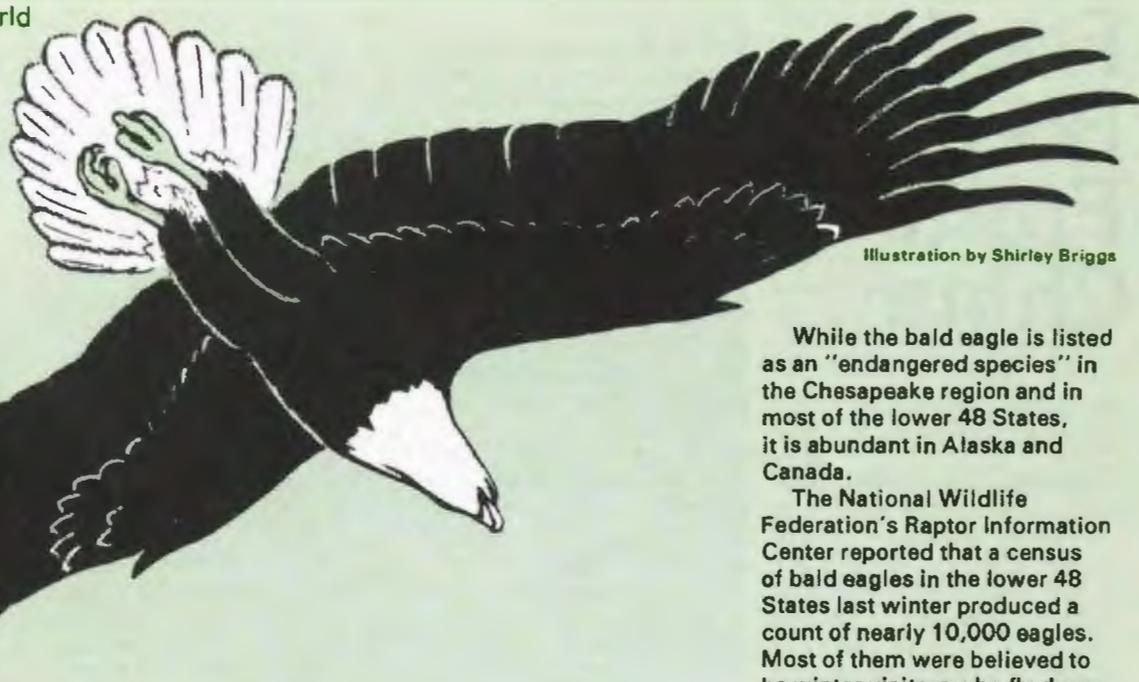


Illustration by Shirley Briggs

ference, often six feet in height, and strong enough to support the weight of a human being. In some cases they can be seen for miles around and serve as local landmarks.

Eaglets are hatching now from the one to three eggs laid in the nests. These nestlings, mostly beak and claws when they first emerge from the eggs, are covered with a silky grey down. At first they peep pitifully for food and later start a shrill monotonous and demanding cry for the meals provided by both parents.

An eagle's diet generally is mostly fish. Ducks, snakes, squirrels, rabbits and meat from deer and other animals killed on the highways also are eaten by eagles when available.

The mother eagle often rakes a carcass with her large beak to cut the food into bite-size portions for her youngsters. By early summer after a great deal of hopping and beating of wings in the nest the fledglings will be ready to begin the first practice flights from the nest.

They will become part of a slowly recovering eagle population in the Chesapeake Bay area. Jackson Abbott, a long-time observer and counter of eagles in this area, reports that the eagle is making a comeback in this region.

A retired Army Corps of Engineer official, Abbott notes that

the number of once abundant eagles in the Chesapeake region began to decline in the mid 1950's and this bird became very scarce until the population began picking up a couple of years ago. Now the hatch rate for eggs has risen from about 10 percent in 1962 to 50 percent."

"The current hatch rate," he noted, "is what is needed to maintain a healthy population. Last year there were more immature than adult birds in the region, an encouraging trend."

Abbott, a bird watcher since boyhood days who counts eagles for the Audubon Naturalist Society, has been using aircraft every year since 1962 to check eagle nests from above to see if they are currently in use. For the first five years he was able to persuade Army helicopter pilots to fly him on these checks as part of their training flights.

"Once a mother eagle attacked and chased the helicopter as the pilot dove his craft to avoid the angry bird," Abbott recalled. "And once we crashed when we were going too slow around an eagle's nest, but no one was hurt." In recent years Abbott has been piloted in U.S. Fish and Wildlife Service planes.

While the bald eagle is listed as an "endangered species" in the Chesapeake region and in most of the lower 48 States, it is abundant in Alaska and Canada.

The National Wildlife Federation's Raptor Information Center reported that a census of bald eagles in the lower 48 States last winter produced a count of nearly 10,000 eagles. Most of them were believed to be winter visitors who fly down from Alaska and Canada when cold weather hampers the hunting and feeding north of the border. The results of a similar survey in January of this year are now being analyzed.

Eagle authorities are still trying to decide whether the bald eagle population is making a comeback nationally as the result of the banning of DDT.

They have reported depressed eagle populations along the York River and the James River in Virginia, where pollution problems have been severe.

The decline of the bald eagle has been blamed on human disturbance of nesting areas, illegal shooting, loss of nest trees and habitat, and the reproduction failures caused by pesticides such as DDT, and its breakdown product, DDE. Even though the long-lasting DDT was banned by EPA for most uses in 1972, traces of DDE are still causing thinning of eagle shells.

Although a biblical proverb notes that the way of an eagle in the air is one of the things that surpasses human understanding, the splendor of their flight is indisputable.

The growing interest in the welfare of the eagle, our national symbol, is based at least in part on recognition of the wisdom of Thoreau's observation that "in wildness is the preservation of the world."

—C. D. P.

Fresh Breeze From China

An Interview with
EPA Administrator
Douglas M. Costle

Q In your recent trip to China you signed a protocol agreement for environmental protection with the Peoples Republic of China. Can you describe what this means?

A This protocol for cooperation in the field of the science and technology of environmental protection provides an umbrella which does several things. It indicates that both sides are willing to permit a wide range of cooperative activities in the field of environmental protection. It will permit government and private departments and agencies to cooperate under the agreement, and it permits cooperative activities to be undertaken in a wide range of fields, depending on the interests of the two sides.

The initiation of friendly, cooperative contact between environmental authorities in the United States and the Peoples Republic of China is a recognition of the existence of shared problems and a mutual desire to find ways of addressing them together.

Q Will this lead to a greater exchange of U.S. and Chinese environmental officials and scientists in the future?

A I expect that we will begin with a modest number of exchanges of technical and scientific personnel in the near future and a good deal of exchange of information. We will begin small on carefully limited projects and grow gradually as areas of mutual interest are defined.

We have invited a senior delegation to visit Washington this spring. At that time we expect to agree on specific areas to be pursued. The most likely areas are environmental assessments, the environmental effects of coal use, and epidemiological studies of the health effects of pollution. In the health area, we expect to look at the respiratory effects of air pollutants and the effects of drinking water contaminants.

Q What seem to be the most critical Chinese environmental problems?

A China is the world's second largest producer of coal. There is particular concern about health effects and especially respiratory illness as a result of coal consumption. As part of its modernization process, China is interested in low cost mitigation steps such as facility siting and inexpensive pollution control.

The Chinese were quick to point out that at their current stage of development, any resources devoted to environmental protection will necessarily reduce the resources available for agricultural and industrial development. At the same time there is a high level of awareness that these expenditures will be necessary, and that failure to make reasonable resources available today will require unreasonable resources to correct problems in the future. As a rapidly industrializing country, China has many of the same air and water pollution problems as our own country and Europe do, and suffers from the resulting environmental health problems.

Q What are the key things the U.S. can learn from China?

A One of the most promising areas is comparative epidemiological studies. Large populations are often exposed to one or two major pollutants in rural areas and provide good study groups for such studies.

There are likely to be opportunities to obtain research data regarding the effects of pollutants on stable human populations which would be hard to come by elsewhere. China may be doing research and experiments on efficient coal combustion and pollution control that would be of interest to us since we plan to increase our use of coal in the future.

Because of its relative resource endowment, the Peoples Republic of China is likely to pursue different approaches than ours to some problems. This research and experiments may well provide insights which we would not otherwise have.

Q Does it appear that the policy of the "four modernizations" gives an opportunity for more environmental concern?

A The "four modernizations" (agriculture, industry, defense, and science and technology) is the slogan the Chinese use to refer to their broad-gauge program of modernization. An ambitious start is being tempered by the need to carefully allocate scarce resources to obtain maximum results. And, in a way, that is the heart of the problem for the Peoples Republic. Faced with a need for substantial economic growth in order to provide a decent life for its huge population and determined to modernize its economy, the leaders are at the same time aware of the need to pay careful attention to protecting the environment. They recognize that there will be difficult decisions to make, and they want to improve their capability to do the appropriate research, to train the problem-solvers and supervisors needed to use modern technology, and to reach informed decisions about the trade-offs between environmental protection and industrialization.

Q How did you perceive the Chinese reaction to the U.S. delegation?

A I was very much impressed with the open, frank, sincere, and friendly approach of our counterparts on both the professional and personal levels. Our colleagues were obviously eager to meet with us, not only to hear the answers to their questions, but also to share their problems and experiences with us. I believe that the reception we were accorded indicates very good prospects for a mutually satisfactory long-term relationship.



On a recent trip to China, Administrator Costle met with Li Chaobo (right), Director, Office of the Environmental Protection Leading Group of the State Council of People's Republic of China and Qu Geping, Deputy Director (left).

Q How does the signing of the Chinese protocol fit into EPA response to environmental problems among the less developed countries?

A Although there are some who would argue with this position, I think it is fair to say that the Peoples Republic of China is one of the leaders of the Third World, and increasingly likely to be so. Through dedicated effort on their part and the marshalling of resources unavailable in many smaller countries, it is likely that the Chinese can develop both broad scale operational plans and specific control strategies which can serve as useful models for other developing countries. It is particularly likely that the Chinese may find new ways of using scarce resources or manpower-intensive techniques that would not be immediately obvious to us in industrialized countries, or cost effective in our systems.

Q How should EPA work with the United Nations Environmental Program, particularly with regard to less developed countries?

A The U.N. Environmental Program has a unique role in this area, as the only multilat-

eral organization including nations at all levels of industrialization. I am very impressed with the potential of this organization as a cost-effective means for industrialized nations to share environmental experience with the developing countries. At the same time, Dr. (M.K.) Tolba (executive director of the U.N. Environmental Program) and his associates have also quite honestly pointed out to me that, as currently organized and funded, the U.N. Environmental Program does not have adequate resources to get directly involved in many countries. This is not inherently bad, but suggests that the U.N. and all U.N. member countries need to continue to work on identifying the most pressing problems common to the greatest number of developing countries, and to find most-effective ways to disseminate information on the economics of pollution control, the economics of failure to act, the health consequences of pollution, and techniques and technologies which can be factored into the economic planning and development of each developing country.

Q Does EPA have a policy with regard to the developing countries?

A EPA is working closely with the Department of State and AID to develop a coordinated US Government position on this important question. An increasing number of developing countries are realizing the need to include anticipatory environmental policy in economic and industrial planning. They are aware that prevention of pollution through planning of necessary controls, limits, and sites is far more cost-effective than cleaning up pollution after it is present. Even more important for most of these countries with their very limited resources, once a polluting enterprise is in place and operating, is that modifying or closing it down may be economically impossible for the country.

EPA and the US government are getting an increasing number of requests for assistance of various types. It is in our interest, not only for global environmental reasons, but for political and cultural reasons, for the US to accept some share of the burden of assisting these countries. Since EPA has no mandate for direct involvement in this, we are determin-

ing how EPA might provide assistance through AID, the United Nations Environment Program, and other possible channels. This is a complex issue, since each developing country has unique circumstances and environmental problems. I firmly believe that the U.S. has an obligation to provide assistance and to do it well. My dilemma is the problem of sorting through a number of possible approaches and settling on the one which is most likely to succeed.

Q Does China appear to have the infrastructure to handle environmental issues?

A At present the Chinese are still developing this infrastructure. While there is understanding and a great deal of support at the local level to handle immediate problems, and a broad understanding at the senior levels of the government, the mechanism for joining these through a pyramid of responsible administrators and scientists is not yet in place. As I mentioned earlier, this is one of the areas which the Chinese are addressing first, and one in which they hope to learn a great deal from the experience and mistakes which we and other industrialized countries have made in the past. I am confident that the Chinese will work out an organization which is consistent with their social and political system and which will, in the long run, provide effective environmental leadership. As they themselves admit, this is going to be a difficult task, given the fact that they now have one billion people and urgently need to develop agriculture and industry with relatively scarce resources. Nevertheless I saw clear evidence of strong environmental consciousness and a sincere desire to translate this into effective action. Although my time in Beijing (formerly Peking) was very short, what I saw and what I have heard from others makes me believe that the Chinese will succeed. □

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

HAZARDOUS WASTES

New Rules for Toxics

EPA Administrator Douglas M. Costle recently announced the first steps in a system to transform the way American



EPA Administrator Douglas M. Costle, (right), and Assistant Administrator Chris Beck at press conference on hazardous wastes.

industry handles its toxic chemical wastes.

"Today we are issuing three regulations which will give us a national roadmap of where waste is and where it is going," he said. "These regulations will create an inventory of all businesses in the Nation which produce, transport or dispose of hazardous waste. They establish a manifest system so that we will know at all times who is responsible for hazardous waste, where it is going, and whether it gets there safely."

Costle explained that the manifest system requires the generator to determine if his wastes are hazardous, and if so, to package them according to Department of Transportation standards and then, on the manifest, designate the approved facility to which they must go. The manifest he

is responsible for preparing must also contain: the name of the generator, the name of all transporters, the name and address of the designated facility, and the description and quantity of the waste.

Finally, the generator must give copies of that manifest to the transporter.

The transporter also has specified responsibilities, said Costle. He

must sign a copy of the manifest, acknowledging acceptance of the waste, and give it to the generator. He must deliver the waste to the designated facility, and receive from that facility a signed copy of the manifest. He must, in the case of a spill, take action to clean up that spill and contact the National Response Center and the Transportation Department.

The facility, whether it be an incinerator, a treatment plant, or a disposal site, must sign a copy of the manifest and return it to the generator, thus closing the loop.

The generator, when he receives the signed manifest, knows that his waste arrived safely. But if he does not receive a signed copy he must, within 35 days, contact the transporter and the designated facility to find out the status of the waste and within 45 days submit a report to EPA.

AIR

Diesel standards

EPA recently set new auto emission standards to reduce particulate exhaust released into the air from diesel cars and light-duty trucks. The standards take effect with the 1982 models.

These are the first auto standards for diesel particulates, which may cause lung and respiratory diseases. Particulates, commonly referred to as soot, are composed of hundreds of organic compounds which can become lodged or trapped deeply in sensitive lung tissue causing increased frequency of bronchitis, asthma attacks, and respiratory infection.

EPA Administrator Douglas M. Costle said, "The number of diesels on the road is rapidly growing. The amount of particulates from each of these vehicles is 30 to 70 times greater than particulates released from gasoline powered engines. Auto manufacturers have told us that by the mid-to-late 1980's, 20 percent of the auto market will be diesels."

EPA said the diesels would have emitted between 152,000 and 253,000 metric tons of particulate matter each year by 1990 without the controls. The new standard will reduce particulates 74 percent or down to 40,000 to 66,000 metric tons per year.

Costle said he wanted to make it clear that the standards do not result from any conclusions made from EPA's cancer studies currently underway. EPA is continuing research on the particulates to determine if diesel exhaust may be carcinogenic.

ENFORCEMENT

Settlement announced

EPA has announced the partial settlement of a suit against the owners and operators of the Kin-Buc Landfill in Edison, N.J. Kin-Buc is a chemical dumpsite that has been leaking toxics and hazardous substances into the Raritan River and was one of the initial problem sites that focused public attention on the danger of inadequate disposal practices.

The lawsuit began last February with the filing of a 60-count complaint by the Justice Department charging the operators with multiple violation of Federal environmental laws and seeking injunctive relief requiring them to clean up the site. The agreement reached requires Kin-Buc, Inc., the corporate owner and operator, to construct a cover over a mound of buried refuse to prevent rainfall from infiltrating the mound and carrying contaminants into underlying groundwater. The rainwater instead will flow along the sides, be collected in ditches, and ultimately be discharged into the Raritan River.

In order to insure that the discharge is not polluted, Kin-Buc must file an application for a discharge permit from EPA which will require that the discharge be carefully monitored. Kin-Buc must also sample and analyze groundwater under the site for at least 20 years in order to test whether the cover is controlling contamination.

GM Recall

The EPA has ordered General Motors Corporation to recall approximately 170,000 of its 1977 Buick vehicles equipped with the 350-cubic inch displacement

engine and 2-barrel carburetor which fail to meet Federal exhaust emission standards. The vehicles involved in the recall include the Buick Century, Regal, and Le Sabre. Vehicles sold in California are not included in the recall.

The Agency has identified the problems to be defects in the exhaust gas recirculation system which cause the vehicles to emit pollutants in excess of the 1977 Federal standard for oxides of nitrogen. The vehicles also do not meet the standards for emissions of hydrocarbon and carbon monoxide. Although the exact reason for the latter emissions is still under investigation by GM, the Agency believes there is a defect in the carburetor idle system.

Under the recall provision of the Clean Air Act, General Motors has 45 days to submit a plan to remedy the pollution problem on these vehicles or to request a hearing. Once EPA has approved the plan, General Motors will notify owners whose cars are involved. The cars would be repaired by GM dealers at no cost to the owners.

Fuel complaint

EPA has cited a Sears, Roebuck and Company, Inc. service facility in Louisiana for violating Agency fuel regulations, and an administrative civil complaint asking for \$189,000 in penalties has been brought against the company. The Agency said it knows of 27 occasions when service vans and a compact station wagon belonging to a Sears facility which required unleaded fuel were fueled with leaded gasoline instead, causing violations of Federal unleaded fuel regulations.

Fuel switching has been a source of concern at the Agency for some time. Results of earlier surveys show as many as 10 percent of the vehicles that needed unleaded gas were improperly fueled with leaded. Under the law, retail gasoline station operators and fleet operators with gasoline dispensing facilities can receive a maximum of \$10,000 civil penalty each time a violation takes place.

RESEARCH AND DEVELOPMENT

Wood burning

EPA is conducting research on overcoming air pollution problems from residential and industrial wood burning. Numerous studies are being conducted at the Agency's Industrial Environmental Research Laboratory in Research Triangle Park, N.C., aimed at a better understanding of the types and amounts of industrial and residential wood combustion emissions, determining the impact of wood burning on atmospheric air quality as compared to other energy sources, and learning how this pollution can be minimized by changing conventional wood burning methods.

EPA hopes that the scientific and engineering research generated by this research can be used to: (1) design and construct less-polluting equipment; (2) control emissions through improved operation; and (3) select those types of wood that have the least pollution potential.

Research Proposals

A new system for research proposal solicitation and review, designed to strengthen EPA's research capability, was announced recently by Stephen J. Gage,

Assistant Administrator for Research and Development.

"The Agency's regulatory responsibilities require the best possible scientific information," Gage said. "I believe this new process will open up our system, providing a broader base for research proposals and higher quality scientific results."

The new system, intended to broaden the approach for reviewing proposals, focuses on the wider use of peer panel reviews to assess scientific merit. The review process will be used in conjunction with proposal solicitations similar to those used by the National Institutes of Health and the National Science Foundation.

The Agency's Office of Research and Development (ORD) currently awards approximately \$70 million annually in research grants and cooperative agreements.

Resin Removal

The EPA has asked for the removal of filtering resins from drinking water softeners sold by 21 companies in nine states because the resin may contain low-level radioactive material which might contaminate drinking water.

Water softeners are used to remove calcium and magnesium—the "hardness"—from water. They must be commercially installed and are not "screw-on" type water filters sold to homeowners.

The water softeners involved are believed to be in use in Arizona, Florida, Illinois, Michigan, Minnesota, New Mexico, New York, North Dakota, and Wisconsin.

The Agency is investigating whether further action should be taken

under the Federal Toxic Substances Control Act and whether dealers will be ordered to replace the filtering devices and prohibit future sales of them.

PESTICIDES

Sales Stopped

The Union Carbide Corporation has volunteered to stop selling a pesticide called "aldicarb" in Suffolk County, New York, to prevent further contamination of drinking water wells there, according to EPA. The Agency will permit labelling of aldicarb (brand-name Temik) so that sale and use of the highly toxic pesticide will be prohibited in Suffolk County, on the eastern end of Long Island. However, its use on potatoes, soybeans, oranges, peanuts, and other crops in other parts of the country will be allowed to continue under current safeguards.

Potato growers in Suffolk County have used aldicarb, a granular material plowed into the soil, for the past several years to curb pests called golden nematodes and Colorado potato beetles. But studies begun last August showed that aldicarb was contaminating drinking water wells in the area.

The Suffolk County Health Dept. has closed 51 wells with levels of the pesticide above 7 parts per billion (ppb). In all, 216 public and private water wells in the county have been found to contain aldicarb traces ranging from 1 to 515 ppb.

AGENCY WIDE

Costle Named

President Carter recently established the Federal Radiation Policy Council and appointed EPA Administrator Douglas M.

Costle as its first chairman.

Costle said the Council will involve all government agencies with major activities or responsibilities in the area of radiation protection and "will offer for the first time a mechanism to coordinate the formulation and implementation of Federal policy relating to radiation protection. It will also serve as a forum for public input on radiation protection issues and ensure effective liaison with the Congress and the States."

Energy Study

The EPA has released a new study of environmental impacts related to Western energy development. Titled, "Energy From The West," the 10-volume assessment forecasts the cost and benefits of large scale energy development to reduce the Nation's dependency on foreign oil. The study was prepared for EPA by the Science and Public Policy Program of the University of Oklahoma.

The study focuses on development in eight energy-rich states: Arizona, Colorado, Montana, New Mexico, North Dakota, South Dakota, Utah, and Wyoming. Energy and industrial development other than energy-related activities that will be attracted to the region could add thousands of job opportunities by the year 2000. State, county and, over the long term, municipal governments can expect surplus tax revenues.

The report cites environmental impacts such as underground water contamination, water shortages, waste disposal problems, and increased air pollution.

Environmental Council

The Environmental Industry Council, in a program jointly sponsored by the President's Council on Environmental Quality, has awarded citations to four companies for their outstanding contributions in the fields of pollution control and energy conservation.

Gus Speth, CEQ Chairman, presented the awards at the 1980 Environmental Industry Conference in Washington, D.C.

Perfection of a technique by which a sanitary landfill provided gas for homes and industry won an award in solid waste management for Getty Synthetic Fuels, Inc.

Basin Electric Power Cooperative of Bismarck, N.D., won an award in air pollution control for a successful dry method of removing sulfur dioxide from stack gases of coal-burning power plants.

Martin Marietta Alumina, Inc. of St. Croix, Virgin Islands, received an award for energy conservation for production improvements that have saved two million barrels of oil since 1972.

A General Electric Company plant in Gainesville, Fla. won an award for a new process for handling wastewater in manufacture of nickel-cadmium batteries. Before the system was developed, Speth said, the plant had been discharging some 250,000 gallons of treated water daily into a nearby stream that found its way to an underground water supply. When the State mandated tougher standards, GE installed a process to recycle the wastewater and keep it on the premises, at the same time salvaging several million gallons annually of sodium hydroxide, which is sold as raw material. □



Scenes from Earth Day, 1970.

Earth Day '70

Continued from page 7

In some ways NEPA may turn out to be the most influential of our environmental laws for it not only sets forth our basic national goals for environmental protection, but it also tells us that essential to achieving them is foresight.

There have been other accomplishments. Today, almost every State has one or more agencies charged with protecting its environment and natural resources. Nearly 150 universities and colleges have programs for environmental education. As of Dec. 30, 1979, the U.S. Environmental Protection Agency had made grants of \$24.9 billion for municipal wastewater treatment projects. 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.

It ought to be remembered that there are huge costs involved in the maintenance of the *status quo*, even though they do not show up on corporate balance sheets. A recent study conducted for the Environmental Protection Agency estimates that air pollution alone results in deaths costing the Nation \$5 billion to \$16 billion a year and disease costing about \$36 billion a year. Efforts to clean up our air, land, and water have yielded all of us inestimable benefits and will continue to do so. The National Wildlife Federation sums up the importance of the first environmental decade:

The Environmental Revolution has altered our physical surroundings. Beyond that, it

has worked remarkable changes in government, law, politics and economics. It has reshaped many people's philosophy of life and scale of values. In very practical terms, the Environmental Revolution is lengthening lives and lessening human misery by reducing the poisons in our air, water, and soil. Perhaps most importantly of all in a way not too many people have noted, the Environmental Revolution has revitalized the democratic process.

What has happened to the Great Lakes is an excellent illustration of what has been accomplished in the first decade of national concern for the environment.

In 1970, scientists told us that Lake Erie was dying and that the other Great Lakes were threatened by pollution from the steel plants, oil refineries, paper mills, and city sewage plants which for the previous one hundred years had befouled the world's largest fresh water system.

By 1980, the lakes had won a stay of execution, thanks to an international effort. In two Great Lakes Water Quality Agreements, the first in 1972 and the second in 1978, the U.S. and Canada solemnly agreed to begin the arduous process of cleansing the lakes. And that process has begun. Federal legislation, notably the Clean Water Act, has provided us with the means to assess and abate new threats to the Great Lakes ecosystem.

The result is that substantial progress has been made in controlling pollution entering the lakes from industrial and municipal point sources. Phosphorus levels, which once threatened the lakes with death by eutrophication, are beginning to decline. DDT is leaving the Great Lakes food chain faster than expected. However, as we approach a resolution of these old problems, new ones are identified to take their places.

Within the realm of toxic contaminants, we have had to shift our focus from DDT to PCB's. Our main pollution control and abatement concern has become urban runoff and atmospheric fallout, as the existing environmental laws have progressively reduced emissions from point sources.

The lesson of the Great Lakes in the 1970's is this—in less than 200 years, in less time than America has been a Nation, a brief moment in terms of man's life on this planet, significant adverse changes in the Lakes' water quality have occurred. The responsibility for these changes rests solely with man. In the 1970's, a sufficiently large and dispersed group of people recognized the fragility and finite nature of the Earth's ecosystem, understood that "everything is connected to everything else," and accepted the responsibility not only to set straight the mistakes of the past, but to avoid repeating them in the future.

So long as the human species inhabits the Earth, proper management of its resources will be the most fundamental issue we face. Our very survival will depend upon whether or not we are able to preserve, protect and defend our environment. We are not free to decide about whether or not our environment "matters." It does matter, apart from any political exigencies. We disregard the needs of our ecosystem at our mortal peril.

That was the great lesson of Earth Day. It must never be forgotten. □

Senator Nelson (D-Wis.) proposed Earth Day '70.



Earth Day, 1970.



Norbert A. Jaworski

He has been named Director of the Environmental Research Laboratory in Duluth, Minn. He was most recently the Deputy Director of the Industrial Environmental Research Laboratory, Office of Research and Development at Research Triangle Park, N.C.

He has been director of EPA's Pacific Northwest Environmental Research Laboratory in Corvallis, Ore.; director of EPA's Grosse Ile Laboratory in Grosse Ile, Mich.; and chief of the engineering section of the Chesapeake Technical Support Laboratory in the former Federal Water Pollution Control Administration. He was a member of the North Carolina Scientific Advisory Board for Water Quality.

Jaworski has a B.S. and M.S. in Civil Engineering from the University of Wisconsin and a Ph.D. in Water Resources Engineering from the University of Michigan.



Glenn Schweitzer

He has been named Director of the Environmental Monitoring Systems Laboratory in Las Vegas, Nev. He joined EPA in 1973 as Director of the new Office of Toxic Substances after serving in senior scientific positions within the Department of State, the Agency for International Development, and the Executive Office of the President. In 1977 he joined the Program on Science, Technology, and Society of Cornell University as a Senior Research Fellow, returning to the EPA Office of Research and Development in late 1979 as Director of the Ecological Effects Division in the Office of Environmental Processes and Effects Research.

He is a member of the New York Academy of Sciences, the American Chemical Society, and Sigma Xi.

He received a B.S. from the U.S. Military Academy and a M.S. degree from the California Institute of Technology.



Dr. W. Montague Cobb

He was among the guest speakers during Black History Week Observances at EPA Headquarters, February 25-28. Dr. Cobb spoke on the subject of "Blacks in Medicine—Past, Present and Future." He is a Distinguished Professor Emeritus of Anatomy in the Howard University College of Medicine and editor of the Journal of the National Medical Association.

Since January, 1976, he has been President of the National Association for the Advancement of Colored People. And more recently, he served as Distinguished Professor at Arkansas University.

Others on this year's program, were Larry Young, a member of the Maryland legislature and President of the Center for Urban Environmental Studies, and the Reverend Bernard Lee, a former consultant to EPA and now Project Director with the Southern Christian Leadership Conference.



Richard M. Campbell

He has been named Assistant Inspector General for Investigations, where he will direct EPA inquiries into fraud, malfeasance, contract violations by contractors, misuse of funds, and maladministration. Campbell comes to EPA from the Department of Health, Education and Welfare, where he was Director, Division of Investigations from 1973-79 and Acting Assistant Inspector General for Investigations during 1979. He served in the Department of Agriculture as Assistant Regional Inspector General from 1971-73 and special agent from 1964-71. Previously he was a special agent for the U.S. Army counter-intelligence from 1949-69. Campbell earned a bachelor's degree from the University of Maryland in 1962. In 1979 he received the HEW Inspector General Leadership Award.

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Ecology and the Future

Continued from page

and services." Air pollution is widely seen as one problem, for instance, that can be completely solved by making laws. EPA is still too much on the regulatory side and does not give enough emphasis on prevention, such as developing waste management systems, better siting, and planning so as to avoid anticipated pollution stresses. If heavy industry and power plants were located in large parks with greenbelts of natural or semi-natural buffers, then spills or accidents would be contained. A common sense thing. We don't do it, though. We stick industry right down in the middle of urban sprawl or we let the sprawl grow up around it, as in the Los Angeles airport case where the city eventually had to tear down the houses and buy everybody out in order to keep the airport functional. The Three-Mile Island nuclear plant is another case where people are living too close to a potentially dangerous plant. The point is that the economic cost of poor planning is now evident and must be considered in all impact assessments. And this, of course, brings up another common sense wisdom: "An ounce of prevention is worth a pound of cure!"

Q What do you think is going to be the impact of this tremendous loss of farm land that seems to be going on in this country almost daily?

A Very soon now we won't have surplus grain to trade with or to use for gasohol; we'll need all of it for food (for us and our domestic animals). It's folly to allow our best farm land to be used for other purposes, such as housing, when there is marginal land that can be used for such purposes. Again, we can blame the market system that allows urbanized real estate values to far exceed farm values. We can also blame various vested interests who constantly block any reforms in our tax and zoning procedures that might alleviate the situation. Preservation of farm land is something we must do something about in the 1980's. If

there is real public awareness and public pressure on this, politicians will find a way to do it!

Q With the energy problem we have today, we won't continue to have new suburbs will we?

A I suspect urban sprawl will be slowed. So some overshoot trends are self-corrective. But, of course, that brings us to the fact that we've never solved in America the problem of how to build a city as a place to live; we have built cities whose major purpose is to promote business; you don't plan to live in those glass towers unless you are extremely wealthy! Again, European cities are more livable than ours. So we have lessons to learn from them. We go to some of our cities at night, you know, and there is nobody on the streets except criminals. Whereas in the European city, people live above the stores, have nice homes, parks, Mom-and-Pop shops, and they enjoy living there.

Q Do you think it's going to be possible to make progress on an ecological ethic when we are also confronted by an energy crisis?

A Yes. I think the energy crisis will actually speed the application of ecological principles and the strengthening of ethics. My brother, Howard, and I both emphasize in our books that good ecology is based on the laws of energy. Man and nature are both ruled by and operate under the same natural laws. It's the quality as well as the quantity of energy that is important. Sunlight and oil are not the same in quality in terms of potential ability to do work; thus we cannot shift from oil to solar power without making adjustments for the quality differences. The problem is conversion. There are plenty of energy sources. Hydrogen and sunlight are everywhere; atomic energy is everywhere. There's lots of oil, coal, but how do we convert these with large net benefits and without negative effects on the environment, on our vital life support systems and on social equities? This is

the challenge. So environmental concern and concern for energy is the same thing! It's now a matter of getting people to see that these concerns are not contradictory, because the one promotes the other.

Q Of course, you have a negative effect from almost any type of energy, don't you?

A Oh yes, but some conversions are more costly to the environment than others. This raises the question of the ultimate carrying capacity and the population problem. Increasing population density and resource demand is a world problem. Fortunately, we are seeing a reduction in the world birth rate. There seems to be a substantial decrease coming by the end of this century.

Q What is going to be the answer to getting the right things to happen? How are you going to get the word out?

A It takes a lot of effort and repetition—like advertising; I spend a lot of time with public lectures and writing articles like "Common Sense Ecology" or "There's Good News About Energy." What I'd rather be doing maybe is more research, but I feel all of us, journalists and scientists alike, should invest time in public communications.

Q Do you believe we will be able to live in space on a large scale, as some scientists predict?

A In his book, "The High Frontier," Gerald O'Neill confidently expects that in the middle of the next century there will be millions of people living in great harmony and with great success in space colonies. They will be mining the moon and mining the asteroids in order to continue exponential growth in population and affluence after it's no longer possible on the Earth (so says O'Neill!). Actually, we have not yet taken the first step, that is, built a prototype of a fully regenerative, very large spacecraft capable of functioning in

space without an umbilical cord to Earth. The latest NASA report says straight out that we cannot, with existing technology, build a space colony because we don't know how to miniaturize the buffer capacity of biosphere that we mentioned earlier in this interview. Thus, I'd say that most scientists are skeptical that space colonization will be possible or desirable in the next century. But we can say, let's work towards such a goal, but don't give it high priority until we get Earth in better shape. If we don't preserve and repair the Earth and its life-support system, and conserve its precious store of energy, we'll never get to space because revolutionary disorder (as in Iran) and constant wars over declining resources will require all of our energy and human ingenuity simply to survive on Earth!

Q We hear a lot about ecology and nature. What about ecology and cities? Is that an area where we need more emphasis?

A Yes. It certainly does need more attention. There has been much talk and writing about the "ecology of cities" but most has been too narrow in focus. We have already commented on the need to manage cities as places to live, not just places to earn money. Another important point to emphasize is that the city is a heterotrophic or incomplete ecosystem which depends on a huge "life support" area to provide food, energy, outdoor recreation, water, and air. Thus, the city *does not have a separate ecology* but is a part of the larger ecosystem that includes the rural environment, the atmosphere, oceans, tropical forests, and so on. The city survives only if its life support systems are working. The best cities in the world to live in are those that have lots of open space around them, and are not jammed up back to back with other congested areas. An example is San Francisco, which is surrounded by natural water bodies and mountain buffers that provide "breathing room" so to speak and there are food-producing areas close by. The

SUIT IN
LOUISIANA

EPA Deputy Administrator Barbara Blum has announced that the Department of Justice, on behalf of EPA, has filed a civil suit charging two corporations, the Southeastern Chemical Company, Inc., and 2001 Inc., of Louisiana, with improper disposal or storage of highly explosive, flammable, and toxic chemicals at a site north of New Orleans. "The suit asks that the court stop the defendants from discharging chemical wastes into the air, soil, or water," said Blum. "The suit also asks that a study be done to determine the nature and extent of soil contamination and that a plan for a general clean-up be devised."

UNLEADED
FUEL VIOLATORS

The EPA has issued administrative civil complaints against four companies in Northern Virginia seeking more than one million dollars in fines for using leaded gas in fleet cars that require unleaded gas. The complaints specifically allege that Transportation Inc., Arlington Yellow Cab, Inc., All State Messenger and Delivery Services, Inc., and Murphy Brothers, Inc., are owners or operators of a facility at 1200 N. Hudson Street in Arlington that illegally introduced leaded gasoline into vehicles designed for unleaded, and offered for sale or dispensed leaded gasoline which was represented as unleaded fuel. Each company was assessed individual fines of \$271,000.

urban dweller must realize how valuable these buffers are and be *very militant* in their preservation.

Q How would you describe our goal as a society?

A Our goal should be towards achieving an efficient society which is designed to work with rather than against natural laws such as the laws of energy, growth, and development. Along with this goes a goal to close the very dangerous rich-poor human gap, as discussed in the latest "Club of Rome" report. Both of these goals require a political and economic reordering of priorities—and this will be a difficult transition that will take time, common sense, patience, and better public understanding than we have at present. It would appear that the gaps can-

not be closed by laissez-faire capitalism alone or extreme socialism either. Some kind of different mix must evolve. So Federal agencies must zero in on energy thrift, reduction of waste, urban-industrial siting, rural-urban integration, preservation of agricultural lands and other life-support environment, and perhaps most of all, public education on holistic principles!

Q What environmental measure would you use to decide whether to allow a new industry to locate in a community?

A We suggest that communities look at potential industries very carefully and determine which will provide the most jobs for people needing work and at the same time produce the least deleterious environmental impact. One way to do that is to consider water consumption per employee. A

paper mill, or a chemical plant, may consume thousands of gallons per day to support one employee. A plant assembling watches might use maybe 10 gallons per employee per day and have correspondingly much less demand on resources and less deleterious impact on the environment in general. So, the former (i.e., the chemical plant) would be desirable only in communities and States that have the resources, the sites, and the political will and public opinion to take care of the severe impacts; the latter type of industry would be more appropriate in small communities in less developed regions.

Q What do you see as the big environmental need in the 1980's?

A Integrating man-made and natural ecosystems for mutual benefit and starting the

transition from sole dependence on declining and non-renewable resources to renewable ones. This means a merging of economics and ecology with increasing emphasis on human values and life support values and less emphasis on production of hard goods. In other words, my prediction for the 1980's is that we're going to begin to merge things that have been controversial and to override special interests with common interests according to the age-old wisdom of common sense. Furthermore, we are going to have to do these things to survive; the handwriting is on the wall! □

Dr. Odum, nationally-known ecologist and teacher, is director of the Institute of Ecology at the University of Georgia and author of five books and numerous articles on ecology.



Environmental Conference

The Lincoln Filene Center for Citizenship and Public Affairs at Tufts University recently held a New England Environmental Conference in Boston. The conference offered thirty workshops on key environmental issues including air pollution and acid rain, hazardous wastes and wetlands protection, and water supply. There were also workshops to assist citizens in sharpening the skills necessary for active participation in governmental decision-making in the 1980's.

Acid Rain

In conjunction with Earth Day '80, EPA Region I is scheduled to present an Acid Rain Conference on April 12. The conference will be held in Boston and will provide interested citizens with up-to-date information on acid rain and its effects.

New England is particularly susceptible to acid rain because the underlying bedrock of the region contains little of the natural components necessary to neutralize the acid.



Cleanup Action

EPA is using the Clean Water Act to control pollution from the storm sewers leading from the Love Canal site into adjacent Black Creek. The Act provides funds for pollution cleanup if navigable waters are threatened with contamination. The

Agency has earmarked \$260,000 to pay for fencing off the area around Black Creek and scraping the tar-like materials which contain several hazardous substances from the sewers.

Charles Warren, the new EPA Regional Administrator, is also pushing the work involved in the \$8 million cooperative grant with New York State to finance the construction of a remedial containment and collection system (\$2.5 million), a permanent treatment facility (\$2 million), analytical services (\$1.4 million), as well as monitoring, risk assessment, and epidemiological studies.

Warren explained that the \$8 million EPA/New York State grant will also be used to establish a technical advisory committee to make scientific reviews and recommendations separate from political or policy implications. Demonstration projects will be employed to find out what remedial techniques work best at the site. A safety plan to minimize unhealthful worker or resident exposure is also to be included.



Air Permits

Region 3 has issued an air pollution permit to the Hampton Roads Energy Company for a proposed oil refinery to be built in Portsmouth, Va. In a related action, EPA approved a change in Virginia's air pollution control regulations designed to protect air quality in the refinery area.

The permit, known as a "PSD" (Prevention of Significant Air Quality Deterioration), requires that the levels of air pol-

lutants will not be significantly increased by operation of the refinery.

Region 3 issued the permit after a careful review of the application and consultant studies, plus extensive public participation, which indicated that the refinery could meet the conditions required by the regulations.

EPA's review determined that the pollution control equipment being proposed, plus the use of low sulfur fuel in refinery operations, meets the best available technology requirement. As a further protection, tankers that tie up to the refinery's marine terminal will be required to burn low sulfur oil. These measures will insure that air quality will be protected.

EPA has also approved a change in Virginia's air pollution control regulations designed to insure that concentrations of ozone, which already exceed national standards in the Portsmouth area, will continue to decline despite operation of the refinery.

The necessary offset was found when the Virginia Department of Highways and Transportation agreed to use emulsion or water-based asphalt rather than cut-back or solvent-based asphalt for their road construction and repair activities.



Hazardous Waste

The State of Mississippi is making an all-out effort to involve the public in its hazardous waste program. This spring, citizens in all parts of the State are being encouraged to participate by attending public education forums in Columbus,

Jackson, and Hattiesburg. The Jackson forum will be videotaped and televised statewide over Mississippi's educational television network. The Mississippi State Board of Health is leading the campaign with an assist from Region 4's Office of Public Awareness. An Ad Hoc Advisory Committee on Hazardous Waste Public Education is playing a key role in "promoting public awareness of challenges Mississippi faces in the critical area of hazardous waste management." The broadly-based committee includes representatives from government agencies, environmental organizations, and industry. The group has produced a slide show, a brochure, and other materials to aid in the public education process.

The State is re-writing regulations first drafted in 1979. Public hearings on the new regulations will be held following the series of forums. It is anticipated that the regulations will be adopted by the State this summer and implemented concurrently with EPA's.



Seek and Find

Region 5 has launched a new citizen participation program to locate dangerous, illegal hazardous wastes, and in conjunction with State agencies, eliminate any threat they present to human health and the environment. Called "Seek and Find," the new program uses a toll-free hotline to help concerned citizens reach EPA specialists trained in hazardous wastes investigation. People are urged to call the "Seek

and Find" line if they suspect illegal dumping, but are cautioned not to attempt to investigate a hazardous site themselves. Many such wastes are in the form of liquids or sludges that can be explosive and should be handled only by experts. The hotline telephone numbers were incorrectly given in the last issue of the EPA Journal. The correct numbers are as follows: For Illinois residents only, the phone number is 800-972-3170. For residents of Wisconsin, Minnesota, Ohio, Indiana, and Michigan, the phone number is 800-621-3191.



Grants Awarded

EPA, in cooperation with the Urban Mass Transportation Administration, has awarded \$1,514,900 in transportation/air quality planning grants to local government agencies in Region 6.

Regional Administrator Adlene Harrison said the grants will be used to evaluate reasonably available transportation control measures including vehicle inspection/maintenance programs, increased transit service, carpool/vanpool programs, bicycle facilities, and parking management programs.

Ultimately, EPA will be able to determine the extent of air quality improvements from these transportation measures. Evaluation of the transportation alternatives includes air quality analyses and assessments of the economic, mobility and social impacts of the measures.

Earth Day '80

The Office of Public Awareness has mounted a special public information campaign to increase participation in environmental protection as a part of Earth Day '80. Regional Administrator Adlene Harrison will hold a telephone press conference with key media throughout the region to announce environmental accomplishments in the last ten years. There are also plans to provide special information to Senators and Congressmen for release to their constituents, send public service announcements to radio stations, sponsor a grade school poster contest on cleaning up the environment, and encourage student clean-up activities and special Earth Day displays.



PCB Fine Levied

Kansas City Power and Light Company has been fined \$55,000 for violations of PCB regulations at three facilities in Kansas City and at the La-Cygne power plant in Kansas. Region 7 charged that the utility mishandled, mislabeled, and improperly disposed of PCB's during a period from September 4 to October 30, 1979.

This is the second major Agency action in four months involving enforcement of PCB regulations. In October, Region 7 fined Radium Petroleum Company of Kansas City \$131,000 for allegedly spraying PCB-contaminated waste oil on roads at a suburban Kansas City landfill. Negotiations for a settlement between EPA and Radium are in progress.

Earth Day '80

Region 7 will join local conservation groups in celebrating Earth Day '80. Plans are underway to mark the tenth anniversary of Earth Day by staging ceremonies with tree plantings and mayoral proclamations in major cities in the region. A regional Earth Day brochure was sent to 12,000 environmentalists, civic leaders, educators, and others to encourage participation in the celebration. Also, EPA employees will be allowed to commemorate the day by planting their own trees provided by the Missouri Department of Conservation. Elsewhere in the region, communities are scheduled to hold seminars, festivals, and other benefits under an environmental theme.



Combined celebrations

Thousands of metropolitan Denver residents and visitors are expected to take part in a dual celebration of Earth Day and Year of the River on Sunday, April 29th. Through the combined efforts of approximately 50 environmental, civic, business and government organizations, numerous events are scheduled.

Denver's Confluence Park, located on the Platte River, will serve as the focal point. Visitors will be entertained by live music while strolling by the many information booths and exhibits. Among the demonstrations planned are stream stocking, tree planting, pollution monitoring processes, precision parachuting, and kayaking.



Clean Lakes Grant

Region 9 has awarded \$70,000 to the State of California to restore Lake Merritt in downtown Oakland. The grant was one of ten awarded across the country to clean up urban lakes. Authorization for the money comes through the Clean Lakes Program under the Clean Water Act. The program was designed in conjunction with the President's Urban Policy Initiatives. An additional \$30,000 will be contributed by the State Water Resources Control Board and/or a local agency such as Alameda County Flood Control and Water Conservation District, making the total \$100,000.

This money will then be used by various local agencies to diagnose the dying lake and to come up with a feasible means of remedying its problems. These include periodic nuisance algae growth and fish kills, polluted sediments, bacterial contamination, and floating debris. There have also been years when biomass accumulation has prevented boating, and during the rainy season occasionally sewage makes its way from overflowing storm drains to the lake.

The need for a solution to the Lake Merritt problem was first brought to light in 1977 in the EPA-funded Environmental Management Plan, developed by the Association of Bay Area Governments.



EPA Employee "Hired"

A senior staff level engineer from EPA's Northwest Region 10 office has been hired by Anchorage, Alaska, to help the city develop coordinated approaches to improve the local environment.

Kenton L. Lauzen, for the past four years the State-wide coordinator of EPA's approximately \$80 million-a-year sewage treatment construction program in the State of Washington, will report to Anchorage on April 1 to begin work on the staff of John Spencer, Anchorage's chief administrative officer.

Spencer said Lauzen will provide technical and administrative assistance to the city as Anchorage tackles problems related to sewage needs, drinking water protection, air pollution control, and the environmental impacts from land use, energy, and transportation programs.

Lauzen will be employed by Anchorage under terms of an agreement with EPA that identifies high priority environmental questions of mutual concern to Anchorage and EPA's Northwest regional office.

Lead Studies

Region 10 has begun a series of studies on the control of airborne lead in Kellogg, Idaho, where current ambient levels are frequently 10 times more than allowed by the national air quality standard. The studies—being undertaken with the joint participation of the Division of Environment within the State of Idaho's Department of Health and Welfare—will

identify the sources of stack and fugitive emissions of lead from the Bunker Hill Company's lead and zinc smelter complex in Kellogg. The studies will also determine the level of control technology needed to reduce the airborne emissions of lead and will inform the Bunker Hill company about the costs of such technology. Results of the study, expected to be available late this year, will be used to help develop a State Implementation Plan for controlling airborne lead in the Kellogg area. □

States Served by EPA Regions

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The Colorado— America's Hardest Working River

By Truman Temple

The Spanish named it the Colorado because of its reddish, silt-laden waters. John Wesley Powell, a 19th century explorer, called it "a mad, turbid stream." In the 20th century, it has been nicknamed "Lifeline of the Southwest."

But in recent times, the Colorado River also has been termed an "ailing giant." Its lower reaches are burdened with so much salinity that the problem has become an inter-



national issue with Mexico. The increasingly severe demands for multiple use of its waters by the seven States in its drainage area keep lawyers busy. Near the river's upper reaches, cities containing the bulk of the State of Colorado's population are busy piping its water east to the so-called Front Range, while Western Slope farmers argue that their livelihood is being threatened. And many residents—not all of them dedicated environmen-

talists—are deeply concerned about what the exploitation of oil shale, coal, and other energy resources in the West will do to the river.

As Colorado Governor Richard D. Lamm observed a few months ago, "Our finite, limited water resource is being seriously taxed and depleted in most geographic areas. For the first time in our history, we are consuming almost all of the water to which we are entitled in three of our four river basins. . . . Even in the most water-abundant area of Colorado, the Colorado River Basin, the competition is stiff as to how, when, and where we allocate the remaining 1,000,000 acre-feet of our unconsumed water. Further, the availability of this water will depend, in part, on interpretations of treaties, compacts, water quality requirements, and environmental statutes."

To understand the unusual character of the Colorado, it is necessary to consider how it differs from other great rivers of America.

First, when compared to many such waterways, the Colorado has a modest annual flow, an estimated 13 to 15 million acre-feet. That is about the same as the Delaware River's, which is one-third the length of the Colorado and drains a far smaller basin. By contrast, the annual flow of the Columbia River is about 130 million. (An acre-foot is the amount of water that would cover an acre one foot deep.)

Furthermore, the Colorado is unnavigable to any ocean shipping. There is no major city at its mouth where it flows into the Gulf of California, no deepwater port along its length, no complex of docks, or any of the other transshipment facilities that characterize rivers like the Mississippi and the Hudson.

Despite all this, the Colorado has been described as the aorta of the Nation's fastest-growing region. Vast desert areas depend on its nourishing water. Fed by winter snows in the high passes of the Rockies, it begins

at 14,000 feet in Rocky Mountain National Park and snakes its way more than 1,400 miles to the Gulf of California, helping to sustain a total of 29 million people in seven States. South of the border, it also is a water supply for half a million people and irrigates about 500,000 acres in Mexico.

In fact, the Colorado permeates the economy and life-style of the Southwest so thoroughly that three of EPA's Regional Offices are involved in the quality of its water in one way or another. Region 8 deals with many of the Upper Basin matters from its Denver headquarters. Region 9 with headquarters in San Francisco is concerned with the river since it flows through one State in its jurisdiction, Arizona, and borders two others, California and Nevada. Region 6 from its central office in Dallas also participates in Colorado affairs since one of the Upper Basin States, New Mexico, is in its territory.

"We are involved with the Colorado in several ways," says Frank Covington, Director of Region 9's Water Division. "We're on the receiving end of problems. The Lower Basin States of course contribute salinity, as do the Upper Basin ones, and as the latter gets into energy development, we'll feel any impact. We also interface with Mexico, and Paul De Falco, our Regional Administrator, represents the Region at meetings of the International Boundary and Water Commission."

The references to the Colorado as the cardiovascular system of the Southwest are not idle fancies of travel writers. The populations along its route depend on its life-nourishing flow for their household needs, electric power, food and fiber, as well as many jobs in a multi-million-dollar recreation industry. In fact, more than 90 percent of the Colorado and its tributaries is used to irrigate agricultural fields, most of which get little rainfall. The river's drainage basin covers some 244,000 square miles and waters 3.4 million acres producing crops worth more than

\$1 billion a year. Unfortunately, it also flows through the most arid sector of the North American continent. In this desert climate, water evaporation is extremely high. And although the irrigated farms in the Lower Basin permit a year-round growing season with double and even triple cropping, producing a big share of the Nation's fruits and fresh vegetables, a huge amount of the river evaporates into the air from the chain of man-made reservoirs along its course. This evaporation further increases the river's salinity.

What sort of climate is it? The region that the Colorado drains has an annual average rainfall of only 10 inches, compared with about 57 for Louisiana, the Nation's wettest State. But even worse, only one-eighth of that ten inches ever survives to contribute to the volume of the river, since the rest is lost through evaporation on the ground or by transpiration through the leaves of the basin's plants.

Great quantities of the river's flow are diverted to reclamation projects and to other locations hundreds of miles distant. The lush grazing meadows in the valleys of the Rockies and the lawns of Los Angeles are both nourished by the Colorado. It slakes the thirst of people from Denver to San Diego. From Lake Havasu on the Arizona border, one billion gallons of Colorado River water are taken daily 250 miles west across California to supply the Los Angeles and San Diego megalopolis. Other vast quantities are channeled to California's Imperial Valley to irrigate crops. And numerous other projects divert the river's waters along its course. In fact, in all but two of the last 20 years, the Colorado petered out into a dry riverbed at its mouth because so much of it had been siphoned off.

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Raft trip on the Colorado River

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being divided equally into two huge segments: The lower compact States of Arizona, Nevada, and California, and the upper ones of Wyoming, Utah, Colorado, and New Mexico. (The dividing line was near Lees Ferry, Ariz., where an exiled murderer named John D. Lee began transporting passengers in 1871 across the river. The annual river flow has been measured there since 1922 with the long-time average annual flow now believed to total only 15 million acre-feet.) The compact also recognized that Mexico could be given rights to use Colorado River water at some future date. A treaty was signed with Mexico in 1944—but more about that later.

The 1922 compact paved the way for enormous engineering projects. It made possible for the first time a drainage basin with multiple use of water including power development, irrigation, recreation, and flood control. Among the projects that followed were Hoover Dam in 1936, creating Lake Mead and considered a major engineering feat of its time; the Imperial Dam in 1938 where the All-American Canal carries water 80 miles west to the Imperial Valley and its 2,000 miles of lateral canals; Parker Dam 150 miles south of Hoover Dam, completed in 1938 and creating storage water for 22 California cities; the Colorado-Big Thompson Project, completed in 1945, diverting water by tunnel beneath the Continental Divide to irrigate cropland in northern Colorado, and the Davis Dam in 1949, alleviating power shortages in Arizona.

The creation of these vast reservoirs and irrigation projects brought wealth and population to the Southwest—but not without a price. Evaporation from the huge new bodies of water along with other uses concentrated the salinity of the river water remaining behind, and the run-off and percolation from irrigated fields increased it even more. To be sure, much of the salt load also comes from natural sources, since mineral weathering and dissolution of soluble salts in the land would occur even if the

river basin were totally uninhabited. According to a 1971 EPA report on the Colorado, for example, about 60 percent of the salt load in the waters at Hoover Dam comes from natural sources.

But since the region began its dramatic growth in the past few decades, there is no doubt that man's activities have greatly affected the salinity of the river. Estimates vary on just how much. Myron B. Holburt, chief engineer of California's

figure will hit \$237 million annually by the year 2000 if no salinity control measures are carried out.

The 1944 treaty made no mention of the quality of the 1.5 million annual acre-feet of water from the Colorado that Mexico was guaranteed. But in the 1960's it became apparent that the increased saltiness of Mexico's share was greatly reducing the usefulness of the water for irrigation in that country. Each year the

Brownell, former U.S. Attorney General, to head a task force seeking a solution. The conclusion: Build a giant desalting plant at Yuma near the Mexican border where water could be diverted, cleaned up, and poured back into the river to dilute the salts.

Congress in 1973 authorized construction of the plant, which would be ten times bigger than any such facility in the world, and able to process 96 million gallons of water a day. However, a number of large projects that would increase irrigation and other water uses are in various stages of completion. The drainage from some of the new irrigated lands will soon be carrying still more salt into the Colorado and south of the border.

In the meantime, the estimated cost of the desalting plant has soared. The House recently approved more than \$356 million for the project including some related work to alleviate impacts on fish and wildlife habitat at the site, more than double the estimate six years ago. The price tag attracted fire from several quarters. The General Accounting Office, in a critical report to Congress, said earlier that the project "needs to be re-assessed" and suggested that cheaper alternatives be studied. Some Congressmen also objected. The most vociferous of them, Representative George Brown of California, estimated the ultimate construction cost will hit half a billion dollars plus operating costs that will run many more millions of dollars in ensuing decades.

"How can we get out of this mess?" he asks. "While I'm no expert, the experts I've consulted believe the key is how we develop our arid lands, and how we irrigate our crops. In some cases, this may mean not using certain lands due to the soil conditions. In other cases, it means reducing the water return flows, which carry the salts."

In a letter to Representative Brown last September, EPA Administrator Douglas Costle noted that the Agency earlier had expressed environmental reservations about the facility, adding:



Colorado River Board, says the salinity of the river flowing into Mexico increased from 800 parts per million in 1960 to 1,500 parts in 1962 (although others note it has decreased since then). A study by Professor Stanley A. Schumm of Colorado State University reports that the average annual salinity concentration has almost doubled this century.

Salinity hurts crops. The Water and Power Resources Service (WPRS—formerly the Bureau of Reclamation of the U.S. Department of the Interior), estimates that total losses including agricultural and municipal damage due to salinity in the Lower Basin are now \$96 million per year. It estimates the

Mexican authorities pointed this out to Washington with increasing vehemence, and in 1972 William D. Ruckelshaus, then EPA Administrator, convened an enforcement conference of the seven basin States and Federal officials to curb the salinity. Conferees recommended among other things a high priority on removing salt from Paradox Valley and Grand Valley, which were leaching into the Colorado, urged EPA to accelerate its data collection and research, and named the Bureau of Reclamation as the lead agency for basinwide salinity control. President Nixon, sensing a major international problem, asked Herbert

"Our major concern was, and continues to be, that a desalting plant should not be viewed as a panacea for salinity problems in the Colorado River. EPA supports a basin-wide approach to solving these complex and controversial problems, and we will continue to work with the Interior Department in pursuit of this goal."

In response to concerns raised by EPA, the seven basin States created the Salinity Control Forum to develop Colorado River salinity standards, which now include numeric criteria and a plan of implementation. All the basin States have adopted the Forum's recommendations as part of their water quality standards. The basic objective of the standards is to treat salinity as a basin-wide problem and to maintain the 1972 salinity levels in the lower part of the river while the States develop the waters appropriated to them under the compact. Key elements of the standards include establishing numeric criteria at three stations in the lower mainstem (below Hoover and Parker Dams and at Imperial Dam); developing monitoring stations and baseline values at key locations in the Upper Basin, and carrying out a variety of salinity control projects by Federal and State authorities.

EPA has helped to fund a number of irrigation studies dealing with salinity at Grand Valley, Colo. and elsewhere. (EPA Journal, February, 1978.) Scientists say there is no one technology to cure all the problems, but a number of remedies are well known. These include lining canals and lateral ditches to prevent seepage, and the use of sprinkler, drip, or trickle irrigation which applies the water more effectively. Another method calls for more careful timing of irrigation to apply water when the soil requires it. The Soil Conservation Service is now pursuing corrective measures at Grand Valley. It is estimated that 410,000 tons of salt can be eliminated annually from the current discharge into the Colorado from that area.

In addition, water experts are focusing on certain areas of

natural salt deposits that are leaching into the Colorado. The Federal water and power service, for example, is drilling nearly two dozen wells along Paradox Valley in southwestern Colorado to pump brine out of a geologic formation that now contributes 200,000 tons of salt annually to the Colorado via a tributary, the Dolores River. The project, which is targeted for completion in 1986, will pump the brine to an evaporation reservoir or dispose of the brine through deep well injection. EPA's Region 8 staff has worked with the Department of the Interior agency on the problem area.

"We're also investigating 12 other sources of salinity," says Michael Clinton, Chief of the Interior agency's Colorado River Water Quality Office. "Five of them involve saline seepage from irrigated areas like Grand Valley, five involve point sources of salinity like the Paradox Valley situation, and the others involve salt loading from normally dry drainage areas where weathering and natural runoff carry it into the river." These studies will be completed between 1983 and 1989.

The U.S. Department of Agriculture also has become more involved in salinity control in the basin. In Grand Valley, for example, the Soil Conservation Service has provided technical assistance and the Agriculture Stabilization and Conservation Service has helped to fund measures for reducing salinity from irrigated agriculture. These include ditch lining, land leveling, water measuring and control structures, and installation of sprinklers in selected areas. A similar program is beginning in the Uintah Basin. In addition, the Soil Conservation Service has salinity control studies under way in the other major irrigation areas.

Another project to help ease the salinity problem is a weather modification program by means of cloud-seeding that the Interior water and power agency is now putting together for the Upper Basin of the Colorado.

"The Bureau of Reclamation did a successful pilot study in

the San Juan Mountains in southwestern Colorado five years ago," explains Clinton. "Further studies indicate a potential of producing about 1 to 1.5 million acre-feet of water annually." Such a heavy addition of inflow to the river would, of course, provide much-needed dilution of the salinity.

(The dilution would occur only if the added water from rain and snow moves downhill and reaches the Colorado. If large amounts of this water are consumed before reaching the river, the cloud-seeding obviously isn't going to do much to solve the salinity problem.)

Cloud-seeding programs have focused on increasing the winter snow-pack. The idea, however, has been a source of some controversy. Ranchers, highway departments, and some community leaders have voiced concern that additional snow would compound existing winter problems, and fish and wild-life interests fear that the extra snow would have an adverse impact on critical winter range for many game species. In any event, the program would require Congressional authorization and probably would not get underway until the mid-1980's at the earliest.

Still another way to reduce salinity in the lower Colorado would be to mitigate the impact of transmountain diversion of water that now goes by tunnels and pipelines to the East Slope from the Upper Basin. This is water that would dilute the salinity if it didn't end up in Denver, Colorado Springs, and other cities on the eastern side of the Rockies. One of the most articulate forces protesting the way transmountain diversion is taking place now is the Northwest Colorado Council of Governments, representing six counties in high mountain terrain located mostly west of the Continental Divide and extending from the Wyoming border south for 140 miles.

The six counties contain some of the most spectacular land in America, and some world-famous ski centers—including Aspen, Vail, Steamboat Springs, and Breckenridge.

"About 541,000 acre-feet

are now being diverted to the Eastern Slope, or around 20 percent of the total virgin water here," says Tom Elmore, water quality management coordinator for the Council. "This is very pure water, much of it from melting snow. But we're very concerned about new water resource development projects. We project that an additional 1,142,900 acre-feet will be taken by the Eastern Slope by 1995. We estimated these new diversions will mean \$29.9 million per year in salinity damages downstream between now and 1995." The Council is seeking to regulate all new diversion projects and wants the Eastern Slope diverters to compensate for the adverse impacts of their projects by installing salinity controls—not yet specified but perhaps lined irrigation ditches—in the Colorado basin.

"We have an outstanding area here. It's vacationland for the rest of the country—high quality trout streams, pristine water, world-famous ski resorts. The economy is built on energy development, agriculture, and tourism. Much of what we do depends on water. We're seeking to protect our present economic base and to prevent the foreclosure of our future economic options," Elmore declares.

The six counties, to be sure, are up against formidable political forces. The Eastern Slope has about 90 percent of Colorado's burgeoning population, which grew about 25 percent in the last decade. So the votes and political clout are there, and it will take a skillful balancing act for the State to keep its high mountain trout streams flowing if Denver and other nearby cities continue to mushroom.

EPA itself has not escaped the continuing controversy surrounding the Colorado River. The Environmental Defense Fund, a public interest group, sued EPA for its 1976 approval of the water quality standards for salinity by the seven Colorado Basin States, alleging the implementation plans did not provide adequate salinity controls. However, last October the U.S. District Court for the District of Columbia decided

the case in favor of EPA and Interior, which was also a defendant. The Environmental Defense Fund filed an appeal last December.

What of the Colorado's future? One of the biggest questions hanging over the river is the impact of energy developments in the area. The Rocky Mountain West has 50 percent of the Nation's coal reserves, 100 percent of the now commercially recoverable oil shale deposits, and 9 percent of the oil reserves. The region's stripable coal totals 195 billion tons. Its shale oil potential totals 600 billion barrels.

But the industry required to extract these fossil fuels will need water from the Upper Colorado River Basin. According to a report for the Water Resources Council, oil shale and coal gasification developments would consume about 200,000 to 250,000 acre-feet a year to produce 1.5 million barrels of oil or its equivalent daily. Surface water supplies can be made available for these industries only if existing uses are bought out or water not now under contract is brought from the Federal water and power service reservoirs, or if new reservoirs plus pipeline and pumping facilities are constructed. The report estimates the cost of developing the surface water supply would total \$1 billion. The changes this would entail, the report warns, could also reduce recreational opportunities and the habitat for a number of species of fish.

William McDonald, Director of the Colorado Water Conservation Board, points out that the study assumes that neither oil shale nor coal gasification plants will be discharging effluents into the surface waters of the Upper Basin. The study declares that the technology exists to reduce and dispose of the waste streams in other ways that would not affect the river, and actually it will be cheaper to use these methods than to treat the effluent enough to meet discharge standards.

"There is a national need for more energy—but people must pay the full costs to protect the environment and factor those costs into the product," he emphasizes.

Pro-development organizations such as the Club 20, a Western Slope group headed by former Colorado Governor John Vanderhoof, stress the need for balanced economic growth and new jobs in the State. McDonald says the State's approach is to evaluate costs and benefits in any decision about water problems.

Aside from the quality of the Colorado's waters, the tug-of-war over who gets to tap how much of the water promises to intensify. In recent years, the Navajo Indian Tribe has been stating that it has rights to a major portion of the river's flow, as much as 5 million acre-feet a year. If a suit is filed, it promises to drag on for years, possibly decades. Holburt, of the Colorado River Board of California, has pointed out that an earlier lawsuit between his State and Arizona took 13 years to wend its way up to a Supreme Court decision. And a Navajo suit could be more complex since it would involve the Federal Government, all seven States, and many other parties.

Under the existing Compacts and court decrees, some States have been taking more than their quota of the Colorado's water because other States have until now not used all their allotments. But that situation promises to change. California has been using nearly 4.9 million acre-feet per year but when the big Central Arizona Project begins deliveries in the mid-1980's, California will reduce its use to a 4.4 million basic entitlement. Holburt has testified in the past that he thinks there will be enough water from reservoir storage to take up shortages in the decades ahead.

Conflicts over uses of the Colorado's waters come into sharp focus in EPA's Region 8, for instance, when that office reviews environmental impact statements related to water project development. Key examples include the Foothills water treatment project southwest of Denver and the Central Utah Project aimed at supplying water to irrigators, cities, and industries across central Utah.

After months of protracted, sometimes heated, controversy,

EPA's Region 8 office agreed to the issuance of a dredge and fill permit for the dam portion of the Foothills project when sponsors agreed to measures protecting minimum stream flows below the dam and a water conservation program aimed at reducing per capita water consumption in the Denver Water Board's service area over coming years.

Protection of minimum stream flows and water conservation issues generally fuel heated debate among individuals and agencies involved in the Central Utah Project.

To improve its own handling of water project reviews and to inform project supporters and opponents alike of what they could expect from EPA, the Regional Office recently began drafting a proposed water policy.

"Much of the delay and litigation involved in water projects, we believe, can be traced to misunderstanding and misinformation," according to Region 8 Regional Administrator Roger L. Williams. "We hope, through our water policy, to clarify EPA's role and responsibilities in addressing water resource issues.

"We will emphasize early involvement with project proponents to identify and defuse, where possible, areas of conflict and to avoid 11th hour litigation tied to hardened positions where change or compromise is nearly impossible.

"We are committed to involving the widest range of public possible in the development of this policy even recognizing the hazard of doing so where water is so vital and emotional an issue," Williams adds.

Apart from all the other troubles, the Colorado also is suffering in one scenic stretch from an excess of outboard motors, according to the National Park Service. Recently the Park Service ordered a phase-out of all motorized rafts, over the next five years along the 277 miles of the Grand Canyon. River trip parties also will be banned from burning driftwood for campfires during summer months, and must haul their wastes out of the canyon. The move has the support of

environmental groups. Says Gaynor Franklin of the San Francisco Sierra Club. "Let's leave the Grand Canyon to those who want a true wilderness experience."

With all its problems, can the Colorado retain its integrity as a unique water resource in America's Southwest? As the protective measures by Federal, State, and other organizations have come into play, it is obvious that many forces are working to keep the river healthy. Because of the absence of heavy industry along its banks, it has thus far escaped the PCB's that afflict the Hudson. It has experienced no Kepone disaster and none of the massive fish kills that periodically visit coastal areas. So in a way, the Colorado is lucky.

Back in 1903, Theodore Roosevelt stood at the rim of Grand Canyon and looked down at the river, experiencing the awe that visitors often feel when viewing this magnificent vista.

"Leave it as it is," he declared. "The ages have been at work upon it, and man can only mar it."

In the ensuing decades, America has turned the waterway into what one conservation official calls "the hardest working river in the United States." But many of its stretches retain the splendor, solitude, and prehistoric aura that inspired the early Spanish and American explorers. Given enough forethought and care, the Colorado can still be preserved, a river of myths and moonscapes and mystery. □

Truman Temple is Associate Editor of EPA Journal

Back cover Tree on the Coleman Ranch, part of the Flint Hills prairie near Kansas City, Mo. The picture was taken by prairie photographer Patricia Duncan, whose story is included in the Environmental Citizens report in this issue (Article on P.16)

Opposite Toroweap Overlook, the Colorado River, Grand Canyon National Park



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