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# Environmental Goals For America

## With Milestones For 2005

**Draft for full Government Review**

A Proposal from the
United States
Environmental Protection Agency

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# Introduction

Twenty-six years ago, America embarked on a bold and unprecedented effort to become a more responsible steward of the air, water, and land. Although environmental protection had been under way in fragmented fashion for many years, in the early 1970s Americans committed themselves and their government to reclaiming and protecting the environment as never before, in growing realization that sustained economic growth and quality of life are dependent on a healthy environment.

Americans remain committed to a vision of a nation where healthy, economically secure people sustain—and are sustained by—a healthy environment. And Americans are a "can-do" people.

The United States has made tremendous progress over the past quarter century. People now fish and swim in once-polluted waters. The skies are cleaner. U.S. environmental expertise and technology are in demand throughout the world.

But the job is not done. One-half of the American people live in an area where, in 1995, the air was too polluted to meet health standards.[1] Thirty-five to forty percent of America's surveyed rivers, lakes, and estuaries are too polluted to fully support uses such as fishing or swimming.[2] One in four Americans lives within 4 miles of a Superfund site.[3]

To meet the challenges of the future, Americans are calling for a new generation of environmental protection—one that is based on common sense and partnership. They are challenging their leaders to adopt tough but reasonable goals for the environment and to offer people and institutions the flexibility to find cost-effective ways to achieve those goals.

*Environmental Goals for America* is part of the Clinton Administration's effort to build that new generation of environmental protection through regulatory reinvention. By stimulating a discussion of the real environmental results that our nation should achieve, the U.S. Environmental Protection Agency (EPA) hopes to clear the way for solutions that are cleaner for the environment, cheaper for taxpayers and industry, and smarter for the future of this country.

Clear, measurable environmental goals should help the nation answer such important questions as:

- What tangible results should our national environmental programs aim to deliver?
- What investments should be made by federal, state, tribal, and local governments, industry, and others to achieve our environmental goals?
- How can we encourage regulatory reinvention, flexibility, and innovation in working toward our goals?
- What environmental progress are we really making?

## Environmental Goals for America

*Environmental Goals for America* proposes long-range goals and measures of progress—or "milestones for 2005"—that will improve our personal health, our national economy, and our quality of life. They are ambitious but realistic targets for the air we breathe, the water we drink, the food we eat, and the land where we live and work. EPA believes they are achievable with a level of environmental protection that is consistent with current laws and policies. A summary list of the goals and milestones is provided in Appendix A.

In a few cases, U.S. laws and international agreements articulate clear environmental goals and specify target dates. These are incorporated into this report. Often, however, the laws and agreements do not specify measurable results to be achieved, focusing instead on the means of control (see Appendix B). These proposed goals and milestones seek to fill that gap.

Although EPA is proposing them, the goals and milestones are for the nation as a whole, not just for EPA. They fulfill a commitment in EPA's 1994 5-year strategy, *The New Generation of Environmental Protection*, to develop national goals. They will also help satisfy a requirement of the Government Performance and Results Act of 1993 (GPRA) for federal agencies to prepare goal-driven strategic plans.

The goals and milestones are not new requirements. Rather, they are proposed targets that EPA believes the nation can and should achieve by one means or another—regulatory and voluntary, public and private. The milestones reflect EPA's best judgment about measurable progress the nation can reasonably make over the next decade.

For each of 12 goals, the report:

- Summarizes what already has been done to improve public health and the environment and what remains to be done (The Challenge).
- Describes the parties with current and future responsibility for meeting this challenge (Responsibilities).
- Proposes environmental progress indicators with target levels for 2005 and data that will be used to track results (Environmental Milestones for 2005).
- Describes EPA's current approach for working toward the goal (Strategy).

Various issues raised by federal agencies during a preliminary review of the report are listed in Appendix D.

### Using the Goals

EPA intends that these goals should stimulate improvements in three areas:

1. **Communication.** National environmental goals should help to change the public discussion on environmental protection to focus more on intended results. This should enable more enlightened debate on the means of achieving these results, which is where most of the discussion has occurred in the past. Public discussion of outcomes is a way to reach greater consensus on environmental policy.
2. **Planning and Budget.** National goals should stimulate joint planning by public and private environmental partners. They form the basis for EPA's strategic planning goals, objectives, and performance measures that are required by the 1993 Government Performance and Results Act. National environmental goals will be used to guide joint EPA/state/tribal and local planning under the new National Environmental Performance Partnership System. With national agreement on intended results, the public and private sectors will be freer to seek more innovative, flexible, cost-effective ways to achieve them. For example, the goals provide an environmental results context for such high-priority EPA reinvention programs as the Common Sense Initiative and Project XL (eXcellence and Leadership).
3. **Accountability and Evaluation.** National environmental goals will provide a basis for the United States to measure its environmental progress and to gauge how effective its policies and programs have been. Well-crafted milestones also should stimulate better environmental quality reporting and more efficient use of resources devoted to environmental monitoring.

The goals cover nearly all the major environmental issues with which (by law) EPA is concerned. In particular, they cover the major risks to human health and ecosystems described in EPA's *Reducing Risk: Setting Priorities and Strategies for Environmental Protection* (1990) and *Unfinished Business: A Comparative Assessment of Environmental Problems* (1987).

**The goals and milestones are intended to stimulate public discussion of what Americans are seeking to accomplish in environmental protection. They are not new requirements. Rather, they are proposed targets that EPA believes the nation can and should achieve by one means or another—regulatory and voluntary, public and private.**

Many important public health and environmental issues lie outside EPA's major areas of responsibility and are not directly covered in this report. These include responsibilities such as management of public lands, farmlands, fisheries, forests, and energy and transportation. Also, some milestones in this report cover only EPA's limited role in issues for which other agencies have lead responsibilities, such as food safety and occupational safety and health. Other federal agencies will establish national goals in these areas, as required by the Government Performance and Results Act. EPA will work with other agencies, just as they are working with EPA to develop these goals, so that federal goals and plans support one another as fully as possible.

Because the goals and most of the milestones described here are cast in *environmental* terms, they do not directly measure the results of all the essential work carried out at EPA. For example, they do not include separate measures of progress for environmental research, information resources management, or enforcement and compliance efforts. As broad national goals, they also do not directly address important efforts affecting many special places, populations, and industries. But all these activities are essential, and they contribute significantly to the achievement of national environmental goals.

*How* the goals are achieved is as important to many people as the goals themselves. In March 1995, President Clinton announced a new approach for environmental protection. His report, *Reinventing Environmental Regulation*, describes 25 measures that EPA is taking to institute performance and market-based regulations; set science-based priorities; build state and local partnerships; cut red tape; improve accountability, compliance, and enforcement; and harness the power of information to make better decisions. EPA also is experimenting with new strategies that offer industries, communities, and government agencies more flexibility to innovate—to find cheaper, cleaner, smarter ways to protect the environment—while also requiring accountability for environmental results.

One example is *Project XL*, in which a limited number of companies and government agencies are being given the opportunity to demonstrate *eXcellence and Leadership* in environmental protection. EPA is offering them flexibility to develop alternative strategies that replace current regulatory requirements, while producing even greater environmental benefits. The XL approach complements the *Common Sense Initiative*, in which EPA is negotiating comprehensive environmental strategies with six industries (automobile manufacturing, computers and electronics, iron and steel, metal plating and finishing, oil refining, and printing).

Environmental goals are at the heart of this new approach. As the President noted in *Reinventing Environmental Regulation*, "environmental protection must be driven by clear and measurable national goals.... Performance will be mea-

sured by achieving real results in the real world, not simply by adhering to procedures."

EPA is beginning to draft an Agency strategic plan to help achieve the national environmental goals. The plan will include targets for national environmental improvement consistent with this report.

## How the Goals Were Developed

These proposals were developed over several years by an Agency-wide task force through a process of data collection and analysis, consultation, and professional judgment. In reaching judgments, EPA staff examined trends affecting health and ecological risks, the effectiveness of current and foreseeable environmental technologies and programs, and available information on costs and benefits (see below). Scientific analysis underlies virtually all the decisions leading to the environmental targets—from setting health standards to assessing the likelihood of meeting them. EPA is inviting further scientific review of these proposals. The availability of information has been an important consideration in choosing the milestones. As new research and monitoring information becomes available, the measures of progress and target levels might change.

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EPA also consulted with people in federal, state, tribal, and local governments and with industry and citizen organizations. Agency staff had one-on-one discussions with these groups and participated in a series of nine regional roundtable meetings on goals conducted in 1994. In 1995 EPA circulated a draft summary of the goals and milestones and received many useful comments.

In the course of this effort, EPA examined health and environmental goals already set by federal agencies, states, and other countries. As a member of the President's Council on Sustainable Development (PCSD), the EPA Administrator took part in developing the national goals for sustainable development (*Sustainable America—A New Consensus for Prosperity, Opportunity, and a Healthy Environment for the Future*). The PCSD's goals for sustainable development and these proposed goals for the environment complement each other (see Appendix C).

EPA also worked closely with the U.S. Department of Health and Human Services, which is responsible for the national public health goals established in *Healthy People 2000*. In this process, both agencies made changes to their progress targets, although some differences remain.

In drafting these proposals, EPA assumed that existing and currently planned environmental programs would continue. Achieving some of the milestones might cost more than is being spent in those areas now, but efficiencies will likely be realized in other areas. Deep cuts in the federal budget would probably delay the attainment of many milestones.

This report does not attempt to rank the goals or milestones in order of importance. EPA hopes that public discussion of national goals will include a discussion of priorities for environmental risk reduction. Policymakers might choose to set more ambitious targets for certain higher-priority problems and reduce the targets for lower-priority ones.

**Vision Statement of the President's Council on Sustainable Development**

Our vision is of a life-sustaining Earth. We are committed to the achievement of a dignified, peaceful, and equitable existence. A sustainable United States will have a growing economy that provides equitable opportunities for satisfying livelihoods and a safe, healthy, high quality of life for current and future generations. Our nation will protect its environment, its natural resource base, and the functions and viability of natural systems on which all life depends.

*— The President's Council on Sustainable Development*

## Considering Costs and Benefits

An informed discussion on setting goals should be based on the best available science and economic policy analysis. Indeed, all public policy decisions require consideration of several types of information and are made on the basis of multiple criteria. Economic efficiency, equity, and institutional and legal feasibility represent some of the criteria that may be incorporated into policy discussions. Benefit-cost analysis is designed to inform decision makers about the efficiency effects of alternative actions. When conducted properly, benefit-cost analysis can also help organize information and clarify the potential effects of different decisions. The discussion of goals and milestones in this report has been informed not only by economic information but also by these other types of information.

**With national agreement on intended results, the public and private sectors will be freer to seek more innovative, flexible, cost-effective ways to achieve them.**

When designing and evaluating specific Agency regulatory options, EPA devotes considerable attention to the study of economic costs and benefits. The current attempt to describe goals and milestones for environmental improvements at a national level, however, could not be based on a formal benefit-cost analysis for two reasons. First, very little of the existing information on costs and benefits of individual EPA regulations matches with the goals and milestones under consideration. Second, many of the costs and benefits associated with these goals are very difficult to quantify or cannot be represented in monetary terms. Rather than wait until the economic information is developed, EPA is proposing these goals now to signal a path toward a healthy environment and a healthy population. EPA hopes that publication of this report will initiate a national dialogue about needed environmental improvements. During this dialogue, as specific actions are proposed, benefit and cost information will be developed to aid in the final decision about creating new initiatives or changes in existing programs.

The goals and milestones were not, however, conceived in an information vacuum. Managers and analysts, throughout the process of debating and choosing them, looked at available information on the expected economic consequences of reaching the milestones. In most cases, the milestones are expected to be achieved with the continuation of existing programs, or implementation of recently passed legislation.

**National environmental goals will provide the basis for the United States to measure its environmental progress.**

EPA is committed to the development of more complete cost and benefit information. For example, a major study will be completed in early 1997 providing estimates of the costs and benefits stemming from implementation of the Clean Air Act. In the future, EPA expects to expand the analysis of costs and benefits to all EPA programs.

In 1990, EPA estimated total pollution control expenditures in the United States through the year 2000. The results were published in *Environmental Investments: The Cost of a Clean Environment*. Although that report did not directly estimate the costs to meet the specific milestones proposed here, the overall cost estimates provide a general indication of the magnitude of pollution control expenditures in the United States in the late 1980s and forecasted through the 1990s. The report estimated that expenditures by industry, government, and households in the late 1980s was on the order of $100 billion to $120 billion in 1990 dollars. This estimate was based on several premises, including the full

implementation of environmental regulations and programs in place at the end of the 1980s, as well as continuity in the regulatory agenda in place at the end of the 1980s.

The analysis forecasted that total expenditures for pollution control will rise from 1.9 percent of the U.S. Gross Domestic Product (GDP) in 1987 to between 2.6 and 2.8 percent of the GDP by the year 2000. By way of comparison, total expenditures in 1987 for clothing and shoes were 4.2 percent of the GDP and for national defense, 6.9 percent. The report included projected pollution control expenditures for air and radiation, water, solid waste, hazardous waste, leaking underground storage tanks, Superfund sites, and pesticides and toxic substances. The projected expenditures covered only costs directly related to pollution controls; they did not cover expenditures for managing wildlife, fisheries, and public lands. Also not covered were expenditures for climate change risk reduction that do not directly relate to other environmental protection objectives. EPA expects to issue newer assessments of the nation's investment in environmental pollution control with the next few years, including an expanded discussion of the benefits.

**Estimating costs.** It is difficult to identify and quantify the full array of costs that result from preventing and controlling pollution. In concept, these costs can be defined as the benefits foregone as a result of devoting scarce resources toward these objectives. For example, to estimate the cost of reducing direct environmental risks resulting from a ban on a particular chemical, one must consider the value of products that are not developed because of the ban, plus the costs and delays in getting regulatory agency approval for testing and production of substitutes. Substitution risks and generalized reductions in public welfare also may be significant indirect costs. Where regulatory intervention causes firms or individuals to comply by substituting riskier processes or products, additional costs arise in the form of reduced health, safety, or environmental protection. For example, increasing stringency in the regulation of hazardous waste disposal intensifies the financial advantages of illegal dumping. Finally, a proper cost analysis must account for the value individuals place on foregoing these commodities in order to obtain the environmental benefits achieved through regulation rather than just the out-of-pocket costs of regulatory compliance.

The analysis of both benefits and costs should cover the entire spectrum, from those which can be assigned a dollar value to those which can be described only qualitatively, and from those which are direct and immediate to those which are remote in distance or time.

**Estimating benefits.** Similarly, it is difficult to articulate the full array of economic benefits that result from preventing and controlling pollution. In concept, the benefits of less pollution can be defined as improvements in human health and the environment, including reductions in damage to plants, animals, materials, and other quality-of-life attributes. For example, to evaluate the benefits of reaching a milestone for decreased pollutant releases, one must document a complex sequence of analytic steps to arrive at an assessment of the impacts. Important prerequisites to estimating benefits include a clear scientific understanding of the linkage between an activity or condition and its effects on human health and the environment; scientifically based estimates of incremental

effects of these linkages, such as dose-response relationships, expressed in forms compatible with economic analysis; and assessments of the value of the decrease in pollutant releases. The assessment of risks from pollutants released to the environment, the measurement of the consequences to persons and natural life exposed to these pollutants, and the quantification of the values associated with these changes are but some of the challenges facing EPA and larger society in an attempt to quantify the benefits of taking action.

Many regulatory programs produce benefits that affect market transactions. These can be expressed in monetary terms. Illustrations of such cases include increased productivity in commercial fishing, improved crop yields, avoidance of costly adverse health effects, avoidance of materials damage such as corrosion, protection of valuable drinking water supplies and the associated saving of treatment costs, prevention of flooding and erosion that would damage physical structures, and many others. Even in cases where benefits do not affect market transactions, techniques are sometimes available to estimate their monetary value. For example, improved water quality and improved air quality increase the value of recreational experiences and the value of residential property.

An alternative to monetary valuation is to represent the size and frequency of benefits in physical terms. For example, control of certain air pollutants has the primary effect of reducing adverse health effects in exposed populations. Part of the "value" of these reductions can be captured by measuring the dollar value of expenditures on medical treatment and lost work productivity that would be avoided if air quality were improved. But this "cost of illness" approach does not consider the nonmonetary effects of pain and suffering and reduced quality of life. In this case, analysts might report the number of cases avoided by type of illness, such as chronic bronchitis or sinus irritation. Sometimes these damages are quantified as "reduced activity days," signifying the number of total person-days that victims suffer due to pollution-related effects.

Reduction in damages to ecosystems is a major component of the total benefits of environmental protection. Yet because of the complexity of ecosystem function and the long time periods involved in the response to environmental insults, even nonmonetary quantification of benefits is very difficult or impossible. Nutrient cycling, energy capture through photosynthesis, waste assimilation, carbon sequestration, weather control, habitat provision, soil fertilization, and many other "ecosystem services" are essential functions of all life and economic activity. But our understanding of the function of these systems is so limited that we are often forced to rely on qualitative descriptions of the effects on them that we achieve through environmental policies.

**Concluding thoughts.** An appropriate comparison of costs and benefits requires that the environmental improvements (e.g., reductions in concentrations of an airborne pollutant) used in calculation of the benefits are the same improvements for which cost estimates are developed. For many of the milestones in this report, EPA does not have quantitative estimates of the costs and benefits of the incremental improvements necessary to achieve them. EPA will continue to develop benefit and cost information for the actions necessary to achieve the new goals and milestones, consistent with Executive Order 12866, in order to support the best informed decision making possible. If such analysis does not demon-

strate that actions necessary to achieve a milestone can be justified, taking into account both cost-benefit information and other relevant factors, it will become necessary to reconsider that milestone prior to the establishment of programs and regulations. The bringing together of disparate types and forms of information is among the most useful features of cost-benefit analyses. By releasing this report, EPA hopes to add impetus to the continuing process of information collection and analysis that will serve as the basis for refinement of the goals and milestones. The particular milestones will evolve as better information is developed, allowing a more complete assessment of the benefits and costs.

## Next Steps

This report is a proposal to EPA's *government partners.* EPA would like to know if it fairly describes ambitious but realistic progress targets that federal, state, tribal, and local government agencies would like to see. During 1997 EPA will revise and improve the goals and milestones, taking into consideration all comments that it receives, and then will distribute the report as a proposal for public review.

The report has been given a limited federal review during the past several months. As a result of that review, EPA corrected inaccuracies and made other revisions. Because EPA did not want to delay the opportunity to get further comments from its government partners, it has moved ahead with the present draft without taking the time to respond fully to all the earlier federal comments. Appendix D is a summary of issues raised by federal reviewers that EPA is currently working to resolve. Similar comments have been combined in the interest of brevity. EPA agrees with some of these comments and does not agree with others. EPA offers these comments in order to stimulate a full discussion with reviewers.

## References

### *Text Notes*

1. USEPA. 1996. *National Air Quality Emissions and Trends Report, 1995.* Washington, DC: U.S. Environmental Protection Agency, Office of Air and Radiation. Forthcoming.
2. USEPA. 1995. *National Water Quality Inventory, 1994 Report to Congress.* EPA-841-R-95-005. Washington, DC: U.S. Environmental Protection Agency, Office of Water.
3. EPA analysis of 1990 census data (unpublished).

# Environmental Goals, Milestones, and Strategies

The following chapters describe EPA's proposed 12 national environmental goals and related milestones. The goals cover aspects of the environment for which EPA shares substantial responsibility with states and their municipalities, tribes, and other federal agencies. They are long-range goals; it will take decades, perhaps centuries, to achieve them all. Most of the milestones are 9-year targets (for 2005) by which EPA will document progress toward the goals.

1. **Clean Air:** Every American city and community will be free of air pollutants at levels that cause significant risk of cancer or respiratory and other health problems. The air will be clearer in many areas, and life in damaged forests and polluted waters will rebound as acid rain, ozone, and hazardous air pollutants are reduced.

2. **Clean Waters:** All of America's rivers, lakes, and coastal waters will support healthy communities of fish, plants, and other aquatic life, and uses such as fishing, swimming, and drinking water supply for people. Wetlands will be protected and rehabilitated to provide wildlife habitat, reduce floods, and improve water quality. Ground waters will be cleaner for drinking and other beneficial uses.

3. **Healthy Terrestrial Ecosystems:** America will safeguard its ecosystems to promote the health and diversity of natural and human communities and to sustain America's environmental, social, and economic potential.

4. **Safe Drinking Water:** Every American public water system will provide water that is consistently safe to drink.

5. **Safe Food:** The foods Americans consume will continue to be safe for all people to eat.

6. **Safe Homes, Schools, and Workplaces:** All Americans will live, learn, and work in safe and healthy environments.

7. **Toxic-Free Communities:** By relying on pollution prevention, reuse, and recycling in the way we produce and consume materials, all Americans will live in communities free of toxic impacts.

**It will take decades, perhaps centuries, to achieve all the long-range goals. EPA will measure progress toward the goals with the milestones for 2005.**

8. **Preventing Accidental Releases:** Accidental releases of substances that endanger our communities and the natural environment will be reduced to as near zero as possible. Those which do occur will cause only negligible harm to people, animals, and plants.

9. **Safe Waste Management:** Wastes produced by every person, business, and unit of government in America will be stored, treated, and disposed of in ways that prevent harm to people and other living things.

10. **Restoration of Contaminated Sites:** Places in America currently contaminated by hazardous or radioactive materials will not endanger public health or the natural environment and will be restored to uses desired by surrounding communities.

11. **Reducing Global and Transboundary Environmental Risks:** The United States and other nations will eliminate significant risks to human health and ecosystems arising from climate change, stratospheric ozone depletion, and other environmental problems of concern at the transboundary and global level.

12. **Empowering People with Information and Education and Expanding Their Right to Know:** Americans will be empowered to make informed environmental decisions and participate in setting local and national priorities.

Each of the goal chapters contains:

- A *challenge* section that summarizes the importance of the goal, what has been done in the past, and what remains to be done to reach the goal.
- A *responsibilities* section that outlines the respective roles of all parties in meeting the challenge.
- *Milestone* statements and descriptions of how the targets were selected and the data to be used to track progress.
- A *strategy* section that describes EPA's approach with its partners to attain the set of milestones.

Each milestone appears on a separate page with graphics designated M.1, M.2, and so forth to show past conditions (if reliable data are available), current conditions, and the 2005 target. Figures (e.g., Fig. 1, Fig. 2) that are not directly associated with the milestones sometimes appear to illustrate or clarify information provided in the text. Several milestones are not yet supported by a baseline; data on current conditions for these milestones are not yet available. Their appearance in this document represents a commitment by EPA to develop a means to track progress toward them. Appendix A contains a listing of all 66 milestones and further information about the data sources.

# 1. Clean Air

*Long-Range Goal*

**Every American city and community will be free of air pollutants at levels that cause significant risk of cancer or respiratory and other health problems. The air will be clearer in many areas, and life in damaged forests and polluted waters will rebound as acid rain, ozone, and hazardous air pollutants are reduced.**

## The Challenge

Despite concerted efforts to achieve cleaner, healthier air, air pollution continues to be a widespread public health and environmental problem in the United States, contributing to illnesses such as cancer, respiratory and reproductive problems, and mental impairment. In many cases, air pollutants end up on the land or in rivers, lakes, and streams, harming the life in them. Air pollution also makes soil and waterways more acidic, reduces visibility, and corrodes buildings.

EPA is responding to air pollution because the problem is national — even international—in scope. The majority of the population lives in expanding urban areas, where air pollution crosses local and state lines and, in some cases, even crosses our borders with Canada and Mexico. Federal assistance and leadership are essential for developing cooperative state, local, regional, and international programs to prevent and control air pollution, and for ensuring that national standards are met.

EPA develops health-protective standards that set safe limits for concentrations of the six most widespread pollutants, which are linked to several serious health and environmental problems:

- **Ground-level ozone (smog).** Causes and contributes to respiratory illness and lung damage, crop and forest damage, building and material damage, and visibility problems.
- **Carbon monoxide.** Causes reduced oxygenation of circulated blood and heart damage.
- **Sulfur dioxide.** Causes increased respiratory illness, especially in asthmatics, and is a major contributor to atmospheric particulates, acid rain, reduced visibility, and vegetation damage.
- **Nitrogen dioxide.** Causes lung tissue damage and increases respiratory illness, and also contributes to formation of ground-level ozone, acid rain, atmospheric particulates, and visibility problems.
- **Lead.** Causes infant mortality, reduced birth weight, and childhood IQ loss, as well as hypertension and heart attacks in adults.
- **Particulate matter (very fine dust and soot).** Linked to premature death and can cause increased lung disease.

Over the past 25 years, most of these pollutants have been reduced in U.S. cities. Most areas of the nation now meet the standards for lead, sulfur dioxide, nitrogen dioxide, and particulate matter. A major accomplishment in protecting public health from air pollution was the elimination of lead in gasoline and in paint, an action that protected

millions of American children from developing serious and permanent learning disabilities due to lead contamination. Today, lead has been almost completely removed from our air, and blood levels of lead in children have dropped dramatically.

However, 130 million Americans in 170 major cities still breathe unhealthy air.[1] Two of the six most widespread pollutants are extremely difficult to control—smog-forming ozone and carbon monoxide. Both result from polluting emissions from cars and other vehicles, as well as industrial plants and other, smaller sources. Reducing both of these harmful air pollutants is essential to meeting the goal of protecting public health.

In some cases, we might need to go beyond the current air quality standards for these top six air pollutants to protect public health. For example, ozone, sulfur dioxide, nitrogen dioxide, and particulate matter can all have residual harmful effects to health and the environment even when they occur in amounts that are within the standards. Sulfur dioxide and nitrogen dioxide can cause damage over the long term as they mix with moisture and fall as acid rain. Existing standards might also need to be revised to address health problems identified by new scientific information. For example, recent studies suggest that fine particulate matter is even more harmful to health than previously thought.

In addition to the six most widespread air pollutants, hundreds of toxic chemicals are released into the air. Over 1 million tons of air toxics are released annually to the atmosphere from industrial facilities, automobiles, and other sources. Since air toxics are harder to measure than the six pollutants discussed above, and since there is typically no minimum level we can call safe, EPA's policy is to use the best available pollution control strategies and technology to minimize these emissions to the extent possible.

The national challenge, then, is to continue efforts to reduce the remaining air pollutants that have major impacts on human health and the environment in ways that make both economic and environmental sense.

### Responding to the Challenge: Emission Trading

Emission trading is a way of reducing air pollutant emissions by applying pollution reduction measures at places where reductions are most cost-effective. EPA's Acid Rain Program is a dramatic departure from traditional command and control regulatory methods that establish specific emission limitations with which all affected sources must comply. Instead, a trading system harnesses the incentives of the free market to reduce pollution.

In many eastern and midwestern states, sulfur dioxide emissions from coal-burning electric utility plants cause acid rain. These power plants are issued emission allowances that are either banked or traded privately or publicly. Power plants select their own compliance strategies to meet emission limits. Sources may install scrubber equipment, switch to cleaner-burning fuel, or adopt conservation measures. Each power plant must continuously measure and record its emissions of sulfur dioxide. If emissions exceed the allowances held, the power plant must pay a penalty.

Because of the success of this innovative program, EPA is supporting other emission trading programs to provide flexible, market-based approaches to solving the smog problem in America's cities. EPA has already issued regulations and guidance to encourage the development of economic incentive programs, helped develop an emission trading market in southern California, and sponsored demonstration projects in the Northeast. EPA is issuing an "open market" trading rule for ozone-creating pollutants (volatile organic compounds and nitrogen oxides) that will provide far more flexibility for companies and other private and public organizations to trade emission credits without prior state or federal approval. Any state that adopts an identical rule will receive automatic EPA approval. Once in the state plan, companies may freely engage in trades without prior regulatory agency approval as long as emission tracking and accountability protocols are followed.

## Responsibilities

EPA's efforts to protect public health by limiting air pollution are authorized by the Clean Air Act, which was updated in 1990 to give EPA expanded authority to control smog, air toxics, acid rain, and other health threats. Two other federal laws—the Solid Waste Disposal Act and the Clean Water Act—authorize EPA to reduce air pollution caused by burning certain wastes, such as toxic chemicals and sewage sludge. Many states set their own standards (for example, odor controls) to address local air pollution problems that are not adequately covered by the federal statutes.

EPA is charged with setting air standards to protect public health and welfare, and guiding state agencies in developing plans and programs to attain them. EPA also helps the states by developing federal regulations to control pollution from vehicles and some industrial plants, especially in the areas of air toxics and smog. With the help of this guidance and assistance, the states develop and carry out plans to achieve the needed pollution reductions, largely from industrial sources and vehicles. Other federal agencies, such as the Department of Transportation and the Department of Energy, contribute to air quality goals by making sure that their own activities conform to state air quality plans.

## Environmental Milestones for 2005

The 1990 amended Clean Air Act sets out a detailed schedule for attaining clean air goals, as well as interim targets to be met on the way to reaching those goals.[2] The milestones in this chapter reflect those mandates, which were developed over a 2-year period involving extensive congressional consultation with EPA, environmental groups, industry groups, and the public. The milestones reflect Congress's determination, informed by a wide array of expert opinion, about how much air quality improvement is realistically possible within the next 10 to 15 years.

The six Clean Air milestones set several targets, including meeting air quality standards for the six most common pollutants; reducing vehicle emissions, which will be the single largest contributor to meeting the ozone standard; reducing the environmental impact of the increase in motor vehicle use; reducing toxic air pollutant emissions; reducing acid-rain-causing sulfur dioxide emissions; and improving visibility. Many of these milestones are interrelated; meeting some of them will contribute to (or result from) meeting others.

Air quality standards are reviewed periodically to ensure that they are based on the best scientific evidence. If future reviews result in changes to the standards to make them more stringent, designated air quality problem areas might increase and the milestones might have to be revised.

***Federal Reviewers:*** *Please provide other related agency targets*

MILESTONE

1

# *By 2005,*

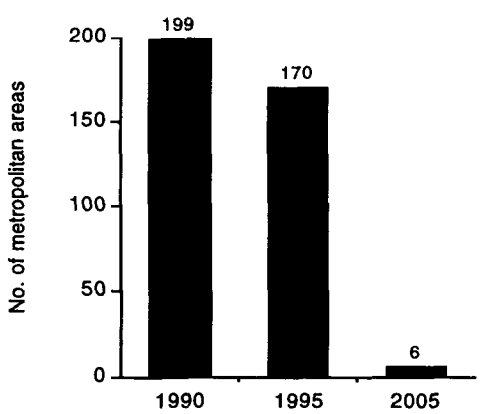
**the number of cities where air quality does not meet national standards will be reduced more than 96 percent from 1995 levels, thereby making the air safer to breathe for an additional 85 million Americans in 164 metropolitan areas.**

**RELATED FEDERAL TARGETS**

Dept. of Health and Human Services
*Healthy People 2000*

[By 2000,] reduce human exposure to criteria air pollutants as measured by an increase to at least 85 percent in the proportion of people who live in counties that have not exceeded any EPA standard for air quality in the previous 12 months. (Baseline: 49.7 percent in 1988.)

**M.1—Number of metropolitan areas not meeting air quality standards.**




*Between now and 2005, air quality will be improved in all areas that do not currently meet federal standards. The six most polluted metropolitan areas (Los Angeles, Southeast Desert (south of L.A.), Chicago, Houston, Milwaukee, New York City) will show progress so that they will achieve the standards by 2010.*

In 1995, some 170 metropolitan areas in the United States had air that violated health standards, affecting the health of 130 million Americans. If EPA's proposed tighter standards for ozone and fine particulates are adopted to adequately protect public health, those numbers will rise after 1998.

### *Past Trends and 2005 Target*

Since the early 1970s, the concentrations of the most widespread pollutants have been substantially reduced in most U.S. cities. However, carbon monoxide, fine particulates, and ozone continue to be serious problems in many areas. EPA's target, as required by law (see below), is to reduce the number of cities with unhealthy air to 6 by 2005, which would reduce the number of Americans breathing polluted air to 45 million. The air in the six remaining areas will also improve greatly by 2005 and should meet the standards by 2010.

This milestone follows the timetables set by Congress in the 1990 Clean Air Act Amendments for achieving health standards for the six criteria pollutants (ozone, sulfur dioxide, nitrogen dioxide, carbon monoxide, particulate matter, and lead). However, if the recently proposed standards for ozone and fine particulates are adopted to protect public health, this milestone target will be changed.

### *Tracking Results*

Progress in attaining national air quality improvements is measured by reductions in the number of areas that still do not meet those standards, as tracked by EPA's Findings and Required Elements Data System (FREDS).

MILESTONE

2

# *By 2005,*

**emissions of unhealthy smog-causing volatile organic compounds will fall 68 percent per mile per car, compared to 1990 levels.**

***Federal Reviewers:***

*Please provide other related agency targets*

Smog, or ground-level ozone, causes and contributes to respiratory illness and lung damage, crop and forest damage, building and material damage, and visibility problems. Emissions from motor vehicles contain volatile organic compounds (VOCs) which help to form smog. To reduce the health and environmental problems caused by smog, the 1990 Clean Air Act Amendments set standards for controlling smog-causing emissions from automobiles.

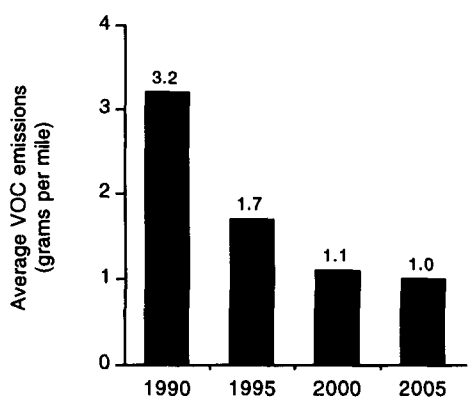
### *Past Trends and 2005 Target*

From 1990 to 1995, the average car's emissions of smog-causing compounds were cut nearly in half: from 3.2 grams per mile in 1990 to 1.7 grams per mile today. The 1990 Clean Air Act standards call for the milestone emission level of 1.0 gram per mile, which Congress judged to be achievable at reasonable cost given expected advances in technology.

### *Tracking Results*

Achievement of these standards is measured in terms of grams per mile — the number of grams of smog-causing VOCs allowed to be released per mile traveled by the average car. Automobile emission improvements are tracked in terms of the average emissions of a typical vehicle, as measured in EPA tests. Data are reported to EPA's Mobile 5 Model database.

**M.2—Average VOC emissions from a typical motor vehicle.**




*Achieving this milestone's 2005 target is critical to achieving milestone 1 since reducing motor vehicle emissions will be the single largest contributor to meeting air quality standards for ozone.*

***Federal Reviewers:***
*Please provide other related agency targets*

**MILESTONE**
**3**

# *By 2005,*

**increases in miles driven by U.S. vehicles will not interfere with attainment or maintenance of air or water quality standards, nor will increases in driving interfere with fulfillment of the U.S. commitment to reduce greenhouse gas emissions.**

This milestone is necessary to achieve Clean Air milestone 1, as well as some Clean Waters and Reducing Global and Transboundary Environmental Risks milestones.

### *Past Trends and 2005 Target*

Although vehicle emissions will be cleaner by 2005, total emissions might increase if the number of miles driven continues to grow. Measures to slow the growth in miles driven—including economic incentives, public education, and incentives for smart land use—will help to ensure that increased driving does not offset the emission reductions from cleaner vehicles. Cleaner air and greater efficiency also can be promoted by eliminating perverse incentives for solo driving, such as the federal tax subsidy for employer-paid parking. The necessary target for such efforts will depend on how much cleaner the vehicle fleet becomes. Because driving contributes to polluted runoff and road construction can lead to wetland loss, moderating an increase in the amount of driving can also help meet our water quality goals. Finally, because each gallon of standard formulation gasoline burned produces the same amount of the greenhouse gas carbon dioxide, an increase in driving threatens the nation's ability to meet its greenhouse gas commitment.

### *Tracking Results*

The Federal Highway Administration collects data on vehicle miles traveled from each state highway administration and reports this information to the Bureau of Transportation Statistics. State air quality agencies track emission rates and establish targets for vehicle miles traveled in order to meet air quality standards. The Department of Energy reports greenhouse gas ($CO_2$) emissions from motor vehicles.

MILESTONE

4

# *By 2005,*

## all 174 categories of major industrial facilities will meet toxic air emission standards.

***Federal Reviewers:***

*Please provide other related agency targets*

The 1990 Clean Air Act Amendments set timetables for achieving technology-based standards for controlling toxic releases to the air, which will also reduce the deposition of airborne toxic substances into the nation's waters. "Technology-based" means requirements for the use of maximum achievable control technologies on all major industrial toxic emission sources. This milestone is a surrogate measure for documenting progress in actual emission reductions, for which sufficient data are not available.

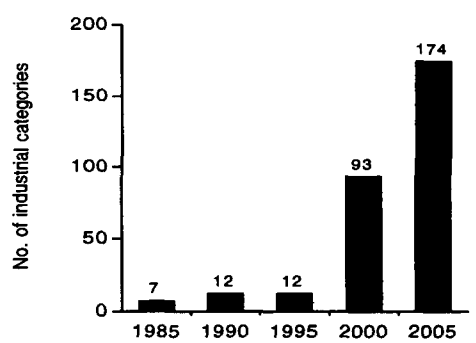
### *Past Trends and 2005 Target*

In the 25 years since the 1970 Clean Air Act was enacted, only 12 industrial categories (similar to the Department of Commerce's Standard Industrial Categories [SIC]) of toxic emitters have been controlled. The 1990 Clean Air Act requires all major facilities to at least match the achievements of existing facilities that have effective controls already in place.

### *Tracking Results*

Progress in air toxics control is measured by the number of categories of major emitters complying with controls. These categories are listed in Title 40 of the Code of Federal Regulations (CFR), Parts 61 and 63.

**M.4—Major industrial categories that meet toxic air emission standards.**




*All major industrial facilities will have adequate controls on toxic air emissions in 2005.*

***Federal Reviewers:***
*Please provide other related agency targets*

MILESTONE
**5**

# *By 2005,*

**sulfur dioxide emissions, a primary cause of acid rain, will be reduced by nearly 10 million tons from 1980 levels.**

Acid deposition occurs when sulfur dioxide (mostly from power plants and other industrial sources) or nitrogen oxides (mostly from power plants and motor vehicles) react with moisture and with other chemicals in the atmosphere and fall to the earth, causing surface water acidification, forest damage, and premature mortality and chronic bronchitis in people. Acid rain also accelerates the decay of building materials and paints.

The 1990 Clean Air Act Amendments require that nationwide sulfur dioxide emissions be reduced by 10 million tons per year from their 1980 level. This objective was incorporated into the United States-Canada Air Quality Agreement of 1991, which contains precise commitments for both countries. In the United States the first phase of this reduction occurred in 1995. The remainder will be achieved by 2010, and most of it by 2005. The reductions will be achieved through a cap on total emissions and the use of an innovative, market-based emission trading system that allows companies to reduce emissions in the most efficient way.

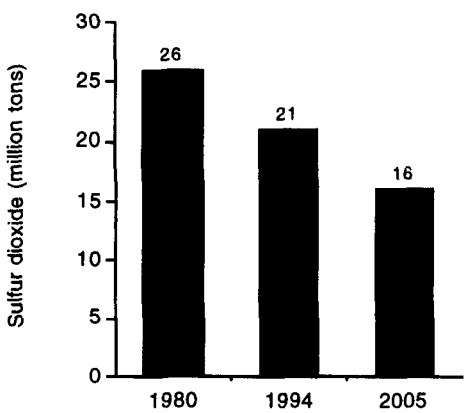
## *Past Trends and 2005 Target*

In 1980, nationwide emissions of acid rain-causing sulfur dioxide were about 26 million tons annually. As recently as 1994, sulfur dioxide was still being released at an annual rate of 21 million tons. The 1990 Clean Air Act Amendments called for a reduction of these emissions to approximately 16 million tons annually. This level of reduction was judged by Congress to be sufficient to redress the worst of the known ecological damage caused by acid rain; it was also judged to be achievable at a reasonable cost, given the expected state of technological development.

## *Tracking Results*

Progress in acid rain control is measured in terms of reductions in annual tonnage of emitted pollutants, as reported with data in EPA's Acid Rain Emissions Tracking System.

**M.5—Sulfur dioxide emissions.**



MILESTONE

6

# *By 2005,*

**annual average visibility in the eastern United States will improve 10 to 30 percent from 1995 levels.**

***Federal Reviewers:***

*Please provide other related agency targets*

The 1990 Clean Air Act Amendments will have the effect of improving the clarity of the air and thus increasing visibility. This improvement will occur primarily in the eastern United States because it will come from reducing emissions at midwestern power plants, which primarily affect air quality in the East.

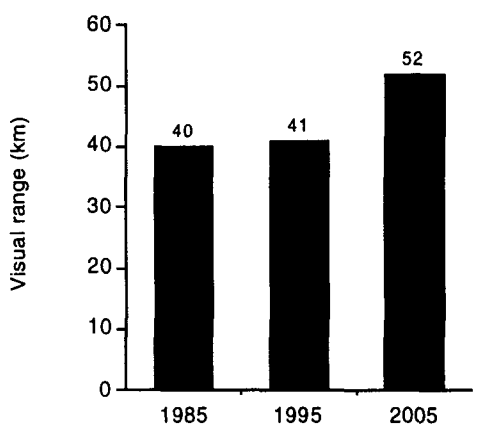
### *Past Trends and 2005 Target*

This visibility milestone is measured in terms of average visual range. Trends have been relatively constant over the past 10 years. As noted above, EPA expects the target to be achieved by pollution reductions that the Clean Air Act Amendments require.

### *Tracking Results*

Visual range is measured through a cooperative federal effort involving the National Park Service, EPA, and others. The data are stored in the Interagency Monitoring of Protected Visual Environments (IMPROVE) database.

**M.6—Visibility in central Appalachia.**




*Improvement will be centered in the East because it will come from reducing emissions at midwestern power plants, which primarily affect air quality in the eastern United States.*

## Strategy

Federal and state government agencies, industry, and individuals must work together to achieve these milestones toward the goal of healthy, clean air. Success is far from guaranteed. Much remains to be done if the health and environmental improvement targets stated in the Clean Air Act are to be achieved. Meeting the goal depends on a strong partnership between the states and EPA. The strategy calls for the states to play a pivotal role by providing information for and actually helping to write the standards.

To reduce the number of metropolitan areas with unhealthy air (milestone 1), EPA will continue to provide guidance and technical assistance as states develop and carry out plans to attain these health-based standards. This guidance will encourage the states to make use of innovative, market-based approaches wherever possible. EPA will also continue to develop complementary federal programs that will help achieve the needed emission reductions. States will apply the federal guidance and programs to their own situations, working with local industries to achieve the pollution reductions necessary to meet standards. Many industries are already well along in their programs to reduce pollution to meet these new requirements.

Among the most important federal emission-reduction programs are those aimed at reducing automobile emissions. Reductions of emissions from each vehicle (milestone 2) will be the largest contributors to achieving milestone 1. To reduce emissions from motor vehicles, EPA is working with its state partners to establish reformulated and oxygenated gasoline (cleaner-burning fuel) programs in the most polluted areas; to make flexible inspection and maintenance programs more effective; to develop low-emission and zero-emission vehicles; and to achieve lower pollutant emissions from cars, buses, and trucks.

To achieve milestone 3, EPA promotes and supports the comprehensive state and local transportation planning required in the Intermodal Surface Transportation Efficiency Act. With the help of EPA and other agencies, citizens and local governments develop more flexible, efficient transportation systems. These systems integrate all forms of transportation, serve communities, and give people choices: How much do I want to spend for transportation? Do I prefer to walk or drive or telecommute? EPA continues to support reforming the federal tax subsidy for employer-provided parking into a powerful cash reward for urban commuters who voluntarily ride transit, carpool, or find other ways to get to work, at no cost to their employer. In addition, the Agency is developing tools for states to cost-effectively achieve the goal of cleaner vehicles and to have transportation systems pay for themselves, using such mechanisms as variable registration fees based on emissions and mileage.

To achieve milestone 4, EPA will continue to develop and issue emission standards for industrial facilities that emit toxic air pollutants. These standards, called Maximum Achievable Control Technology (MACT) standards, require that all plants in a given industry install pollution controls at least as stringent as those already in place at the better-controlled plants in that industry. Milestone 5 will be achieved through the innovative, market-based emission trading system employed by EPA's Acid Rain Program. The sulfur dioxide emission reductions from this program are also the primary means for achieving milestone 6 because sulfur dioxide emissions are a major cause of reduced visibility. (See also Reducing Global and Transboundary Environmental Risks.) EPA's Regional Haze Program will address the need for further reductions in sulfur dioxide and other pollutants to improve visibility.

### Costs

In a 1990 report, *Environmental Investments: The Cost of a Clean Environment*, EPA estimated that the annual public and private costs of meeting air quality standards were approximately $27 billion in 1990 and would rise to $44 billion by 2000 to fully meet standards expected to be in place by then (constant 1986 dollars). Achievement of the proposed milestones might require implementation of some programs not anticipated when these estimates were prepared, which would add to the costs. The costs and benefits associated with clean air programs are now being more fully assessed. EPA recently proposed changes to the ozone and particulate matter standards; the benefits and costs of these proposed changes will be assessed as part of the development of final rules.

To make sure emission standards are met, EPA will help companies ensure their own compliance with these standards. Enforcement actions will be targeted toward those sources of air pollution which present the highest risk to human health and the environment. EPA also will assist states and tribes in crafting effective, efficient compliance programs with the flexibility to use economic incentives in ways that reduce costs while ensuring that environmental goals are met. This combination of targeted enforcement, flexible approaches to compliance, and federal support of state and tribal enforcement and compliance assurance programs is critical to meeting our national Clean Air goal.

## References

### *Text Notes*


1. USEPA. 1996. *National Air Quality and Emissions Trends Report, 1995.* Washington, DC: U.S. Environmental Protection Agency, Office of Air and Radiation. Forthcoming.
2. Clean Air Act Amendments. 1990.


### *Milestone Data Sources*


M.1 USEPA. 1995. *National Air Quality and Emissions Trends Report, 1994.* Washington, DC: U.S. Environmental Protection Agency, Office of Air and Radiation.

M.2 USEPA. 1995. Projections using Mobile 5 Database. Washington, DC: U.S. Environmental Protection Agency, Office of Air and Radiation.

M.3 Ibid.

M.4 USEPA. 1995. *Schedule for Regulation of Toxic Source Categories, 40 CFR Parts 61 and 63.* Washington, DC: U.S. Environmental Protection Agency, Office of Pesticide Programs.

M.5 USEPA. 1995. Projections. Washington, DC: U.S. Environmental Protection Agency, Office of Air and Radiation.

M.6 Acid Rain Emissions Tracking System. Interagency Monitoring of Protected Visual Environments, National Park Service.

# 2. Clean Waters

*Long-Range Goal*

**All of America's rivers, lakes, and coastal waters will support healthy communities of fish, plants, and other aquatic life and uses such as fishing, swimming, and drinking water supply for people. Wetlands will be protected and rehabilitated to provide wildlife habitat, reduce floods, and improve water quality. Ground waters will be cleaner for drinking and other beneficial uses.**

## The Challenge

Meeting the long-range goal hinges on our ability to maintain high water quality in our lakes, streams, estuaries, wetlands, and ground water aquifers. We need clean water for drinking, recreation, irrigation, industrial processing, and other uses. Our economy, as well as our quality of life, depends on reliable sources of clean water. The basic challenge is to keep pollution out of the water so that beneficial uses can be maintained.

Fish, shellfish, and other aquatic organisms also require clean water to thrive, and they need a food supply and appropriate natural habitat. Thus, the challenge for Clean Waters must also include efforts to ensure that the entire aquatic ecosystem remains healthy. These efforts will also require close and ongoing cooperation between EPA and a host of key partners, including other federal agencies. For example, the U.S. Department of Agriculture (USDA) will make water quality a top goal for its Farm Bill conservation program. Over time, these and other efforts are expected to have a major impact on water quality improvement nationwide.

Discussed below are specific challenges associated with the three basic types of water resources: surface water (e.g., lakes and rivers), wetlands, and ground water.

### *Surface Water Challenge*

According to EPA's *National Water Quality Inventory 1994 Report to Congress*, about 40 percent of surveyed U.S. rivers, streams, lakes, and estuaries are too polluted for fishing, swimming, or other uses designated for them by the states (see Responsibilities below). Such uses may include swimming, fishing, boating, irrigation, drinking water supply, support of aquatic life, or others. But pollution from sewage and industrial waste has dropped dramatically since the early 1960s, largely as a result of the 1972 Clean Water Act. Much of this success is attributed to controls placed on municipal and industrial outfalls, the *point sources* of pollution. Improvements have come from massive investments in both municipal and industrial wastewater treatment infrastructure. Many older pollution-control facilities, however, will still need renewed investment in the next 10 years merely to maintain the gains of the past. More action to control point sources will be necessary, with special emphasis on urban "wet-weather" sources like combined sewer overflows, storm water systems, and sanitary sewer overflows.

Large amounts of sediment, nutrients, bacteria, and toxic pollutants also are entering our waters from sources not directly linked to specific outfalls. These pollutants originate

**National Water Quality Inventory "305(b)" Process**

The primary sources of surface water quality data are the state and tribal assessments conducted in accordance with section 305(b) of the Clean Water Act. The goal of these assessments is to measure the degree to which the nation's surface waters are able to support certain designated uses established by states and tribes (such as swimming, fishing, and support of aquatic life). Since 1975, EPA has published the results of these assessments in the biennial *National Water Quality Inventory Report to Congress*. The report currently aggregates the state descriptions into a national picture for rivers, estuaries, lakes, ground water, and wetlands.

Ideally, these state and tribal water quality assessments would cover all of the waters in each state. However, due to time and resource constraints, states and tribes have historically been able to report on only a portion of their waters in each 2-year cycle. This makes national data difficult to use to portray trends or to characterize the health of all of the nation's waters, not just those surveyed.

To address these concerns, EPA is lengthening the "305(b)" reporting cycle from 2 to 5 years. In conjunction with improved monitoring and assessment techniques and annual electronic reporting of key information for waters assessed, this cycle should enable states and tribes to comprehensively assess the surface waters in the United States using techniques that vary according to the condition of and goals for the waters. Consequently, although current and past data reflect the condition of only a portion of the nation's waters—those which have been surveyed—the 2005 targets outlined in this chapter are for *all* rivers, lakes, and estuaries in the United States.

on the land—particularly agricultural fields and urban areas—and are washed into bodies of water by rainfall and snowmelt runoff. This *nonpoint source* pollution is the largest remaining threat to water quality and healthy aquatic ecosystems.

Another major threat is physical alteration of waters by dams, channelization, bank destabilization, animal grazing, and other activities that alter flow, circulation, water level, and temperature. Yet another challenge is finding out more about the condition of our waters to better measure progress. New monitoring techniques and partnerships are needed to assess more waters and to do it in ways that provide better information.

Continued efforts by EPA and its government partners are essential if we are to meet the Clean Waters milestones. These efforts are especially critical in the areas of standards setting, monitoring of surface waters to better assess their conditions and trends, and control actions like permitting to actually reduce the amount of pollution discharged to surface waters. Providing necessary technical assistance for states and tribes is a critical component of this challenge.

### *Ground Water Challenge*

Ground water is the source of drinking water for over 50 percent of Americans. Farmers depend on it for irrigation; approximately two-thirds of ground water withdrawals nationwide are for agricultural uses.[1] Many industrial, mining, and other commercial facilities also rely on ground water. In addition, ground water contributes 40 percent of the annual flow in streams. Ground water can be polluted by farming, leaking underground storage tanks, septic tanks, municipal landfills, hazardous waste sites, road-salting, and many other activities on the land. (See Toxic-Free Communities, Safe Waste Management, and Restoration of Contaminated Sites.)

Our knowledge of the extent of ground water contamination is incomplete. Most wells are not monitored for water quality. With the exception of drinking water suppliers regulated by EPA, few well owners keep detailed monitoring records. Part of the ground water challenge is to establish effective monitoring programs to track the condition of the nation's ground waters and design studies that will aid in understanding the factors that affect ground water quality. To help protect ground water from pollution, continued federal actions are necessary to help educate people on ways in which this valuable resource becomes polluted, to expand monitoring, and to support voluntary control strategies.

### *Wetlands Challenge*

Wetlands are an aquatic resource that requires special attention. They provide essential habitat for many types of fish, wildlife, and plants. The U.S. Fish and Wildlife Service estimates that up to 43 percent of threatened and endangered species depend on wetlands.[2] About 71 percent of commercially valuable fish and shellfish depend on wetlands. Wetlands provide natural flood control by absorbing water in times of flood and releasing water in times of drought. Wetlands recharge aquifers and filter out sediments and other pollutants.

Maintaining and improving the quality of our remaining wetlands is an important challenge. Wetlands typically receive sediment, nutrients, and pollutants from agriculture and urban development in their watersheds. In excessive amounts, these pollutants can impair many wetland functions, including their ability to filter contaminants and provide fish and wildlife habitat.

Historically, wetlands have not been valued as important natural resources. Many have been drained and filled to create dry land for agricultural use or development. Although the rate of loss has slowed, the sum total of wetlands lost to date is staggering. Therefore, other major challenges include preventing the further loss of our remaining wetlands and increasing total wetland acreage through the expansion of natural wetlands and creation of artificial wetlands.

Federal support for reducing the continued loss of wetlands is crucial, especially in such areas as monitoring to determine both the quality and quantity of remaining wetlands, permitting to address actions that can eliminate or damage wetlands, and continuing support to increase the capability of states to develop effective wetland protection and restoration programs.

## Responsibilities

EPA works closely with key partners in all levels of government, with industry, with environmental and conservation organizations, and with the general public to meet the 1972 Clean Water Act goal of restoring and maintaining the chemical, physical, and biological integrity of the nation's waters.

States and tribes, with input from all sectors, set goals for their waters by adopting water quality standards that describe the uses to be protected and the conditions necessary to protect the uses. To maintain and attain the water quality standards, EPA assists states and tribes in developing regulatory controls. A central element of these controls is the issuance of permits to regulate the discharge of pollutants from sewage plants, industrial facilities, and municipal storm water systems. EPA or states issue permits with discharge limits that meet state water quality standards and national effluent regulations.

Nonpoint source and other wet-weather runoff control and prevention programs, ecological restoration projects, and water quality assessments are carried out mostly at the state and local levels. EPA works with other federal agencies and the private sector to develop guidance and tools for reducing the impacts of most pollution sources. Section 6217 of the Coastal Zone Act Reauthorization Amendments of 1990 requires states to establish coastal nonpoint source programs approved by EPA and the National Oceanic and Atmospheric Administration. The central purpose of section 6217 is to strengthen the links between federal and state coastal zone management and water quality programs in order to enhance state and local efforts to manage land use activities that degrade coastal waters and coastal habitats.[3]

To protect ground water, EPA and the states administer programs aimed at wellhead protection, underground storage tanks, hazardous waste facilities and municipal landfills, agricultural runoff, septic systems, injection wells, and other sources of contamination.

EPA and the U.S. Army Corps of Engineers or the states protect wetlands through a permit program established under section 404 of the Clean Water Act. Wetlands are also protected through preservation measures established by the 1985, 1990, and 1996 federal Farm Bills.

Additional water protection programs are derived from water quality, wetland protection, and erosion control responsibilities assigned to states and other federal agencies such as the U.S. Department of Agriculture's Natural Resources Conservation Service. The National Oceanic and Atmospheric Administration and the U.S. Fish and Wildlife Service are assigned responsibilities for managing living aquatic resources. The

U.S. Geological Survey has major responsibility for monitoring the quality and quantity of water resources. The U.S. Forest Service, Bureau of Land Management, and National Park Service manage water protection programs as part of their stewardship of federal public lands. The Corps of Engineers has key regulatory responsibility for protecting surface waters and wetlands from the impacts of the discharge of dredged or fill material and other physical modifications. The U.S. Coast Guard has responsibility for preventing spills on water of oil and hazardous materials, overseeing (jointly with EPA) response to spills, managing pollution liability programs, and enforcing laws protecting marine resources.

## Environmental Milestones for 2005

EPA proposes seven clean water milestones for 2005. Ground water and wetlands are each covered by a single milestone; surface water milestones make up the rest. Milestones 1 through 5 are targets for expected improvements in either the amount (in the case of wetlands) or condition of the nation's waters. "Condition" is usually measured by determining whether water quality is good enough for swimming, fishing, or other uses designated by the state or tribe that has jurisdiction over it. Milestones 6 and 7 are targets for reducing the amount of pollutants entering waters from major nonpoint and point sources.

Milestone 3 in the Safe Drinking Water chapter provides a target for improving the use of rivers, lakes, and reservoirs for drinking water supplies.

For all these milestones, progress will be measured with existing data collection and reporting mechanisms. All data systems supporting these measures are undergoing or are slated for enhancement, and new measures are now under development (see Strategy). As the measures improve and as the picture of conditions and trends becomes more complete, the milestone targets might change.

MILESTONE

1

# By 2005,

**there will be an annual net increase of at least 100,000 acres of wetlands, thereby supporting valuable aquatic life, improving water quality, and moderating the effects of health- and property-damaging floods and drought.**

***Federal Reviewers:***

*Please provide other related agency targets*

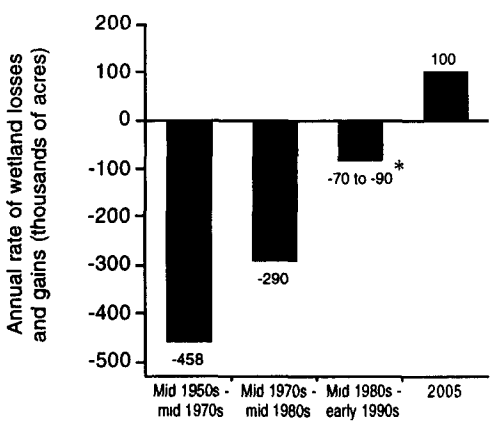
Wetlands are areas where the frequent and prolonged presence of water at or near the soil surface drives the natural system—the kinds of soils that form, the plants that grow, and the fish and wildlife that use the habitat. Freshwater and coastal wetlands are important to both natural and human communities. In addition to functioning as fish and wildlife habitat, they help maintain freshwater flow and quality. Abundant, healthy wetlands moderate the effects of both floods and droughts, and they filter sediments and nutrients.

In August 1993, the Clinton Administration issued a wetland plan supporting the goal of no overall net loss of the nation's remaining freshwater and coastal wetlands and the long-term goal of *increasing the quality and quantity of wetlands.* The plan includes more than 40 actions to make federal wetland programs more flexible, fair, and effective. This milestone supports and is consistent with the long-term federal goal.

## *Past Trends and 2005 Target*

Our historical record of wetland protection has not been good, generally because the value of wetlands has not been understood. An estimated 53 percent of wetlands in the continental United States have been lost since colonial times. Seven states (California, Indiana, Illinois, Iowa, Missouri, Kentucky, and Ohio) have lost more than 80 percent of their original wetlands.[4] Fortunately, the annual rate of wetland loss has been decreasing since the mid-1970s.[5] In the early 1990s, a net loss of approximately 70,000 to 90,000 acres occurred on nonfederal lands. (Nonfederal lands represent about 75 percent of the U.S. land mass.)

**M.1—Annual net losses and gains of wetlands from mid-1950s to 2005.**




* *nonfederal lands only*

This milestone sets a target of an annual net increase of wetlands by 100,000 acres, beginning no later than 2005 and continuing in the following years, through wetland protection and restoration efforts. Restoration programs such as the Wetlands Reserve Program, the Conservation Reserve Program, and the Partners for Wildlife Program, as well as state, local, and private efforts, will continue to be integral to achieving this milestone. The target is based on the assumption that effective regulatory and nonregulatory programs will be maintained. In the future, this milestone might be expanded to include measures of wetland health and function as better information becomes available.

## *Tracking Results*

Progress will be measured using information compiled by the U.S. Fish and Wildlife Service (USFWS) and the U.S. Department of Agriculture (USDA). The USFWS National Wetlands Inventory is updated every 10 years. USDA's Natural Resources Conservation Service maintains the National Resource Inventory, a database that provides wetland loss information on nonfederal lands every 5 years.

***Federal Reviewers:***
*Please provide other related agency targets*

MILESTONE
**2**

# *By 2005,*

## 80 percent of the nation's surface waters will support healthy aquatic communities.

**RELATED FEDERAL TARGETS**

National Research Council Recommendations

- "A net gain over the next 20 years [2012] of 2 million acres of restored lakes, out of the current 4.3 million acres of degraded lakes, is an achievable goal. By the year 2000, it is recommended that a minimum of 1 million acres of lakes be restored."
- "[The National Research Council] recommends that a national river and stream restoration target of 400,000 miles of river-riparian ecosystems be restored within the next 20 years." [6]

Fish, shellfish, and other aquatic organisms require good water quality and habitat conditions. This milestone supports the Clean Water Act objective of restoring and maintaining the chemical, physical, and biological integrity of the nation's waters and providing water quality that supports the protection and propagation of fish, shellfish, and wildlife.

States and tribes frequently adopt aquatic life goals, such as support for a bass or trout fishery, in their water quality standards. The standards describe appropriate chemical, physical, and biological conditions needed to support aquatic life objectives, and they are the basis for management programs to attain the uses. Waters are monitored to measure conditions, including biological conditions such as the type, abundance, diversity, and function of the resident plants and animals, and the status of threatened or endangered species or species at risk.

### *Past Trends and 2005 Target*

Statistically valid national-level trend data on past conditions for aquatic life do not exist. The baseline data in this milestone are derived from three sources (see graph). Data from the 1994 *National Water Quality Inventory* show river miles, lake acres, and estuarine square miles assessed by states and tribes that support their aquatic life objectives. Many states also report biological community assessment information, which is depicted as the percent of rivers with healthy aquatic communities. For estuaries, biological assessment data are provided by EPA's Environmental Monitoring and Assessment Program (EMAP), conducted in conjunction with other federal and state agencies.[7]

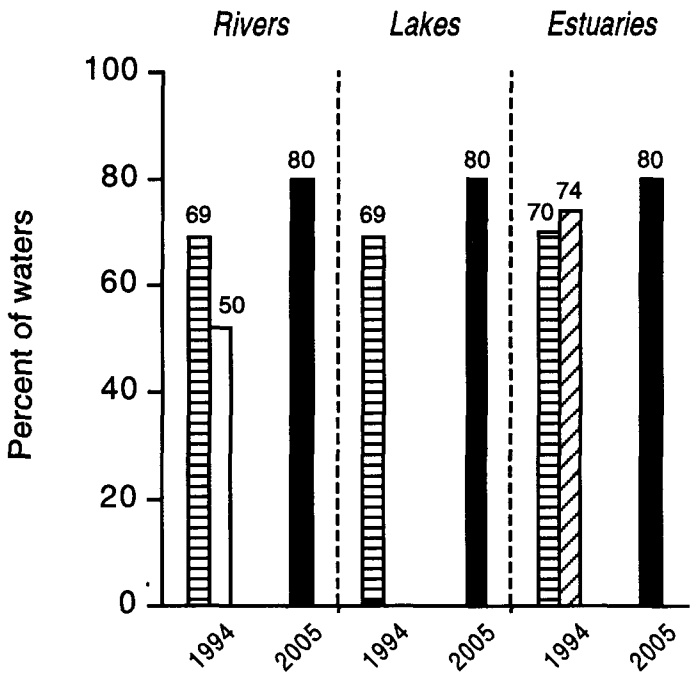
It is difficult to set a target for improvement at a national level without past trend data and an adequate baseline. EPA, however, estimates that with improvements in point and nonpoint source pollution controls, and with increased emphasis on pollution prevention and restoration of aquatic habitats, the nation's deteriorated waters will improve. Therefore, based on observed improvements at the local and state levels, a target has been established to restore roughly one-third of waters that currently do not support healthy aquatic communities.

### *Tracking Results*

Over time, EPA, working with states and tribes, will merge the key measures of this milestone to have one common measure of healthy aquatic communities. Progress will be determined with information submitted to EPA by states and tribes for the *National Water Quality Inventory Report to Congress,* which will be issued by EPA and the states every 5 years, beginning in 2001. (See box on the National Water Quality Inventory on page 24.) Additional data for the biological health of estuaries will come from the National Oceanic and Atmospheric Administration (NOAA) and the National Environmental Monitoring and Research Network (NEMRN). EPA will also work with these partners on

strategies for collecting data and achieving results. As EPA develops improved biological health assessment techniques, and as states and tribes expand their biological monitoring programs, more information will be available. EPA, the U.S. Fish and Wildlife Service, and The Nature Conservancy are considering including data on threatened and endangered species or other species at risk as a component of this milestone.

**M.2—Percent of rivers, lakes, and estuaries supporting healthy aquatic communities.**




*Water resources assessed by the states as reported in 1994 for aquatic life use support: 17 percent of the nation's total river/stream miles (48 percent of the perennial stream miles), 42 percent of the lake acres (excluding the Great Lakes), and 78 percent of the estuarine square miles.*

*River and stream miles assessed by states using biological survey methods: 9 percent of the nation's total perennial river/stream miles.*

*Estuaries assessed by EMAP: 55 percent of the nation's total estuarine acres.*

***Federal Reviewers:***
*Please provide other related agency targets*

**MILESTONE**

**3**

# *By 2005,*

**90 to 98 percent of the nation's fish and shellfish harvest areas will provide food safe for people and wildlife to eat.**

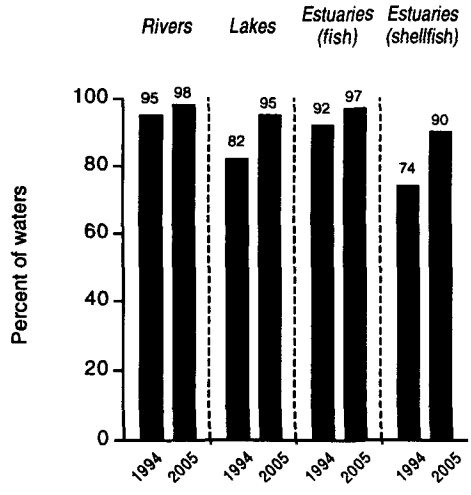
**RELATED FEDERAL TARGETS**

U.S. Dept. of Health & Human Services
*Healthy People 2000*

[By 2000,] reduce potential risks to human health from surface water, as measured by an increase in the proportion of assessed rivers, lakes, and estuaries that support beneficial uses. For consumable fishing use these percentages would change as follows:

| | 1992 | 2000 |
|---|---|---|
| Rivers | 89% | 94% |
| Lakes | 64% | 82% |
| Estuaries | 94% | 97% |

**M.3—Percent of rivers, lakes, and estuaries with uncontaminated fish and shellfish harvest areas as defined in state water quality standards.**




*Percent of water resources assessed by the states as reported in 1994: 17 percent of the nation's total river/stream miles (48 percent of the perennial stream miles), 42 percent of the lake acres (excluding the Great Lakes), and 78 percent of the estuarine square miles.*

This milestone supports the Clean Water Act goal of water quality that provides for the protection and propagation of fish, shellfish, and wildlife.

Fish and shellfish harvested from polluted waters can be unsafe to eat. In 1994, states issued over 1,500 advisories warning consumers not to eat or to limit their consumption of fish and shellfish taken from polluted waters.

This milestone targets an increase in the river/stream miles, lake acres, and estuarine square miles yielding fish and shellfish that are free of toxic pollutants and pathogens that could pose a human health risk when eaten. Through water quality standards, states and tribes designate bodies of water that should support safe harvesting areas. They subsequently monitor those waters to determine whether the standards are being met and report the results to EPA.

## *Past Trends and 2005 Target*

Statistically valid national-level trend data on fish and shellfish harvest areas that are closed because they are unsafe for human consumption do not exist. The chart displays data from the most recent *National Water Quality Inventory* concerning safe fish and shellfish harvest areas. EPA expects that planned improvements in sewage treatment plants, industrial discharges, and control of nonpoint pollution sources over the next 10 years will bring continued reductions in discharges of bacteria, viruses, and toxic chemicals, making more waters safe for fish and shellfish harvesting. Reductions in toxic chemical emissions to the air will also contribute to achieving this milestone (see Clean Air milestone 4 and Safe Waste Management milestone 2). The 2005 target represents roughly a two-thirds reduction in unsafe waters—an ambitious but reasonable level of improvement given mixed trends in recent years.

## *Tracking Results*

Progress will be measured with information submitted to EPA by states and tribes for the *National Water Quality Inventory Report to Congress* and the *National Listing of Fish and Wildlife Consumption Advisories*. By coordinating these data sources, EPA and its public partners, such as NOAA and state health agencies, are working together to provide a more meaningful assessment of the nation's waters. (See box on the National Water Quality Inventory on page 24.)

MILESTONE

4

# By 2005,

## 95 percent of the nation's surface waters will be safe for recreation.

***Federal Reviewers:***
*Please provide other related agency targets*

Fifteen to twenty percent of America's rivers, lakes, and estuarine waters are too polluted for swimming or boating. The Clean Water Act established a goal for recreational use of our nation's waters; this milestone supports that goal and sets a target for safe recreation. States and tribes designate bodies of water that should support safe recreation by setting water quality standards for that use. Use of water for recreation is divided into two categories: (1) primary contact recreation, which means that people can swim without risk of adverse health effects, and (2) secondary contact recreation, which means that people can perform activities like canoeing without risk of adverse effects from occasional contact with the water. Both types of recreation are covered by this milestone.

### Past Trends and 2005 Target

Over the past 20 years, many polluted waters have been cleaned up and are now open for recreation. With implementation of better controls on storm water and combined sewer overflow systems, EPA estimates that 95 percent of U.S. waters designated for recreation will be safe for use by 2005. The milestone is equivalent to restoring two-thirds of the waters currently impaired for recreation, a reasonable target given the water quality programs currently in place and under development.

### Tracking Results

Progress will be measured with information submitted to EPA by states and tribes for the *National Water Quality Inventory Report to Congress*. EPA and its public and private partners are working together to provide a more comprehensive assessment of the nation's waters. (See box on the National Water Quality Inventory on page 24.)

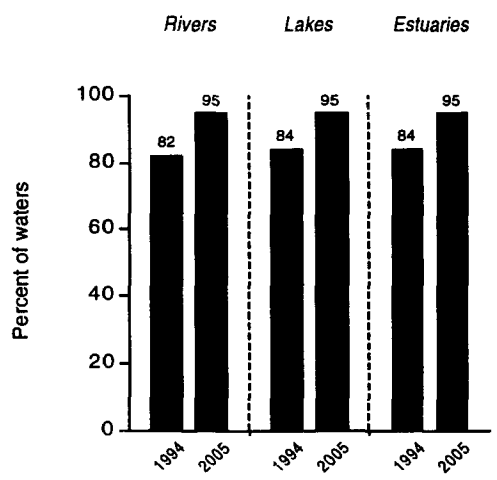
**RELATED FEDERAL TARGETS**

U.S. Dept. of Health & Human Services
*Healthy People 2000*

[By 2000,] reduce potential risks to human health from surface water, as measured by an increase in the proportion of assessed rivers, lakes, and estuaries that support beneficial uses. For recreational uses these percentages would change as follows.

| | 1992 | 2000 |
|---|---|---|
| Rivers | 71% | 85% |
| Lakes | 77% | 88% |
| Estuaries | 83% | 91% |

**M.4—Percent of river, lake, and estuary waters safe for recreation as defined in state water quality standards.**




*Percent of water resources assessed by the states as reported in 1994: 17 percent of the nation's total river/stream miles (48 percent of the perennial stream miles), 42 percent of the lake acres (excluding the Great Lakes), and 78 percent of the estuarine square miles.*

***Federal Reviewers:***
*Please provide other related agency targets*

**MILESTONE**

**5**

# *By 2005,*

**the number of Americans served by community and rural water wells containing high concentrations of nitrate in ground water will be reduced.**

Ground water is a source of drinking water for over 100 million Americans. By ensuring good-quality ground water, we protect ourselves from illnesses associated with drinking water contaminants and we maintain other uses of ground water such as livestock watering, farmland irrigation, and industrial processing.

Nitrate contamination is the most widespread ground water pollution problem in the United States. High levels of nitrate in well water typically indicate that pollution is seeping in from septic tanks, animal wastes, fertilizers, municipal landfills, or other nonpoint sources. Recently, elevated levels of nitrate in well water have been linked to fertilizer applications on agricultural lands.[8]

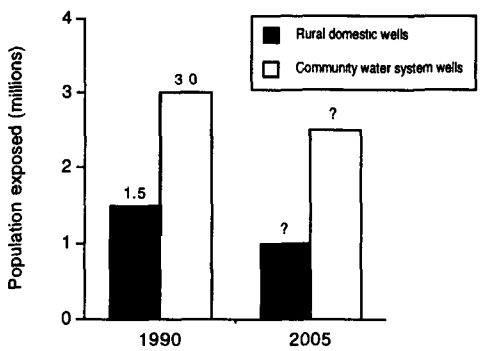
High concentrations of nitrate in drinking water can pose a risk to human health. Specifically, "blue baby syndrome," a potentially fatal disease in infants, can be caused by elevated levels of nitrate in drinking water.

The Safe Drinking Water Act (SDWA) mandates establishment of federal safety standards that limit the levels of contaminants in drinking water. For nitrate, this level is 10 milligrams per liter (mg/L). To prevent contamination, both the Clean Water Act and SDWA, along with other federal laws, establish requirements for states and tribes to protect their ground water.

### *Past Trends and 2005 Target*

Various surveys have detected nitrate in approximately 50 percent of wells sampled. The 1990 National Pesticides Survey indicated that about 4.5 million people were potentially exposed to nitrate concentrations from wells that exceeded the current national health standard for nitrate. There is considerable difficulty in interpreting the results of past ground water studies to determine the degree of contamination on a national level. As a result, EPA does not at this time propose a specific target for the number of people served by wells containing high levels of nitrate.

**M.5—Population exposed to high concentrations of nitrate in ground water.**




*A community water system provides drinking water to at least 15 service connections or a population of at least 25 permanent residents. Rural domestic wells are private water wells that supply homes in rural areas.*

### *Tracking Results*

A national data set on the overall condition of the nation's ground water does not exist. EPA, therefore, proposes using the next best source of data that is aggregated nationally and updated annually, the Safe Drinking Water Information System (SDWIS). SDWIS provides data on whether public drinking water systems are meeting safety standards and includes information on nitrate levels in well water. The modernization of SDWIS and water quality monitoring data from EPA's Storage and Retrieval (STORET) system will provide additional data to track sources of ground water contamination. U.S. Geological Survey data and studies, which have proven to be invaluable, will also be used.

MILESTONE

6

# By 2005,

**the annual rate of soil erosion from croplands will be reduced 20 percent from 1992 levels to a total of 948 million tons per year.**

***Federal Reviewers:***

*Please provide other related agency targets*

Soil erosion (sheet and rill erosion) from cropland is an indirect indicator of sediment delivery to waters since not all eroded soil is deposited into water bodies. Soil erosion is detrimental to farmers because it depletes valuable topsoil. People lose clean, clear water in which to swim and fish; aquatic plants and animals lose natural bottom habitat.

Characterizing the magnitude of nonpoint source pollution requires an in-depth examination of its many causes. One cause, soil erosion, is useful as an indicator of the success of soil conservation efforts and an indirect indicator of the amount of soil and related nonpoint source pollutants entering our nation's waters. Control of cropland erosion is achieved by landowners and managers, often with technical assistance from government experts. USDA has led the federal effort for many years.

## *Past Trends and 2005 Target*

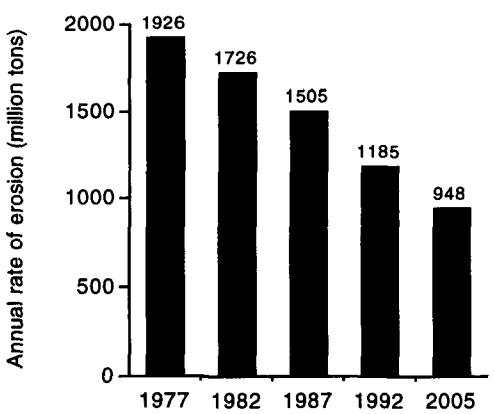
In the *National Water Quality Inventory 1994 Report to Congress* and in many previous reports, states identified agricultural activities as the largest polluter of U.S. rivers. Of all the pollution-impaired stream miles reported, 60 percent were impacted by farming.

Improved soil conservation techniques have reduced the rate of soil erosion from agricultural croplands over the past few decades. USDA personnel estimated that 1,185 million tons of soil were eroded from croplands in 1992. With the 1996 Farm Bill's strengthened nonpoint source programs, EPA projects a 20 percent decrease in the annual erosion rate by 2005. Compared to the past, however, achievement of this milestone is increasingly in the hands of landowners and managers since the 1996 Farm Bill provides farmers with much greater flexibility in making planting decisions.

## *Tracking Results*

Progress will be measured using information compiled by USDA through its National Resource Inventory. This multi-resource inventory is conducted every 5 years and includes information on soils and other resources collected at random sampling sites nationwide (except Alaska). More than 800,000 sites were included in the 1992 inventory.

**M.6—Annual rate of soil erosion from cropland.**



*Federal Reviewers:*
*Please provide other related agency targets*

MILESTONE
7

# *By 2005,*

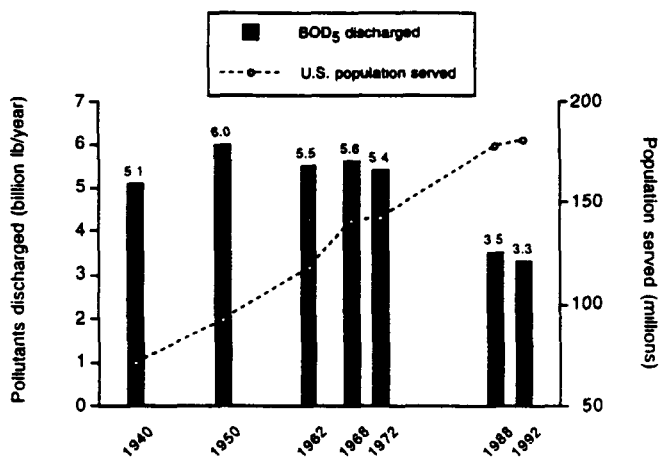
**total annual pollutant discharges from key point sources that threaten public health and aquatic ecosystems will be reduced by 3 billion pounds.**

Discharges from point sources, especially from "wet-weather" sources like combined sewer overflows (CSOs), storm water, and sanitary sewer overflows, remain a problem in many parts of the United States. According to the *National Water Quality Inventory 1994 Report to Congress,* urban runoff, storm sewers, and municipal and industrial point sources continue to be leading sources of impairment of our nation's waters. Many toxic pollutants from these sources find their way into sediments and organisms, where they can accumulate through the food chain and become harmful to people and wildlife. These toxic pollutants are especially difficult to assess and hard to clean up.

This milestone tracks the effectiveness of technologies in reducing the rate of discharge and amount of pollutant loadings to surface water and sediment. Three significant point sources of pollution are targeted. Industrial facilities, the first source, discharge either directly to surface water or to sewage treatment plants. The second source targeted is sewage treatment plants. Implicit in this target is a commitment to increase the number of plants that meet national treatment standards. Combined sewer systems, the third source, are designed to carry storm water runoff and sanitary sewage to a sewage treatment plant. During rainfall or snowmelt, the wastewater flow can exceed the capacity of the combined sewer system or treatment plant, causing the system to overflow into the water body.

Meeting milestone 7 will have a direct impact on our ability to achieve the first five milestones of the Clean Waters goal, as well as several Safe Drinking Water milestones.

**Fig. 1—Trends in pollutants discharged and population served by sewage treatment plants.**[9]




*$BOD_5$ (Biochemical oxygen demand measured over a 5-day period) refers to biodegradable organic pollutants that reduce oxygen levels in water.*

## *Past Trends and 2005 Target*

The 1972 Clean Water Act established national water pollution control requirements that set discharge limits for industrial facilities and municipal sewage treatment plants. The requirements have been implemented through the State Revolving Fund, construction grants, and the National Pollutant Discharge Elimination System (NPDES) programs. These programs have all been very successful in reducing sewage discharges, keeping pace with increasing population pressures on municipal treatment plants (See Fig. 1), and reducing and preventing industrial contamination of our waterways.

Toxic pollutants (M.7a) include priority pollutants (e.g., PCBs, lead, mercury) defined by the Clean Water Act and certain "nonconventional" pollutants (e.g., chlorine). EPA estimates that approximately 23 percent of the toxic pollutants released to water can accumulate in

sediment. The conventional pollutants (M.7b) include oil and grease, total suspended solids, and biochemical oxygen demand (BOD).

The industrial pollutant discharge reduction targets (M.7a, b) were determined by an analysis of the reduction in discharges from industrial categories that will employ the required pollution controls by 2005. For sewage treatment plants, the 2005 target (M.7c) assumes approximately 19,000 sewage treatment facilities will meet all of their treatment needs, with all but 68 of the existing facilities meeting secondary treatment requirements. The indicator pollutant is biochemical oxygen demand (BOD), the degradable organics typically controlled by discharge permits.

The combined sewer overflow target (M.7d) was determined assuming implementation of EPA's CSO Control Policy. The policy establishes a national framework for control of these sources through National Pollutant Discharge Elimination System (NPDES) permits and enforcement actions. The analysis assumes control on CSOs will be implemented uniformly by 2025.

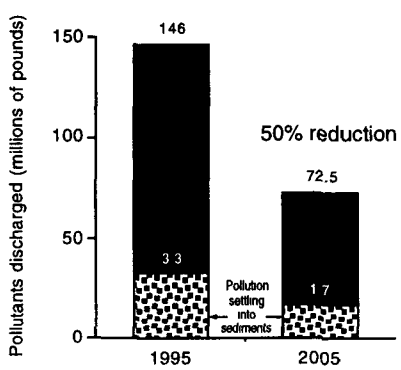
The milestone target (reduction of 3 billion pounds) is the aggregate reduction in pollutants discharged from these sources.

### *Tracking Results*

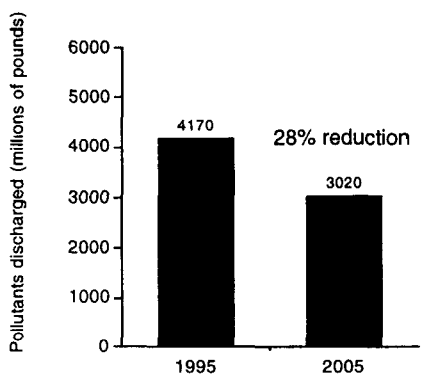
Progress will be measured primarily by analyzing discharge data from EPA's Permit Compliance System (PCS) along with modeling where necessary. EPA and other federal agencies will work to improve PCS to give much greater assurance that the quality of data is sound. Data from the Toxics Release Inventory (TRI) will be used to estimate the amount of industrial toxic pollution that settles in sediment.

**M.7—Annual amount of pollution discharged by point source dischargers**

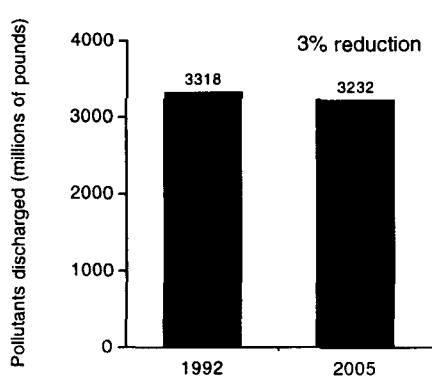
***a. Toxic industrial[10]***



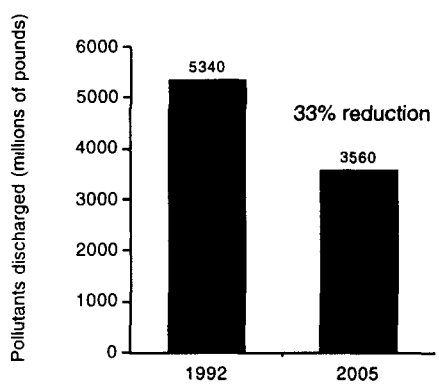

***b. Conventional industrial[11]***




***c. Sewage treatment plants[12]***




***d. Combined sewer overflows[13]***



## Strategy

To address the problems facing America's waters, multiple and varied actions need to be taken by EPA and its partners in all levels of government and the private sector. The Clean Waters strategy emphasizes four themes: reducing pollution, managing watersheds and ecosystems, protecting aquatic biological integrity, and improving water information.

A major theme throughout this strategy is to apply common sense in all we do. Common sense solutions require clarity of purpose, realistic expectations, cost-effective remedies, and stakeholder involvement.

### *Reducing Pollution*

Over the next 10 years, EPA and its partners will put more emphasis on "wet-weather" or rainfall-associated sources of pollution—sewer overflows, runoff from agricultural lands, and city and suburban storm water drainage. Environmental agencies will also continue to work with states, tribes, and municipalities to reduce pollution (especially toxic contaminants) to surface waters from factories and sewage treatment plants.

**Costs**

In a 1990 report, *Environmental Investments: The Cost of a Clean Environment*, EPA estimated that the annual public and private costs of meeting clean water standards were approximately $42 billion in 1990 and would rise to $57.5 billion by 2000 to fully meet standards expected to be in place by then (constant 1986 dollars). Achievement of the proposed milestones might require implementation of some programs not anticipated when these estimates were prepared, which would add to the costs. Over the next few years, the costs and benefits associated with clean water programs will be more fully assessed.

Just as important as what EPA and others will do is *how* it will be done. To achieve its goals, EPA will use collaborative approaches that help to identify efficient, common sense solutions that all key stakeholders can support and help to implement.

A pollution prevention approach is especially important to avoid the costly and time-consuming process of cleaning up ground water. EPA will focus on protecting underground water supplies by offering support to community and rural drinking water systems. Special attention will be given to nitrate contamination, with an emphasis on education to change agricultural practices and enhancement of wellhead and aquifer protection programs. EPA activities that will help reduce pollution of surface and ground waters include:

- Ensuring that by 2005, secondary treatment is in place at 65 percent of sewage treatment plants that currently do not have this level of treatment.
- Developing technology guidelines for industrial effluents and issuing National Pollutant Discharge Elimination System permits.
- Joining other federal agencies, states, tribes, and communities to provide guidance for reducing agricultural runoff, including adoption of erosion and sediment control practices.
- Working with NOAA, communities, and states to protect the Great Lakes from the most important remaining source of pollution—runoff of toxics from city streets and toxic pesticides and nutrients from fields.
- Issuing storm water permits and working with municipalities and industries to implement storm water management plans.
- Ensuring that states and municipalities have long-term combined sewer overflow control plans and developing cost-effective ways of controlling sanitary sewer overflows.
- Establishing wellhead protection areas to protect ground waters that supply community drinking water systems (see Safe Drinking Water). Providing support to programs that encourage people to voluntarily take actions to prevent ground water pollution.

- Preventing further sediment contamination by carrying out the Contaminated Sediment Management Strategy (see Restoration of Contaminated Sites, milestone 7).
- Working with the Superfund program to help clean up toxic waste sites that threaten the health of our waters.

### *Managing Watersheds and Ecosystems*

EPA and its government partners are employing the Watershed Protection Approach (WPA) to support EPA's overall policy of Community-Based Environmental Protection. The WPA is a systematic, comprehensive approach for protecting aquatic resources. It integrates the programs and activities of federal, state, tribal, and local entities and incorporates ecological and societal values into decision making. It is a management approach tailored to conditions within a specific geographic area. Managers can cost-effectively prioritize problems in a watershed and make more effective use of resources to address them. Stakeholder involvement aids in the development of better, more practical solutions. Following are some ways EPA will implement this "community-based" approach:

- EPA will integrate grants planning, standard setting, permit issuance, assessment, and reporting on a watershed-by-watershed basis (see box).
- Permits will be issued by EPA and the states more efficiently and logically, considering the needs of individual watersheds.
- Working with the National Oceanic and Atmospheric Administration (NOAA), EPA will assist coastal states in implementing nonpoint source programs pursuant to the Coastal Zone Act Reauthorization Amendments of 1990.
- EPA will continue to support the National Estuary Program and work with states to bring new estuaries into the program.
- EPA will implement the recommendations from the Great Waters Program to address airborne pollutants affecting the Great Lakes and coastal waters.
- EPA, NOAA, and the National Park Service will continue developing domestic and international coastal zone and watershed management strategies and guidelines for protecting coral reef communities (see Reducing Global and Transboundary Environmental Risks).
- EPA will continue to support the Gulf of Mexico Program, which is facilitating new forms of collaboration and partnerships to protect, restore, and enhance the coastal and marine waters of the Gulf of Mexico.

### *Protecting Aquatic Biological Integrity*

Protecting healthy biological communities in the aquatic environment is a pivotal component of EPA's water quality management program. EPA's biological criteria and biological assessment programs, together with its wetlands, riparian, and other habitat restoration efforts, are key tools used to protect and restore conditions suitable for aquatic life. EPA is developing a framework for assessing ecological risk that will link these activities more closely.

**Massachusetts Synchronizes NPDES Permits Under the Watershed Protection Approach**

The Massachusetts Department of Environmental Protection (DEP) is implementing a comprehensive, statewide Watershed Protection Approach (WPA). In 1993, DEP initiated this effort by synchronizing water quality monitoring and assessment, water withdrawal permitting, nonpoint source pollution control, and wastewater permitting under the National Pollutant Discharge Elimination System (NPDES) under a watershed approach.

EPA Region 1 supported DEP's action by realigning schedules for issuing NPDES permits. The Region issues administrative continuances or issues permits for a shorter duration to coordinate permitting in each of Massachusetts' 27 major watersheds.

Organizing NPDES permitting so that all permits within a watershed expire and are reissued at the same time is an advantage because it offers the state more options for reducing pollution. For example, the state may consider controlling nonpoint sources as opposed to placing more stringent limits on NPDES dischargers. In addition, permitting authorities have the option of placing increased controls on those discharges with the greatest impact on surface waters rather than placing such controls on all facilities.

Massachusetts' WPA brings the activities under the NPDES program together into one organizational unit, providing a mechanism for integrating the relationships between water quality and water quantity and point and nonpoint source pollution while involving local, state, and federal agencies and the general public in the decision-making process.[14]

*See box on page 64 on the New York City Watershed Agreement to protect drinking water.*

Habitat destruction caused by such factors as flow and streambank changes has had a significant impact on biological health and integrity. EPA does not have direct jurisdiction to reduce habitat modification, but it will work closely with its federal, state, tribal, and local partners to:

- Issue guidance for assessing the health of biological communities, including habitat in estuaries and wetlands.
- Work with the Intergovernmental Task Force on Monitoring Water Quality (ITFM) to improve methodologies for assessment and restoration.
- Use biological criteria to more precisely define the aquatic life uses that states and tribes designate as part of their water quality standards setting process in order to set more cost-effective controls.
- Use funds to encourage state nonpoint source programs to target local restoration projects for riparian, wetland, stream, and shoreline habitats.
- Support the USDA's Conservation Reserve Program to reduce soil erosion on highly erodible land, its Wetlands Reserve Program to restore wetlands, and its other incentive-based programs to reduce nonpoint source pollution from agriculture and forest lands.
- Participate with the U.S. Fish and Wildlife Service and The Nature Conservancy in identifying ways to eliminate or reduce the effects of pollution on threatened and endangered species and other species at risk.
- Apply methodologies for assessing contaminated sediments, clean up contaminated sediment when practical, and ensure that sediment dredging and disposal are handled in an ecologically sound manner.

### *Improving Water Information for Decision Making*

Perhaps most critical to EPA's efforts to measure progress toward all of the water quality milestones is the ability to monitor, share, and report water quality information. EPA and its partners have been working actively to improve water monitoring. Through the joint federal-state Intergovernmental Task Force on Monitoring Water Quality, these partners have adopted a nationwide monitoring strategy that member agencies are now implementing. EPA is adopting a series of vigorous steps to carry out essential activities, including technical assistance to states and tribes to portray a clearer and more accurate picture of the condition of our nation's water resources. Better assessments in the future might change the targets proposed for these milestones, and ultimately the overall objectives. To improve monitoring, assessment, and reporting, EPA is:

- Adopting environmental indicators for measuring progress and implementing the nationwide monitoring strategy that supports these indicators. The indicators are presented in *Environmental Indicators of Water Quality in the United States.*[15]
- Conducting (with states and tribes) an updated *National Water Quality Inventory*. The report will be issued every 5 years instead of every 2 years, and there will be annual reporting of key indicators. This new process will allow EPA to assess waters comprehensively, using a variety of monitoring techniques, and to depict national trends over time.
- Adapting water indicators to the watershed level through the National Watershed Assessment Project (NWAP). Using data from 15 of the national water indicators, EPA will issue a report in April 1997 providing an overall assessment of the health of all of the nation's watersheds.
- Encouraging states to build comprehensive ground water monitoring programs through the integration of existing programs and new monitoring initiatives and to collect quality ground water data on an aquifer basis.
- Providing additional tools, guidance, policies, training, and other support necessary to effectively assess the physical, chemical, and biological health of aquatic resources.

- Developing comparable methods to assess the biological integrity of different types of waters in different ecological regions that are compatible with those of other agencies.
- Assisting states and tribes in improving their monitoring capabilities for pollution source identification and evaluation of enforcement actions and compliance promotion programs.
- Modernizing EPA data systems and using the Internet and geographic information systems to provide easy access to information.
- Encouraging, through incentives, more ambient monitoring by permitted facilities to gain a better understanding of the overall health of water bodies.

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11. Conventional industrial pollutants include oil and grease, total suspended solids, and BOD. Loading estimates are based on EPA Support Documents for Effluent Limitation Guidelines and Pretreatment Standards. Baseline data were revised in 1995.
12. Estimates of load reduction are based on data from the *1992 Needs Survey Report to Congress,* population growth rates, and planned treatment plant constructions.
13. Combined sewer overflow pollutants include total suspended solids, BOD, total nitrogen, orthophosphate, metals, and toxic volatile organics. Estimates of load reductions were developed for the President Clinton's Clean Water Initiative. The analysis assumed controls on CSOs will be implemented uniformly in 30 years starting in 1995.
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# 3. Healthy Terrestrial Ecosystems

*Long-Range Goal*

**America will safeguard its ecosystems to promote the health and diversity of natural and human communities and to sustain America's environmental, social, and economic potential.**

## The Challenge

Healthy terrestrial ecosystems and biological diversity, or biodiversity, are directly linked to the long-term health of the nation's economy.[1] We depend on ecosystems for agricultural, industrial, and consumer products; for recreation; and for ecological services, such as air and water purification and flood control. Terrestrial ecosystems also provide habitat for many biologically and economically valuable plant and animal species. Degradation of these ecosystems can result in species becoming threatened, endangered, or extinct, as demonstrated by the decline of grizzly bear and wolf populations, salmon in the Pacific Northwest, and songbird populations in many areas of the country.

The causes of ecosystem loss include both natural and human-induced stresses. Natural stresses, such as seasonal drought, pest species, fire, flooding, and storm damage, impact terrestrial ecosystems. Ecosystems will recover from these natural stresses through processes of natural succession. In contrast, human-induced stresses like habitat fragmentation, toxic chemicals, acidification, desertification, urban development, highway construction, air pollution, mining, introduction of exotic species, and certain pesticide uses might disrupt ecosystems beyond their ability to recover.

The optimal balance between the integrity of natural systems and human activities is indicated by the ability of our environment to support diverse and stable wildlife and plant communities, to maintain economic uses that are sustainable in a time frame of decades to centuries, and to contribute generally to human health and quality of life. Inasmuch as some ecosystems, some plant and animal species, and some past ways of using natural resources are in jeopardy, we have not achieved this balance.

Effective planning is needed at many levels to balance conservation and development and to avoid significant degradation of the nation's terrestrial ecosystems. Interagency collaboration and joint planning and decision making among federal agencies, as well as

**Definitions**

The term *ecosystem* denotes a community of all the species populations that occupy a given area and its nonliving environment.[2] Terrestrial ecosystems are communities associated with living on or in the land, as distinguished from marine or other aquatic ecosystems. Aquatic ecosystem improvements are covered in the Clean Waters chapter.

*Ecosystem management* is a collaborative approach to restore and sustain the health, productivity, and biological diversity of ecosystems and the overall quality of life that fully integrates social and economic goals.

Biological diversity, or *biodiversity*, can be thought of as the variety of all life on earth. It includes species of aquatic and terrestrial ecosystems and the ecological complex of which those ecosystems are a part. Biological diversity, then, refers to diversity within species, between species, and among ecosystems.

People benefit from ecosystems and biodiversity because they sustain our lives by providing many ecological goods and services, including food; industrial, medical, and other products; oxygen production; and water and air purification. Biodiversity and ecosystems also provide recreational opportunities and aesthetic values that contribute to our quality of life and identity.

improved partnerships with nonfederal stakeholders, are essential. This type of collaboration has been recommended by the Interagency Ecosystem Management Task Force. In addition, sound management practices, when applied in conjunction with conservation efforts, are necessary to ensure the sustainable use of our land resources and to maintain populations of native animals and plants. The challenge is to manage our lands and their biological diversity to meet today's needs, while at the same time considering the needs of future generations.

## Responsibilities

At the national level, a patchwork of federal approaches are employed to address ecosystem health and productivity. These approaches include land preservation through the national park and national wilderness preservation systems, multiple-use management of national forests and other federal lands, and technical and financial assistance to private landowners to encourage soil conservation and forest management. In addition, Congress has at times explicitly recognized the importance of protecting the environment at an ecosystem level and has broadly framed several statutes in terms of protecting ecosystems. Such statutes include the National Environmental Policy Act (NEPA), the National Forest Management Act, the Endangered Species Act, the North American Waterfowl Management Act, the Migratory Bird Treaty Act, the Fish and Wildlife Coordination Act, and the Clean Water Act. These and many other federal laws affect federal, state, tribal, local, and private lands and their biological components.

No agency has exclusive "authority" or responsibility to protect ecosystems. Ecosystem protection involves a comprehensive approach to resolving environmental issues. EPA's and other agencies' programs affect ecosystem protection. Although EPA is not directly responsible for land management practices used by public or private landowners, land management clearly relates to the environmental protection mandate of the Agency. To illustrate, EPA is responsible for (1) NEPA reviews of other agencies' actions that cause significant environmental effects; (2) Clean Water Act protection of water quality and wetlands from land-based impacts; and (3) pesticide registration and review and other programs addressing chemical use and pollution prevention.

Beyond EPA's regulatory programs, the Agency carries out a wide variety of nonregulatory programs and activities that provide the science, tools, data, information, and technical assistance needed to support the efforts of others in developing and implementing ecosystem protection programs. EPA's community-based environmental protection efforts can help to forge alliances between EPA, other federal agencies, state and local governments, and private partners for the protection of terrestrial ecosystems and wildlife habitats (see box).

EPA supports the efforts of federal, state, tribal, and local agencies to better manage land resources. The U.S. Fish and Wildlife Service administers federal wildlife protection laws, and land management agencies like the Bureau of Land Management, National Park Service, and U.S. Forest Service manage federal lands in accordance with federal, state, and local laws. Federal water management agencies promote land management practices that protect water resources. EPA works with land management agencies to ensure their programs comply with federal environmental regulations and policies. The National Biological Service

**Community-Based Environmental Protection**

Community-based environmental protection is EPA's new approach to identify environmental problems, set priorities, and forge solutions. Environmental protection issues are resolved in partnership with the people who live in local communities or are affected by proposed activities. Community-based environmental protection integrates environmental management with human needs, considers long-term ecosystem health, and highlights the positive correlation between economic prosperity and environmental well-being.

provides biological sciences and information and technology services to all Department of the Interior bureaus.

Other federal agencies, such as the U.S. Department of Agriculture's Natural Resources Conservation Service, work with private landowners and state and local governments to assist in protecting our nation's air, land, and water. Private landowners must follow laws pertaining to land use at the local, state, tribal, or national level. State and local governments enact and administer laws that regulate land use and actions that can affect ecosystems and wildlife. They purchase parks, acquire easements, and offer economic incentives. Tribal governments regulate many activities and influence state and federal agency policies.

## Environmental Milestones for 2005

EPA proposes three milestones for this goal. They do not cover all aspects of terrestrial ecosystem health, but they are indicators for which national-level data are currently available or expected to be available. The first milestone is to halt the loss of rare ecosystems that are currently in decline. The second milestone is to stabilize or increase populations of native plant and animal species that are threatened with extinction. The third establishes an objective to restore and manage ecosystems to support human communities and native flora and fauna. All three milestones are interrelated; an improvement in one will contribute to (or result from) achievement of the others. An important action that will promote healthy terrestrial ecosystems—increased use of integrated pest management—is described in the "Strategy" section of the Safe Food chapter.

These milestones cannot be achieved through the work of any single government agency or private group. They will require joint efforts by DOI, USDA, EPA, state and tribal agencies, local governments, private landowners and managers, and others whose activities affect the condition of the land.

***Federal Reviewers:***
*Please provide other related agency targets*

**MILESTONE**
**1**

# *By 2005,*

**the loss of ecosystem types considered critically endangered, endangered, or threatened will be eliminated.**

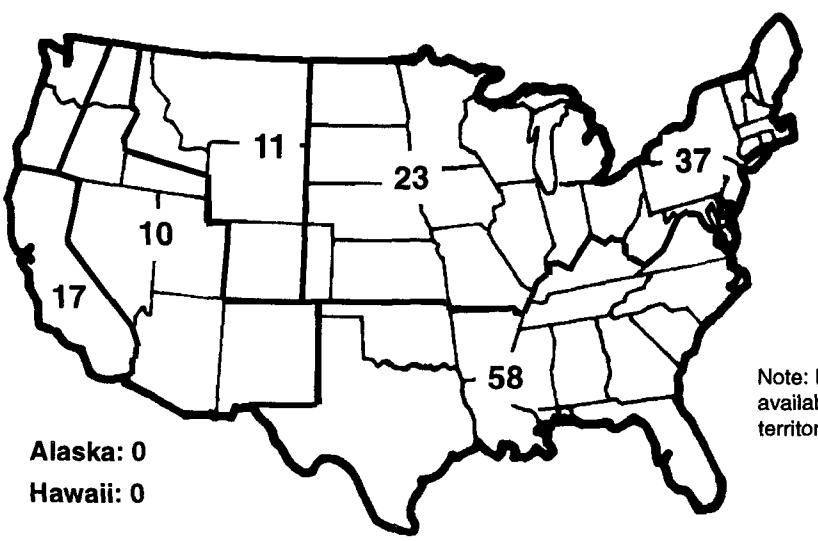
Protection of ecosystems rarely means locking up large amounts of land against all human intrusion; usually it is accomplished through voluntary agreements (e.g., conservation easements, voluntary stewardship programs) that limit destructive activities. There is considerable flexibility in selecting approaches to ecosystem protection. Landowners, private conservation organizations, government agencies, and businesses all make substantial, although often very different, contributions to the protection of ecologically significant lands.

Protecting ecosystems also requires difficult choices among many competing values and places. These decisions are justified by the many important attributes and benefits that ecosystem protection provides, such as the conservation of biodiversity and the provision of ecological services on which human communities depend. This milestone emphasizes that protection efforts should first be focused on those ecosystems which are in danger of extinction. Such ecosystems are distributed all over the nation and can be categorized as critically endangered, endangered, or threatened (Fig. 1). The three categories are aggregated for presentation in M.1. Although they represent a small fraction of the American landscape, they are a valuable and irreplaceable resource.

## *Past Trends and 2005 Target*

Losses of all ecosystem types have been most pronounced in the South, Northeast, and Midwest. Two diverse ecosystems that once dominated the landscape—tall grass

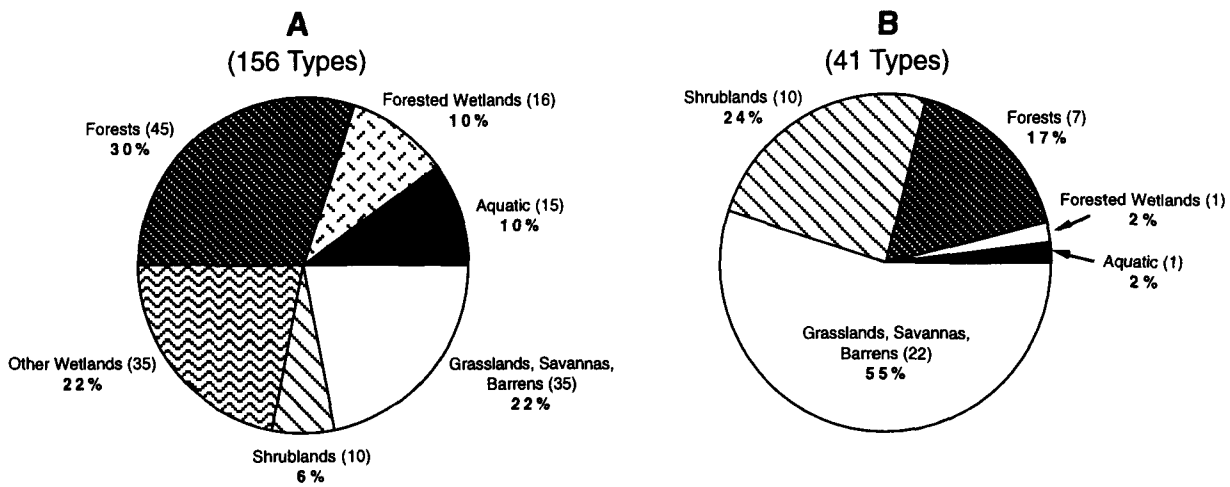
**Fig. 1—Distribution of critically endangered, endangered, and threatened ecosystem types by geographic region**




Note: Data not available for U.S. territories

*When ecosystem types overlapped regions, each region received a point. Regions with fewer types are not necessarily in better condition because numbers reflect sampling and reporting biases in the literature and in heritage programs.*

**M.1—Number and distribution of general ecosystem types that are classified as: (A) critically endangered, endangered, or threatened (as a group); and (B) critically endangered (only)**




prairies and old-growth forests—exist today in small fragments. Less than 5 percent of our native, old-growth forests remain in the conterminous 48 states. Many other native ecosystems, such as virgin eastern deciduous forest, Texas native prairie, and California's native grasslands and riparian (streamside or lakeside) forests, have been virtually eliminated. In addition, many critically important ecosystems exist as disconnected fragments, such as all riparian forests, which have declined by 70 percent.

For this milestone, National Biological Service (NBS) data depicting the current status of our endangered ecosystems provide a ranking of the nation's declining ecosystem types by the percentage of original area lost or degraded. Ecosystem types that are critically endangered (41 ecosystems) have lost more than 98 percent of their original area; endangered ecosystem types (58) have experienced an 85 to 98 percent decline; and threatened (38), a 70 to 84 percent decline. The chart above shows the percentage of these lost or degraded ecosystems by general ecosystem types. For example, the seven forest ecosystems that are critically endangered include ecosystems such as the longleaf pine forests of the southeastern coastal plain, spruce-fir forests of the southern Appalachians, and loblolly pine-shortleaf pine in the west Gulf coastal plain. Similarly, grasslands, savannas, and barren ecosystems that are critically endangered are oak savanna in the Midwest and Lakeplain wet prairie in Michigan.

Although endangered ecosystems now represent a small fraction of the American landscape, they represent a valuable and irreplaceable resource. The protection of these critical resources will be complemented by effective management of other terrestrial ecosystems. This milestone establishes a target to eliminate the loss of those ecosystem types considered critically endangered, endangered, and threatened, which is an essential step in protecting and managing terrestrial ecosystems.

### *Tracking Results*

Progress toward this milestone will be measured in part using data from the NBS's Gap Analysis Program. This analysis maps the extent of the nation's ecosystems, assesses the protection status of each type, and identifies protection gaps. The NBS plans to periodically update its reports on the status of those ecosystems threatened with extinction. Additional data for tracking progress will be obtained from other federal agency programs, The Nature Conservancy, universities, state and tribal agencies, local agencies and organizations, and other interest groups.

***Federal Reviewers:***
*Please provide other related agency targets*

MILESTONE
**2**

# *By 2005,*

**the populations of endangered, threatened, rare, and declining species of native terrestrial animals and plants will be stabilized or increased.**

The health of terrestrial animal and plant populations is greatly affected by the health of the terrestrial ecosystems on which they depend. Documented declines of wildlife populations, especially in amphibians, reptiles, and birds, have paralleled declines in the health of terrestrial ecosystems over the last several decades. These population declines are a result of habitat loss, degradation, and fragmentation (breaking continuous tracts of habitat into pieces too small to sustain species populations); effects of toxic chemicals, pesticides, and other pollutants; and competition from non-native species.

Threatened and endangered species are particularly important because they are the rarest genetic components of our biodiversity storehouse. Their status often reflects the status of the whole terrestrial system. Species listed as endangered or threatened are distributed among the major taxonomic groups and are found in every state and U.S. territory (Figs. 2 and 3).

Although the most endangered species—those with only a few individuals left—might become less critical to ecosystem functions by virtue of their small numbers, their demise reflects the impacts that affect all species in the system, and their loss represents final and irreversible loss of an element of genetic diversity. Today, multi-species or ecosystem approaches to implementing the Endangered Species Act are seeking to protect more terrestrial species than those listed. Recovery efforts often attempt to stabilize or improve habitat, thus providing cascading benefits for vast numbers of other species dependent on those same habitats. Similarly, many wildlife conservation programs focus on habitat or whole ecosystems, thus providing benefit to all species in those areas. This milestone helps measure the progress of these efforts and represents an overall objective to stabilize terrestrial wildlife and plant populations that are threatened with extinction.

**Fig. 2—Distribution of federally listed threatened and endangered species by taxonomic group.**

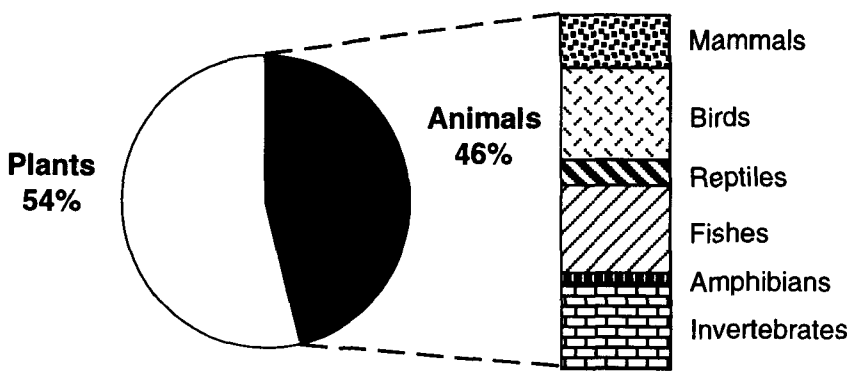
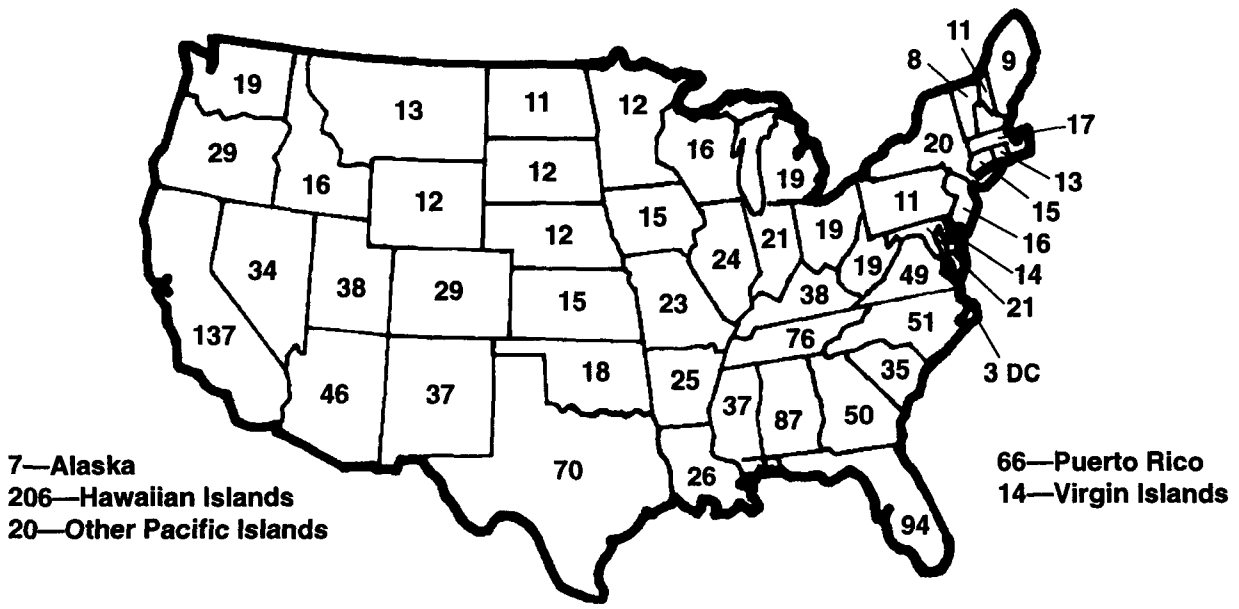


**Fig. 3—Number of federally listed threatened and endangered species by geographic region.**




### *Past Trends and 2005 Target*

Population reductions in many plant and animal species have occurred for many decades. The U.S. Fish and Wildlife Service has focused efforts on collecting data on all of the endangered or threatened species. These data are reported and provide information on the percent of species known to be stable or improving, the percent declining, and the percent for which the population trend is unknown. Stable or improving species are defined as those for which the trend toward extinction has been halted or reversed in the wild.

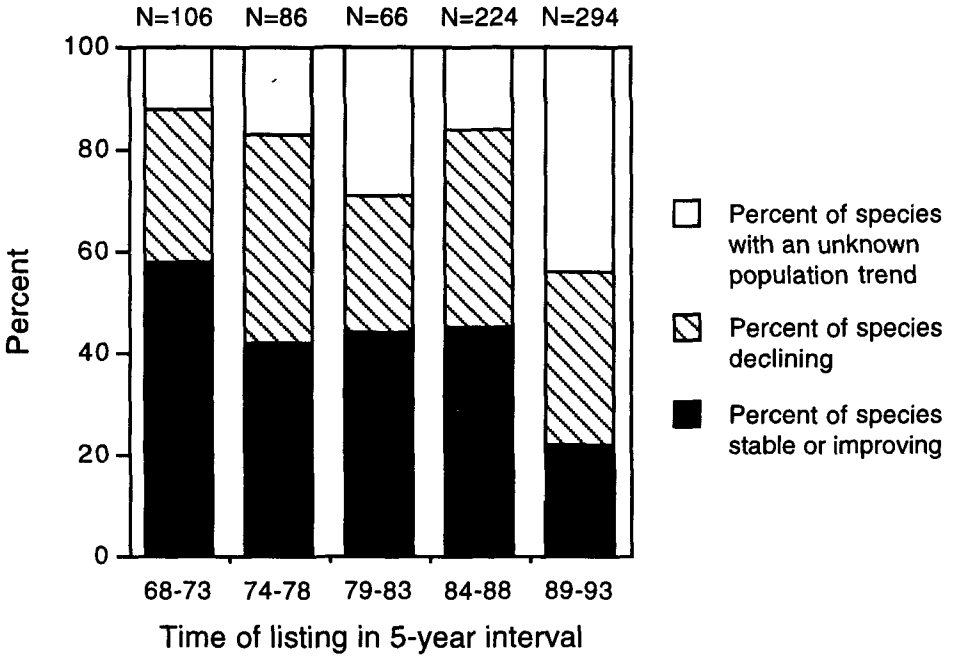
Of the 108 species listed as threatened or endangered between 1968 and 1973, 58 percent are currently known to be stable or improving in their native habitats. Of the 294 species listed between 1989 and 1993, only 22 percent have recovered to the point that populations are stable or increasing. Over 41 percent of all 909 species listed as of September 30, 1994, have stabilized or are improving.[3] In addition, 35 percent of listed species are declining, while there is uncertainty about the population trend of the remaining species (M.2).

Reversing species decline will require important decisions regarding ecological management and economic growth. Establishing a target to stabilize or increase listed plant and animal populations, however, is a critical first step in ensuring ecosystem sustainability.

### *Tracking Results*

The U.S. Fish and Wildlife Service, the National Biological Service, The Nature Conservancy, and state Natural Heritage Program databases house important population statistics and are being considered as sources of the data needed to develop indicators and milestone targets. The FWS will continue reporting on the endangered and threatened species in its biennial reports to Congress. Migratory bird information, obtained through the Breeding Bird Survey and the National Waterfowl Management Program, can be used to determine whether bird species populations are healthy or declining.

**M.2—Current population trends of federally listed threatened and endangered species according to time of listing.**




*N=Number of species in the 5-year interval*

MILESTONE

3

# *By 2005,*

**ecosystem conditions and functions will be restored to ultimately provide adequate amounts of habitat with the necessary size, mixture, and quality to sustain native animals and plants in all regions.**

***Federal Reviewers:***
*Please provide other related agency targets*

Protection of "representative" types of ecosystems, that is, those ecosystems which were common and once dominated the landscape in a given region, will sustain native species, human populations, and valuable natural resources. Improving the quality, functions, and values of ecosystems—even commonplace ones such as second-growth forests and riparian corridors—will benefit human and natural communities. Intact riparian corridors and second-growth forests, for example, provide wildlife habitat, flood control, pollutant filtering, and other important ecosystem services and functions.

This milestone recognizes the need for an extent and pattern of interconnected ecosystems so that vegetation restoration and other land management practices achieve intended wildlife and other environmental benefits. It describes conditions that are desirable to ensure sustaining populations of animals and plants that are native to a region.

**RELATED FEDERAL TARGET**

Bureau of Land Management
*Riparian Wetland Initiative for the 1990s*

Restore and maintain [BLM] riparian-wetland areas so that 75% or more are in proper functioning condition by 1997 . . . Achieve an advanced ecological status, except where resource management objectives, including proper functioning condition, would require an earlier successional stage.

## *Past Trends and 2005 Target*

Protecting native ecosystems and practicing sustainable land stewardship should protect the wildlife and plant species that depend on them for survival. The condition of native vegetation, the health of animal species that depend on terrestrial ecosystems, and the status of conservation practices applied on these lands can serve as surrogate measures of ecosystem health. We have lost 26 percent of our forests and more than 95 percent of our native prairies. Surveys indicate that 56 percent of Neotropical migratory bird species (those species which migrate between the southern hemisphere and North America) and 57 percent of waterfowl species (short-distance migrants) are in decline. These declines have resulted from a variety of factors including deforestation and other habitat losses, lack of hunting controls in Central and South America, and pollution from agricultural and silvicultural practices. Data on the status of other wildlife, especially non-game species, may become available in the future.

Based on past trends and current status, and with adoption of a long-term approach to ecological and economic sustainability of our terrestrial resources, this milestone establishes a target to restore conditions and functions of representative ecosystem types in all regions. Improving management in all ecosystems will enhance the land's productivity for human and ecological uses. No single measure of success can be proposed for both the extent and pattern of ecosystems that are not threatened with extinction. One or more numeric targets for this milestone could be set in the future if we can define an appropriate quantitative measure(s) for success.

### *Tracking Results*

Progress toward this milestone's achievement is highly dependent on public and private land management. Many measurements that can help describe progress will be used by agencies and others who are working to restore terrestrial ecosystem functions, area, and quality. A number of monitoring tools and data sources are proposed to measure progress toward achieving this milestone.

Through its NBS and FWS, the U.S. Department of the Interior (DOI) has initiated biological surveys of the nation's ecosystems and wildlife communities that will be updated at regular intervals. These survey data indicate trends for species and vegetative communities. DOI also maintains program data from its land and water management agencies on the condition of grazing land (Bureau of Land Management), national park lands (National Park Service), and so forth. To supplement these survey and program data, satellite imaging and other techniques are being developed that will allow better measurement of both the amounts and patterns of vegetation and, therefore, progress toward achievement of the milestone.

Data and tools to monitor wildlife trends are sketchy, but bird population data can be used as a proxy for both the extent and connectedness of terrestrial ecosystems. Migratory birds respond to changes in the amount of habitat available for breeding and wintering, and migratory and breeding patterns are affected by the mosaic of ecosystems across the landscape. Breeding Bird Surveys, Christmas Bird Counts, the Feeder Watch Program, the National Waterfowl Management Program, and other data collection efforts are conducted annually for migratory and resident bird species. Avian species data provide a historical perspective and a baseline for measuring the success of future ecosystem management efforts. Targets and trend data related to other wildlife and plant populations can be developed as status information on nonavian species becomes available.

Some tools exist to monitor trends in the use of management and conservation practices at both the private and federal levels. For example, USDA's Environmental Conservation Acreage Reserve Program (ECARP) encompasses the Conservation Reserve Program (CRP), Wetlands Reserve Program (WRP), and Environmental Quality Incentives Program (EQIP). These programs help farmers and ranchers prevent soil erosion and water pollution, protect farm and ranch land, conserve water used in agriculture, preserve wildlife habitat, and encourage energy conservation. The Forestry Incentives Program (FIP) and Stewardship Incentives Program (SIP), administered by the U.S. Forest Service, facilitate responsible private forest management through use of management plans. FIP encourages tree planting and timber stand improvement, while SIP details strategies for managing wildlife, recreation, soils, fish, aesthetics, timber, and other natural resources.

While USDA conservation programs do not track resource abundance, they do provide measures of acreage managed with land conservation practices that protect soil, native vegetation, and wildlife. Information from ECARP, FIP, and SIP includes data on participation, acreage enrolled, payments made, and implementation of conservation practices. The National Resources Inventory (NRI), conducted by USDA's Natural Resources Conservation Service, inventories soil, water, and related resources throughout the country. Surveys are performed every 5 years and include data on soil characteristics, land cover/use, erosion, land treatment, conservation treatment needs, vegetation, and potential for conversion to cropland. Land acreage enrolled in conservation or incentive programs and the status of lands described in the NRI are being considered as potential indicators for tracking progress toward achieving this milestone. Other USDA data can be used to track progress, such as vegetation and wildlife information from ECARP, FIP, and other USDA programs that support ecosystem restoration.

## Strategy

Overall principles for achieving the Healthy Terrestrial Ecosystems goal include ensuring that all relevant and identifiable ecological and economic consequences are considered in decisions; improving coordination among federal agencies; forming partnerships between federal, state, and local governments, tribes, landowners, and other stakeholders; improving communication with the public; carrying out federal responsibilities more efficiently and cost-effectively; using the best science; improving information and data management; and adjusting management direction as new information becomes available. These principles are embodied in a June 1995 report by the Interagency Ecosystem Management Task Force, *The Ecosystem Approach: Healthy Ecosystems and Sustainable Economies.* This report lays out a series of recommendations and specific actions that will be necessary to improve the coordination and collaboration of federal agencies.

**Costs**

The Healthy Terrestrial Ecosystems milestones will have significant costs, but it is difficult to estimate them with the information currently available. Some of the costs will be in the form of lost opportunities to develop land due to the need for protecting natural habitats. Over the next few years, the costs and benefits associated with ecosystem protection will be more fully assessed.

Establishing ecosystem protection as a national priority encourages institutions and individuals to work toward a common set of objectives. Local-, state-, and regional-level implementation of ecosystem management approaches will ensure the integration of all factors—ecological, economic, and social—affecting natural systems. The federal government will support, to the extent possible, cooperation among private and nonprofit organizations in protecting ecosystems. EPA proposes to continue working with other federal and public agencies and private landowners to manage their lands using sound ecosystem management principles to protect land, water, and air resources. Much of the federal effort for terrestrial ecosystem protection needs to focus on providing governments and private organizations with appropriate tools and capabilities. Some of the tools are described below.

### *Improved Scientific Understanding, Monitoring Data, and Analytical Tools*

Current efforts in managing terrestrial ecosystems are often limited by lack of ecological understanding, limited monitoring information, and inadequate analysis tools. Over the next decade, a concerted effort should be directed at strengthening the scientific foundation for the conservation of biodiversity and protection of terrestrial ecosystems. EPA and other agencies are taking steps to improve monitoring and data management systems through participation in the Federal Geographic Data Committee and the National Environmental Monitoring and Research Network.

### *Improved Land Use Decisions and Practices*

Land management decisions, ranging from small individual landowner decisions to large-scale decisions about development and land use, ultimately control the condition of the nation's terrestrial ecosystems. Actions to strengthen the land use decision process should be characterized by a strong scientific foundation, a consideration of the economic forces that often drive land use decisions, and an acceptance that land use planning can help achieve a sustainable local economy that ensures healthy economic activity and conserves natural resources and environmental quality. EPA will be a proponent for land stewardship, using approaches like community-based environmental protection, which is aimed at integrating environmental protection across geographic areas in collaboration with local communities.

Other federal agencies that support private landowners and manage public lands will continue their work to protect and enhance natural and human-dominated ecosystems. USDA's Natural Resources Conservation Service, for example, will develop conservation

plans on rural lands to manage them for soil erosion control, protect wildlife and the environment, and restore native vegetation and other life.

### *More Effective Government Institutions*

A significant challenge for dealing with terrestrial ecosystems is changing existing institutions and traditional relationships between government agencies, different levels of government, nongovernment organizations, industry, and private citizens. The Interagency Ecosystem Management Task Force has proposed a series of recommendations to improve this coordination. At EPA, the change requires a shift from a regulatory focus to include more nonregulatory approaches, as well as a shift from implementing environmental protection one statute, or one pollutant, at a time to an approach that identifies problems and solutions present in specific ecosystems. This place-based approach requires different institutional relationships, and EPA will strive to demonstrate, through its community-based environmental protection initiatives and a series of ecosystem projects, many alternative approaches that can be replicated. These approaches will include working with state and tribal partners to develop multimedia compliance assurance plans for places that contain endangered species or places where high-risk threats to human health and the environment are present.

### *Expanded Environmental Education*

Environmental education is an integral part of instituting new approaches to protecting the terrestrial environment. Many of the necessary actions must involve, and be led by, landowners, businesses, citizens, and local institutions. Education efforts should be directed at fostering the regional and local capabilities needed for ecosystem protection projects. To engage in productive discussions about protecting specific ecosystems, federal agencies will need to expand efforts that promote ecological literacy and awareness of emerging policies (See Empowering People with Information and Education and Expanding Their Right to Know).

### *Public-Private Funding for Habitat and Wildlife Conservation*

Public-private partnerships can protect wildlife and their habitats. A large outdoor industry takes in over $18 billion a year from Americans who engage in wildlife-associated recreation[4]; funding wildlife and ecological conservation makes economic sense. One way to protect wildlife, and the habitats and ecosystems on which they depend, is to build mechanisms for beneficiaries to pay for wildlife protection. Sportsmen support game species with fees on equipment and fuel taxes, but other public funding for wildlife is largely for endangered species protection. Funding will be more effective if species' habitats are protected before they are driven to the brink of extinction. A revenue instrument that could be used to forge a public-private funding partnership is user fees. According to the International Association of Fish and Wildlife Agencies, a 5 percent surcharge levied on manufacturers' prices for outdoor products and recreational vehicles could generate up to $350 million annually to fund wildlife diversity programs. Publicly collected revenues could be distributed through a combination of public agencies and private organizations to protect wildlife habitat. Another way to raise public funds for ecological and biodiversity protection is development fees that, in effect, are mitigation for the losses of endangered and other species' habitat that development causes or has caused. State and local taxes and other public funding alternatives also can be used to share costs with the private sector.

There are many public and private initiatives and programs designed to protect wildlife and/or conserve natural resources, employing the approaches mentioned above and others. EPA will continue to participate in or support these activities. They include the National Recreational Fisheries Coordination Council, Partners in Flight (migratory

birds), Wildlife Habitat Council (corporate lands), the North American Waterfowl Management Program, the Conservation Reserve Program, and various place-based efforts such as the Great Plains Initiative.

## References

### *Text Notes*

1. Aquatic ecosystems are addressed in milestones 1 and 2 in Chapter 2, Clean Waters.
2. Noss, R.F., E.T. LaRoe, and J.M. Scott. 1995. *Endangered Ecosystems of the United States: A Preliminary Assessment of Loss and Degradation.* Biological Report 28. Washington DC: U.S. Department of the Interior, National Biological Service.
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M.2. USFWS. 1994. *Recovery Program Endangered and Threatened Species, 1994 Report to Congress.* Washington, DC: U.S. Department of the Interior, Fish and Wildlife Service.

### *Figure Data Sources*

1. Noss, R.F., E.T. LaRoe, and J.M. Scott. 1995. Projections. *Endangered Ecosystems of the United States: A Preliminary Assessment of Loss and Degradation.* Biological Report 28. Washington, DC: U.S. Department of the Interior, National Biological Service.
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3. Ibid.

# 4. Safe Drinking Water

*Long-Range Goal*

**Every American public water system will provide water that is consistently safe to drink.**

## The Challenge

Thanks to decades of effort by public and private organizations and the enactment of the Safe Drinking Water Act (SDWA), most Americans can turn on their taps without fear of receiving unsafe water. The challenge associated with this goal is twofold. First, we must ensure that people already receiving high-quality water continue to do so. Second, we must reduce the percentage of the population who now drink water from public systems in violation of health requirements.

Ensuring consistently safe drinking water requires that government (federal, state, tribal, and municipal) play a strong role in protecting the water as it moves through the three stages of the system—the raw source water, the water treatment plant, and the pipes that deliver finished water from the treatment plant to the tap.

- *Water supply source.* Water withdrawn from a ground water aquifer, lake, reservoir, or stream should be of high enough quality to use as a source for drinking water supply. (See Clean Waters chapter.) Using polluted source water greatly increases the level and expense of treatment needed to provide finished water that meets public health standards.
- *Water treatment plant.* Treatment plants remove harmful contaminants from the incoming raw water. Virtually all plants that treat surface water (e.g., water from rivers and lakes) use some form of disinfection. Many also employ a system of sediment basins and filtration processes. Ground water also is frequently treated, especially if it is pumped from aquifers underlying developed areas.
- *Delivery system.* The network of pumps, tanks, and pipes that stores and conveys the finished water to homes, businesses, and other distribution points must be designed and maintained to resist infiltration from sewage, runoff, and other pollution sources, including lead solder in the piping system.

**Drinking Water Standards**

EPA sets national primary drinking water standards in two ways: through the establishment of maximum contaminant levels (MCLs) and through treatment technique requirements.

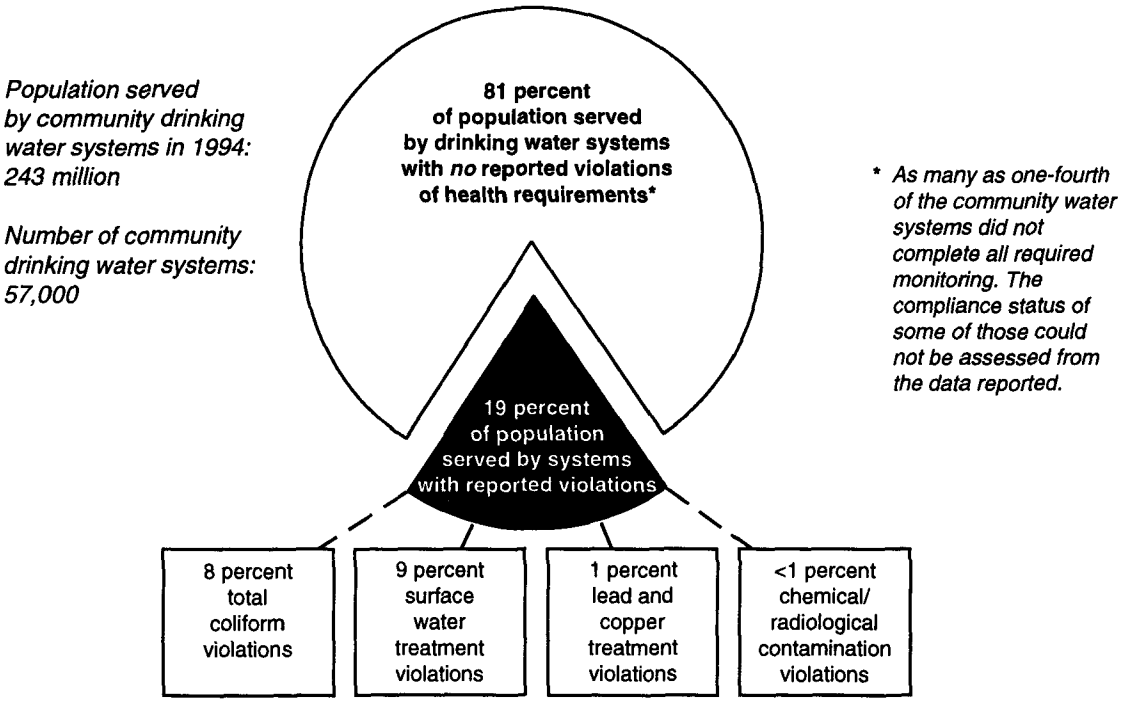
MCLs are the maximum permissible levels of contaminants in drinking water that is delivered to any user of a public water system.

Treatment techniques are procedures that public water systems must follow to ensure contaminants are limited in the drinking water supply. EPA is authorized to establish a treatment technique when it is not economically or technologically feasible to ascertain the level of a contaminant. For example, techniques like filtration and disinfection are established to remove microorganisms such as *Giardia lamblia, Legionnella,* and viruses, all of which are very difficult to detect in water. Treatment requirements also are set to control lead and copper levels in drinking water.

EPA's Science Advisory Board concluded that drinking water contamination is one of the highest environmental risks to human health.[1] This conclusion is due, in part, to the variability in quality of the raw water source and the potential for contamination from materials used in the delivery system as the water travels to the consumer's tap.

Over 90 percent of the people in the United States get their drinking water from public supplies. Most public water systems meet drinking water standards. In 1994, 81 percent of the population served by community systems received water that had no reported health violations (Fig. 1). Of course, that also means that 19 percent of those served by community water systems, or approximately 46 million people, drank water that violated health standards at least once during the year.

**Fig. 1—Compliance of community drinking water systems with health requirements in 1994.**




The highest risk from unsafe drinking water is exposure to waterborne pathogens, which can cause acute health problems requiring medical treatment. As shown in Fig. 2, the majority of waterborne outbreaks over the past two decades have been acute gastrointestinal illnesses for which the pathogen was unknown. However, parasitic pathogens have recently been noted to be the leading cause of waterborne disease outbreaks.

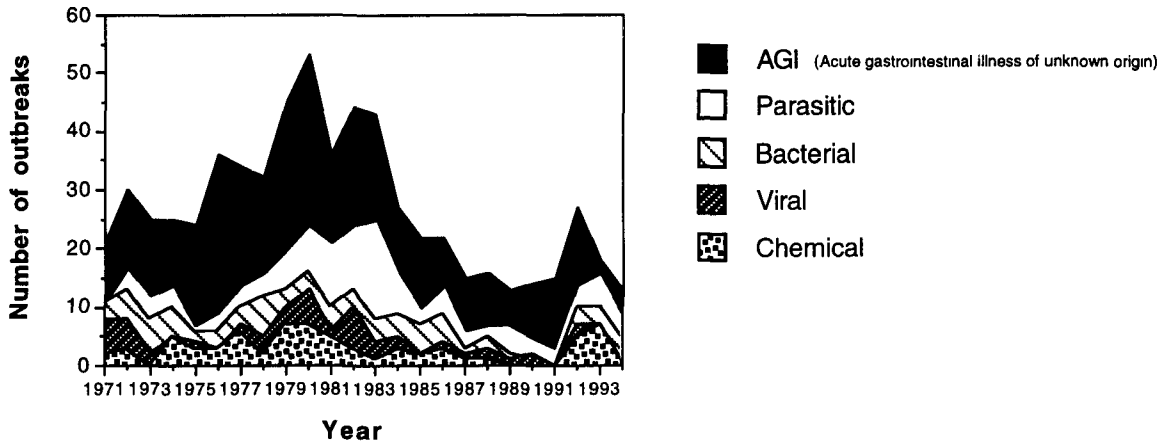
Since the early 1980s, the number of public water systems reporting outbreaks has decreased. But for systems serving a large population, a waterborne disease outbreak can sharply impact a large number of people. The 1993 *Cryptosporidium* outbreak in Milwaukee, for example, affected more than 400,000 people, making it the largest waterborne disease outbreak ever reported in the United States. Compliance with the requirements of the Safe Drinking Water Act is one way to reduce the probability of waterborne disease outbreaks in the future. Measuring progress remains an issue, however, because there is no national program to ensure consistent reporting of outbreaks or individual cases.

## Responsibilities

EPA is required by the Safe Drinking Water Act to establish and enforce drinking water safety standards and delegate primary enforcement authority (primacy) to the states. Currently, 49 states and 6 U.S. territories have primacy. Together, EPA and the primacy states/territories regulate approximately 190,000 public water systems, which serve more than 240 million people. About 57,000 of these systems are classified as *community* water systems. They supply water to homes and businesses. Another 25,000 systems distribute water to schools and industries that serve at least 25 of the same people 6 months or more per year. The rest deliver water to transient users at roadside rest stops, parks, and other facilities.

Whether the program is administered by EPA or the state/territory, all public water system operators must ensure that their drinking water is free of contaminants at levels that can pose a risk to human health. EPA has established safety standards for 81 contaminants, including specific treatment requirements for systems that use surface water and for communities where lead in drinking water is a problem. These safety standards either define the maximum level at which a contaminant is allowed in water

**Fig. 2—Waterborne outbreaks in the United States by year and type.**




delivered to the tap or specify certain types of treatment (e.g., filtration or corrosion control) for contaminants that are difficult to measure. Each standard requires monitoring, which varies by the type and size of the system, and reporting. If contaminants are found to exceed the health-based standards, public water suppliers are required to enhance treatment or take other action to reduce the levels below the maximum contaminant level (MCL). New standards for priority contaminants will be developed as required by the 1996 SDWA amendments.

The 1996 SDWA amendments also establish a strong new emphasis on preventing contamination problems through source water protection and enhanced water system management. The states are central in creating prevention programs and helping water systems improve their operations to avoid contamination. Congress established a Drinking Water State Revolving Fund (SRF) to assist states and communities in installing and upgrading treatment facilities and strengthening the managerial, technical, and financial capacity of water systems to reliably deliver safe drinking water. A portion of the SRF, which is authorized at $1 billion annually through Fiscal Year 2003, will be used for source water protection and other prevention programs.

Although EPA has primary federal responsibility for establishing drinking water standards, programs related to drinking water quality also exist in the U.S. Departments of Agriculture, Interior, and Health and Human Services. Virtually all states have instituted drinking water control programs that extend beyond EPA and other federal requirements.

## Environmental Milestones for 2005

EPA proposes four drinking water milestones to be achieved by 2005. Milestone 1 sets a target for reducing the number of people receiving potentially contaminated drinking water from public water systems. The second milestone focuses on reducing to zero the number of unfiltered community water systems in violation of EPA's Surface Water Treatment Rule. The third milestone is aimed at increasing the percentage of rivers, lakes, reservoirs, and other surface water bodies that meet drinking water designated uses under the Clean Water Act. Milestone 4 proposes an increase in the percentage of people who receive water from systems that have source water protection programs in place.

**RELATED FEDERAL TARGETS**

Dept. of Health and Human Services
*Healthy People 2000*

[By 2000,] reduce outbreaks of waterborne disease from infectious agents and chemical contaminants to no more than 11 per year. (Baseline: Average of 31 outbreaks per year during 1981-88.)

[By 2000,] reduce outbreaks of waterborne disease from infectious agents and chemical poisoning in people served by community water system to no more than 6 per year. (Baseline: 13 during outbreaks per year during 1981-88.)

*Note: Community water systems are public or privately owned systems that serve large or small communities, subdivisions, or trailer parks with at least 15 service connections or 25 year-round residents.*

***Federal Reviewers:***
*Please provide other related agency targets*

MILESTONE

1

# *By 2005,*

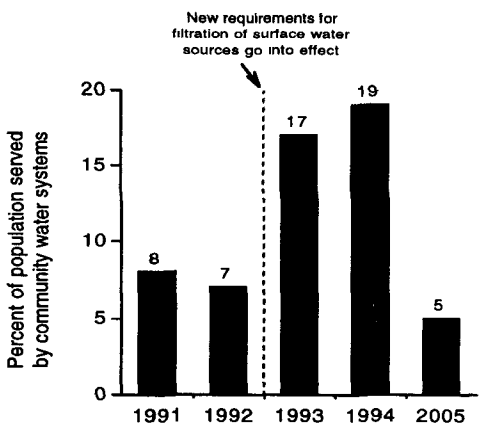
**the population served by community water systems in violation of health-based requirements will be reduced from 19 to 5 percent.**

**RELATED FEDERAL TARGETS**

Dept. of Health and Human Services
*Healthy People 2000*

[By 2000,] Increase to at least 85 percent the proportion of people who receive a supply of drinking water that meets the safe drinking water standards established by the EPA. *This target includes both MCL and monitoring/reporting requirements.* (Baseline: 74 percent of 58,099 community water systems serving approximately 80 percent of the population in 1988)

**M.1—Percent of population served by community water systems that are reported in violation of health-based requirements at least once during the year.**




*Note: As many as one-fourth of the water systems did not complete all required monitoring. The compliance status of some of these could not be assessed from reported data. The exclusion of monitoring/reporting violations might lead to some underestimation.*

This milestone sets a target for reducing the number of people who receive water from community drinking water systems that do not meet EPA's health standards. Health-based requirements are defined as the acceptable maximum contaminant level (MCL) defined in the EPA drinking water regulations for the finished water and related treatment technique requirements. The milestone does not include systems that violate monitoring/reporting requirements. Violations of EPA's health standards do not usually result in disease outbreaks. But violations are a surrogate measure for potential exposure to harmful contaminants, which increases the probability that an illness will result from drinking the water.

## *Past Trends and 2005 Target*

In 1991 and 1992, the population served by community water systems with violations was relatively low. In 1993 EPA's Surface Water Treatment Rule (SWTR) took effect. It required that water systems using inadequately protected surface water install treatment to filter microbiological contaminants. This change resulted in an increase in violations from large and medium unfiltered water systems. In 1994, approximately 19 percent of the people served by drinking water systems (46 million people out of 243 million) received drinking water that did not meet all health requirements. About 21 million of the 46 million were served by systems that violated the SWTR.

The milestone sets a 2005 target of 5 percent of the population receiving water from water systems that violate one or more health-based requirements during the year. This dramatic reduction in population at risk from unsafe drinking water will be due principally to the substantial progress expected in converting unfiltered water systems to complete filtration treatment over the next decade.

## *Tracking Results*

Progress will be measured with information compiled from the Safe Drinking Water Information System (SDWIS), which will provide both the states and EPA greater capability to oversee and manage the drinking water program.

MILESTONE

2

# By 2005,

**every person served by a public water system that draws from an inadequately protected river, lake, or reservoir will receive drinking water that is adequately filtered.**

***Federal Reviewers:***

*Please provide other related agency targets*

EPA's Surface Water Treatment Rule (SWTR) requires that public water systems using inadequately protected surface water sources install filtration and disinfection treatment to remove microbiological contaminants from the drinking water. Compliance with this rule will reduce the probability of exposure to *Giardia lamblia, Legionella*, and many other pathogens from drinking water.

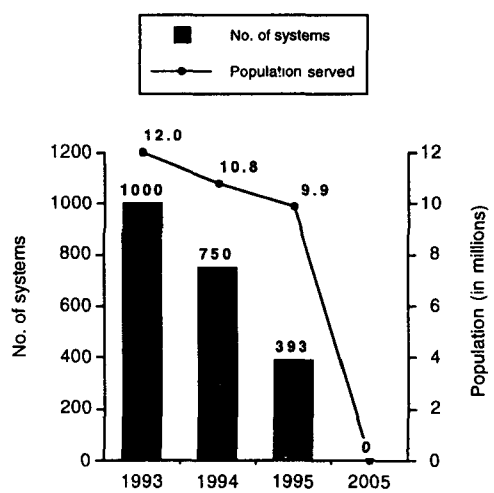
## *Past Trends and 2005 Target*

The deadline for having filtration treatment in place was June 29, 1993. One thousand systems using unfiltered surface water sources, serving more than 12 million people, were found to be in noncompliance on that date. At the end of 1995, the number of systems that had not completed filtration treatment and did not meet all SWTR requirements was reduced to 393 (serving 9.9 million people). Based on consent schedules, EPA expects an additional 127 systems to come into compliance by 1996. EPA's target is for all of them to meet the SWTR requirements by 2005.

## *Tracking Results*

Progress will be measured with information compiled from EPA's Safe Drinking Water Information System (SDWIS), which will provide both the states and EPA greater capability to oversee and manage the drinking water program.

**M.2—Number of unfiltered systems not in compliance with SWTR requirements and population served.**



***Federal Reviewers:***
*Please provide other related agency targets*

MILESTONE
**3**

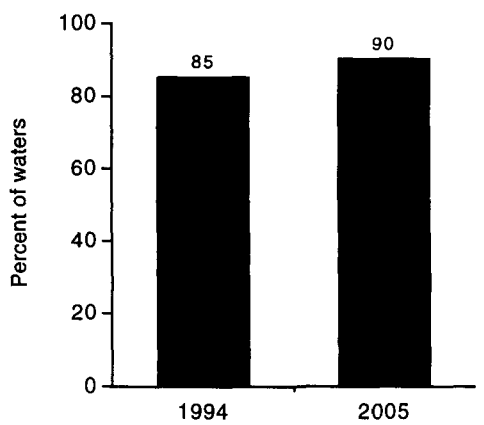
# *By 2005,*

**90 percent of the nation's river and stream miles and lake and reservoir acres designated as drinking water supplies will provide water that is safe to use after conventional treatment.**

Approximately two-thirds of the U.S. population is provided water by public water systems that draw from rivers, lakes, and reservoirs. The quality of the source water is an important factor in determining the level (and expense) of treatment needed to produce finished water that meets safety standards. For pathogen removal, at a minimum source (or raw) waters require conventional treatment: coagulation, sedimentation, filtration, and disinfection. If a source becomes too polluted, it might not be economically or technologically feasible to provide water that meets the EPA and state safety standards since greater than conventional treatment might be required to make the water safe to drink.

This milestone focuses on the quality of surface sources of drinking water. Using water quality monitoring and other measures, each state and tribe assesses whether waters designated as drinking water supplies are of high enough quality to actually be used as drinking water sources. Protecting these designated water bodies requires watershed management, including control of nonpoint and point sources of pollution. In some cases, management within the reservoir itself is also required to maintain high water quality conditions year-round.

**M.3—Percent of rivers, lakes, and reservoirs safe for use as a public drinking water supply.**




*In 1994, 17 percent of the nation's rivers and streams and 42 percent of its lakes designated for drinking water use were assessed by the states and tribes. Consequently, the 1994 column is based on these limited assessments. The target might change as more waters are assessed.*

## *Past Trends and 2005 Target*

Figure M.3 charts data from the most recent *National Water Quality Inventory Report to Congress* along with the milestone target. EPA estimates that given a reasonable level of effort toward water quality improvement through further implementation of source water protection programs (see milestone 4) and other watershed protection efforts, 90 percent of the assessed river and stream miles and lake and reservoir acres designated for drinking water use will meet drinking water supply requirements by 2005.

## *Tracking Results*

Progress toward achieving this milestone will be measured using information submitted to EPA by states and tribes for the *National Water Quality Inventory Report to Congress*. Currently data are reported by the states once every 2 years. EPA and its public and private partners are working together to provide a more comprehensive assessment of the nation's waters. (See box on the National Water Quality Inventory on page 24.)

MILESTONE

4

# By 2005,

## 60 percent of the population served by community water systems will receive their water from systems with source water protection programs in place.

***Federal Reviewers:***

*Please provide other related agency targets*

A critical component of providing safe drinking water is assurance that the *source* of the water is not polluted. This can be accomplished by establishing source water protection programs. Although EPA's emphasis under the Safe Drinking Water Act has historically focused on programs for ground water sources (known as wellhead protection programs), the emphasis on surface water protection programs is expected to increase substantially in the next few years.

A successful ground water protection program has four elements: (1) a geographic delineation of the area covered by the program, (2) an inventory to identify all potential sources of contamination, (3) a contingency plan specifying action to be taken if an accidental spill or other incident threatens the water supply, and (4) effective management and regulation of potential sources of contamination. These same elements will be needed for surface water protection programs.

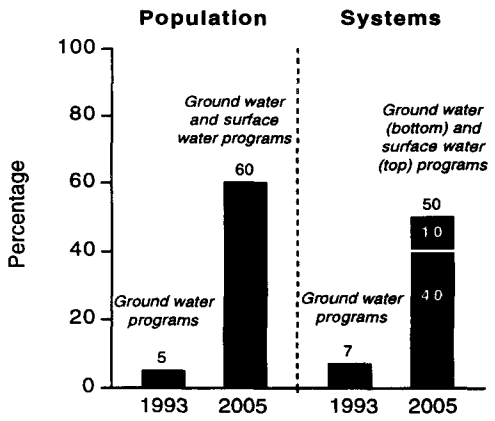
### *Past Trends and 2005 Target*

As of 1993, five percent of the population served by community drinking water systems was known to receive water from systems with wellhead protection programs. Data on surface water source protection programs are not available. To meet the 2005 goal, EPA will provide guidance to communities on establishing source water protection programs. Special focus will be placed on small systems, which often lack the necessary financial, managerial, and technical capability to implement effective programs.

### *Tracking Results*

Various methods may be used to measure progress toward implementing source water protection programs. Current tracking of local-level implementation through the wellhead protection program biennial report will be expanded to include communities that rely on surface water. This tracking mechanism will measure the population protected through implementation efforts, as well as the number of water systems addressed.

**M.4—Percent of population and community water systems with ground water or surface water protection programs.**



## Strategy

The passage of the Safe Drinking Water Act amendments of 1996 substantially changes the national drinking water program for water utilities, states, and EPA, and provides greater protection and information to the 240 million Americans served by public water systems. The amendments increase state flexibility, provide for more efficient investments by water systems, give better information to consumers, and strengthen EPA's scientific work in setting drinking water standards.[2] The SDWA amendments will guide government efforts to achieve the Safe Drinking Water milestones and will help to ensure that every American is provided water that is consistently safe to drink.

Four themes characterize these efforts:

1. New and stronger approaches to prevent contamination of drinking water.
2. Better information for consumers, including the "right to know" about local drinking water quality.
3. Regulatory improvements, including better science, prioritization of effort, and risk assessment.
4. New funding for states and communities through a Drinking Water State Revolving Fund.

**Costs**

In a 1990 report, *Environmental Investments: The Cost of a Clean Environment,* EPA estimated that the annual public and private costs of meeting safe drinking water standards were approximately $3.6 billion in 1990 and would rise to $6.6 billion by 2000 to fully meet standards expected to be in place by then (constant 1986 dollars). Achievement of the proposed milestones might require implementation of some programs not anticipated when these estimates were prepared, which would add to the costs. Over the next few years, the costs and benefits associated with safe drinking water programs will be more fully assessed.

### *New and Stronger Prevention Approaches*

*Source water protection.* The SDWA amendments establish a strong new emphasis on preventing contamination problems through source water protection and enhanced water system management. The states will be central in creating and focusing prevention programs and helping water systems improve their operations to avoid contamination problems. States will assess the susceptibility to contamination of source waters of public water systems. These assessments will provide the information necessary for states to develop tailored monitoring programs and for water systems to seek help from states in protecting source water or initiating local government efforts.

*Capacity building.* The amendments create a program to build nationally on the demonstrated success of several states in strengthening the managerial, technical, and financial capacity of water systems to reliably deliver safe drinking water. State programs will have (1) the legal authority to ensure that *new* water systems have sufficient technical, managerial, and financial capacity to meet drinking water standards and (2) a strategy to identify and assist *existing* water systems needing improvements in these capacities or aid to comply with standards. Water systems in significant noncompliance status will be identified, and states will report to EPA on the success of capacity development efforts.

*Operator certification.* One of the most important, cost-effective means to strengthen drinking water safety is to improve the knowledge and skills of public water system operators. The amendments require all states to implement a program of operator certification to ensure every water system has a qualified operator to meet increasingly complicated operating demands.

### *Better Consumer Information/Right-to-Know*

The consumer information provisions of the SDWA amendments herald a new era of public involvement in drinking water protection.

*Consumer confidence reports and other consumer information.* Community water systems will send customers an annual report with information about their source water

**Partnership for Safe Water**

In 1995, EPA Administrator Carol Browner announced a new partnership between EPA, the states, and water suppliers aimed at safeguarding drinking water. In light of the uncertainties regarding the occurrence and control of *Cryptosporidium* and other emerging microbial contaminants, the Partnership for Safe Water seeks to safeguard surface water supplies around the country and to demonstrate to the public that the federal government, states, and local water supply agencies can work together to protect drinking water supplies. National partners include EPA, the Association of Metropolitan Water Agencies (AMWA), the American Water Works Association (AWWA), the National Association of Water Companies, the Association of State Drinking Water Administrators, and the American Water Works Association Research Foundation.

The Partnership for Safe Water encourages individual water suppliers to assess their facilities, treatment processes, operating and maintenance procedures, operator training, and management oversight practices to identify areas that will enhance their ability to prevent entry of microbial contaminants to treated water, and to voluntarily implement those actions which are appropriate for the system. The Partnership for Safe Water is being conducted in four phases.

*Phase 1—Commitment to Basic Program Requirements.* Basic program requirements include complying for 6 months with the Surface Water Treatment Rule, which ensures that water systems using surface sources filter their water.

*Phase II—Data Collection.* Partners commit to collecting basic plant and plant performance data and to evaluating areas where performance may be enhanced.

*Phase III—Self-Assessment and Correction.* Partners review plant design, operation, maintenance, and administrative factors to identify performance-limiting issues and to implement corrective actions short of major construction or capital expenditures.

*Phase IV—Composite Correction Program.* This program includes the same steps identified in Phase III, but uses an independent and more detailed evaluation. Corrective actions are implemented if they do not entail major construction or major capital expenditures.

Since the program's official initiation in September 1995, when utilities were mailed the self-assessment guidance and a Partnership Agreement for signature, 170 utilities serving 80 million people have joined the Partnership. The utilities have submitted baseline reports including analysis of one year's turbidity data and are working on the self-assessment of their plant performance. The Partners have established a committee of volunteers to review the adequacy of the utilities' self-assessment process and recommend to EPA whether a certificate of completion should be awarded. Prior to beginning a major effort to train volunteers, EPA and a small initial group of volunteers have tested the evaluation process at two utilities that had already completed self-assessments. Training should begin shortly, as well as a push to increase utility participation and recruit volunteers for the evaluation teams.

Systems taking action to reduce risk from microbial contaminants learn a great deal through their efforts. Participation in the Partnership facilitates sharing of information among water systems. The Partnership for Safe Water will develop, improve, and provide tools that all water systems can use to take similar actions and achieve similar results.

and the level of contaminants in the treated drinking water. States will also make available to the public a statewide annual report on violations of national primary drinking water regulations. Additionally, every 3 years states will report to EPA and the public on their efforts toward capacity building. Citizens will be encouraged to comment on the annual priority list of projects eligible for SRF assistance.

### *Regulatory Improvements*

Recognizing that responsible flexibility (e.g., decisions based on good science) and a better prioritization of effort could improve protection of public health, the 1996 SDWA amendments establish a new process for regulating drinking water contaminants.

*New risk-based contaminant selection.* Instead of developing regulations on 25 contaminants every 3 years as required by the 1986 SDWA, EPA now has the flexibility to decide whether to regulate a contaminant after completing a required review of at least five contaminants every 5 years. EPA will use three criteria for deciding to regulate a

**New York City Watershed Agreement**

*"By putting in place the mechanisms for protecting New York City's drinking water at the source, by keeping contamination out of the water supply in the first place, we offer the promise of protecting public health while saving billions of dollars for ratepayers."* - Carol Browner

Since 1991, EPA has been promoting the watershed approach as a mechanism to achieve the next generation of water protection. For the New York City Watershed Agreement, the Safe Drinking Water Act served as the "driver" for using a watershed approach. It has made a difference.

Nine million residents of New York City and surrounding suburbs rely for the source of their drinking water on a series of reservoirs located many miles away in the Catskill and Delaware watersheds in upstate New York. New York City owns less than 10 percent of the watersheds, which cover about 1,900 square miles.

EPA's Surface Water Treatment Rule (SWTR), promulgated in 1989, requires filtration of all surface water supplies (rivers and lakes) to protect against microbial contamination. This requirement can be waived if a water system's treatment processes and natural conditions provide safe water and if the watershed is actively protected to ensure that safety in the future. Under the SWTR's authority EPA worked with New York City, New York State, and local communities on a program to implement this watershed protection requirement in the Catskill and Delaware watersheds.

In 1993, EPA issued New York City a waiver of the filtration requirement on the condition that the city would take numerous steps to maintain and protect the Catskill/Delaware's drinking water quality. EPA then urged New York's governor to convene a group representing New York City, New York State, the watershed communities, EPA, and environmental groups to negotiate an effective and equitable watershed program.

The negotiations produced a landmark agreement that successfully resolves long-standing controversies and sets forth responsibilities and benefits for all major parties. The city will finalize its regulations for watershed land uses, acquire sensitive lands to protect key reservoirs and waterways, conduct more extensive water quality testing in the watershed, and support upstate/downstate partnership programs. New York State will adopt the city's watershed regulations.

The agreement represents historic progress by moving New York City and the Catskill/Delaware watersheds past many decades of controversy toward a commitment to complementary, mutually beneficial goals and solutions.[3]

contaminant: (1) the contaminant adversely affects human health; (2) it is known or substantially likely to occur in public water systems with a frequency and at levels of public health concern; and (3) regulation presents a meaningful opportunity for health risk reduction. By making risk prioritization dominant in the selection of contaminants to be regulated, this approach departs dramatically from the previous law.

*Occurrence information.* The collection, organization, and ready availability of contaminant occurrence data will take on unprecedented importance. Monitoring for unregulated contaminants will be streamlined, and a publicly accessible national database on occurrences of regulated and unregulated contaminants will be established.

*Cost-benefit analysis and research for new standards.* In developing all future drinking water standards, EPA will conduct a thorough cost-benefit analysis, provide comprehensive and understandable information to the public, and use the best available peer-reviewed science and supporting studies. Flexibility is built in by allowing *overall* risk reduction in instances where certain means of controlling one contaminant might increase the risk from another (risk-risk balancing).

*Arsenic, radon, disinfection by-products/*Cryptosporidium, *and sulfate.* Under the new amendments, arsenic will be regulated by January 2001. Sulfate is slated to be among the first five contaminants for which EPA will determine the need for regulation. Risk assessment for radon and a study of risk reduction benefits from various mitigation measures will also be undertaken, with regulations forthcoming. Disinfectant by-products and *Cryptosporidium* will be regulated according to the schedule agreed to in 1994 by an EPA-led regulatory negotiation committee.

### *A Drinking Water State Revolving Fund for States and Communities*

The creation of a Drinking Water State Revolving Fund (SRF) to assist communities in installing and upgrading drinking water treatment facilities is among the most important changes in the nation's drinking water program. The SRF is authorized for a total of $9.6 billion through Fiscal Year 2003. States are authorized to use SRF funds for new prevention programs, and EPA is encouraging states to place a high priority on these activities.

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M.4 State Wellhead Protection Program Biennial Reports, 1993.


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# 5. Safe Food

*Long-Range Goal*

**The foods Americans consume will continue to be safe for all people to eat.**

## The Challenge

Although most of the food consumed in the United States is safe to eat, residues of pesticides and other chemicals can contaminate food during production, processing, marketing, storage, transportation, and preparation. Pesticides are used to prevent pests from damaging or contaminating our food, helping to ensure more abundant and more wholesome food at lower prices. At some levels, chemical residues can cause serious acute and chronic health effects, such as cancer and genetic damage. In fact, during the first two decades of this century, major food safety problems in the meat packing industry and chemical or physical contamination of food threatened the health of many Americans, providing the impetus for the establishment of federal food safety laws.

In an effort to protect public health, EPA and other federal agencies have taken steps to ensure the safety of the food supply. Regulatory programs have been established that seek to keep harmful residues out of food by making sure that chemicals approved for use on food are safe, and by preventing contamination with unauthorized chemical residues. The effectiveness of these programs has been shown by data collected over the past decade that indicate that only a very small fraction of the food supply has excess or illegal pesticide residues. EPA has been successful in eliminating several widely used food-production pesticides that were contaminating the food supply and endangering public health—DDT, chlordane, heptachlor, aldrin, and dieldrin.

The challenge facing the nation is not only to maintain the current high level of food safety but also to cost-effectively provide safer food in the future. EPA will continue its work to eliminate any unacceptable risks from existing chemicals in the food supply and to prevent any new toxic chemicals from contaminating food.

## Responsibilities

Satisfactory protection of the food supply in our complex production, processing, and marketing system involves the coordinated and concerted action of multiple actors. EPA and the Food and Drug Administration (FDA) work with other federal agencies, state and local government, nongovernment organizations, and industry to protect the foods Americans eat.

The federal role in ensuring safe food is defined by several laws including the 1938 Federal Food, Drug, and Cosmetic Act (FFDCA) and the 1972 Federal Insecticide, Fungicide and Rodenticide Act (FIFRA). FFDCA is the principal statute that guides federal regulation of food safety. It authorizes EPA to establish tolerances, or maximum allowable levels, for pesticide residues in raw agricultural commodities and, in some cases, processed foods. Both FFDCA and FIFRA were amended in 1996 with the passage of the Food Quality Protection Act (FQPA), which establishes a uniform, health-based standard for pesticide residues in food. FFDCA also gives FDA the responsibility

of regulating veterinary drugs administered to food-producing animals, as well as nonpesticidal chemicals like food additives and coloring.

FIFRA requires the regulation of pesticide use and gives EPA the authority to review and approve or disapprove existing and new commercial pesticides through a registration or licensing process. As part of this process, pesticide manufacturers are required to submit data on the health and environmental effects of their products to EPA. EPA's programs do not control other food issues; nonchemical contamination and spoilage, for example, are generally the responsibilities of FDA and the U.S. Department of Agriculture (USDA).

Although FIFRA and FFDCA define a strong federal role in ensuring the safety of our nation's food, others also have important responsibilities. Specifically, state and tribal pesticide regulatory agencies play fundamental roles in implementing and enforcing pesticide use requirements and in educating the public on food safety issues. FDA and USDA also enforce tolerance levels on food in interstate commerce and monitor residue levels in the marketplace.

## Environmental Milestones for 2005

Progress will be measured by three environmental milestones and several other objectives which appear in the strategy section. Data for these measures will be obtained from FDA and USDA, as well as other sources. FDA monitors a number of industrial chemicals, environmental contaminants, and pesticides in food. USDA also collects data on chemical residues in the food supply, including meat, poultry, and eggs. Both FDA and USDA data will be used to monitor trends in chemical residues and ensure compliance with established standards.

Although EPA, FDA, and USDA data and collaborative food safety projects are referred to in this chapter, the safe food milestones apply only to those food safety concerns which are the responsibility of EPA. Fish and shellfish and sediment contamination targets are addressed in the Clean Waters chapter (milestone 3) and Restoration of Contaminated Sites chapter (milestone 7).

With the exception of milestone 1, this chapter deals with reducing risks from *legally applied* food-use pesticides, that is, those used according to label instructions. Illegal or improper application, or misuse, is dealt with routinely through state and federal enforcement and compliance programs.

MILESTONE

1

# *Through 2005,*

**the frequency of illegal pesticide residues in food will remain at or below the current low level.**

***Federal Reviewers:***
*Please provide other related agency targets*

One measure of potential human health risks from contaminated food is the extent of illegal pesticide residues found in food. Increases in illegal residues could have serious effects on human health and reduce public confidence in the food supply. Illegal pesticide residues include both unauthorized chemicals at any level (zero tolerance) and authorized chemicals at levels above established EPA standards (above tolerance levels).

### *Past Trends and 2005 Target*

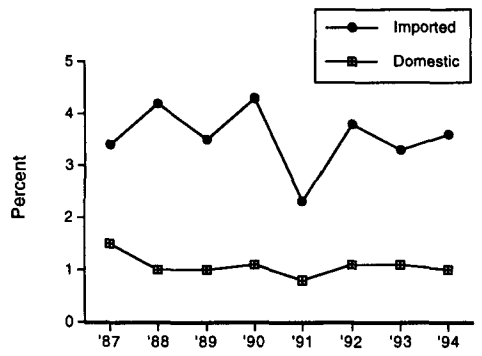
In general, pesticide residues in food have remained at low levels for many years. In 1994, only about 1 percent of domestic food samples (55 out of 5,366 samples) contained illegal pesticide residues or exceeded established tolerance levels. In imported foods, the frequency was 3.6 percent (197 out of 5,488 samples). In 1987, 1.5 percent of domestic samples and 3.4 percent of imported foods exceeded tolerance levels. Achieving this milestone will prevent the escalation of current low levels of illegal residues and consequent health risks to the U.S. population.

### *Tracking Results*

FDA is responsible for enforcement of food tolerance levels (except in meat, poultry, and eggs). Under its food surveillance monitoring program, FDA collects monitoring data on pesticide residues that exceed these levels. Samples are analyzed and weighted by factors such as volume of production and past history of tolerance violations. Samples span a range of foods and chemicals and help identify changes from year to year. The results are reported by FDA every year and will be used to track progress toward this milestone.

USDA pesticide residue data for meat, poultry, and eggs also will be obtained and used to track progress. USDA data are now becoming available and will be used in the future to complement FDA data.

**M.1—Percent of domestic and imported food samples with illegal pesticide residues.**




*Illegal residue refers to chemicals detected at levels above established tolerances or for which there is no tolerance.*

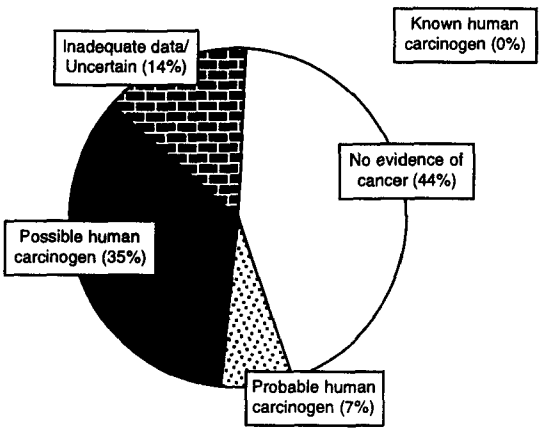
***Federal Reviewers:***
*Please provide other related agency targets*

**MILESTONE**
**2**

# *By 2005,*

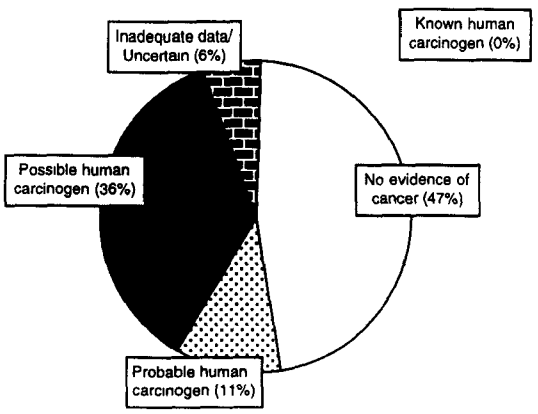
**there will be a significant reduction in the use of the food production pesticides that have the highest potential to cause cancer.**

**M.2a—Percent of acre treatments with pesticide active ingredients used in U.S. crop production in 1992, by cancer categories.**




*Acre treatments refer to application of a pesticide to one acre of cropland one time.*

**M.2b—Percent of pesticide active ingredient volume used in U.S. crop production in 1992, by cancer categories.**




This milestone tracks the quantities of cancer-causing (carcinogenic) pesticides used annually in crop production. Cancer is a major public health concern and a principal focus of food safety programs at FDA and EPA. One way to reduce adverse health effects associated with food is to decrease the use of pesticides that can cause cancer. EPA has already removed from use a number of pesticides and other chemicals that can cause cancer. Further progress can be achieved by replacing carcinogenic pesticides with other chemicals and with nonchemical pest controls.

### *Past Trends and 2005 Target*

Baselines are being developed using methods established by EPA for rating chemicals according to their potential for causing cancer. Pesticides are rated on an alphabetical scale from A to E. The A-rated pesticides are known to cause cancer in humans, whereas the E-rated pesticides have shown no evidence to date of causing cancer. Preliminary data for 1992 reveal that of the 393 pesticides used most often in the United States, those with the highest cancer-causing potential are a relatively small fraction. There is no reported use of A-rated pesticides in food production. There are 48 B-rated chemicals; these represent 11 percent of active pesticide ingredients and are used in 7 percent of treated acres. These data will be used to develop more specific targets for reductions in the use of cancer-causing pesticides. EPA also is updating its cancer-rating guidelines, and the results of this update will be reflected in tracking progress toward this milestone in the future.

### *Tracking Results*

EPA data on the cancer-causing potential of pesticides, as well as data from USDA and other sources, will be used to calculate the amount of pesticide used and the crop acreage treated for pesticide categories A though E.

MILESTONE

3

# By 2005,

## all pesticide residues in food will meet the statutory standard of "reasonable certainty of no harm."

***Federal Reviewers:***

*Please provide other related agency targets*

This milestone addresses further reductions in the theoretical risks from the 11 percent of pesticide active ingredients that could present a lifetime health risk at maximum allowable residue levels. EPA's Dietary Risk Evaluation System determines whether a person's exposure to individual pesticides in food has the potential to exceed public health standards. This evaluation system is used routinely for all pesticides for which tolerances (maximum allowable levels) have been established. It takes into account the estimated percentage of crops treated with a particular pesticide and the amount of treated food consumed by different age groups. The system compares the resulting exposure estimate with the reference dose (RfD) for the chemical across all crops. The RfD is an estimate of the level of daily exposure to a pesticide residue that, over a person's life span, provides a reasonable certainty of no harm.

EPA is developing a database and the capability to aggregate these calculations across all chemicals and crop tolerance levels to arrive at values that can be used to evaluate trends over time. Separate calculations can be made for infants and children, as well as for the overall population. These data reveal the extent to which risks are above safety standards and should be reduced.

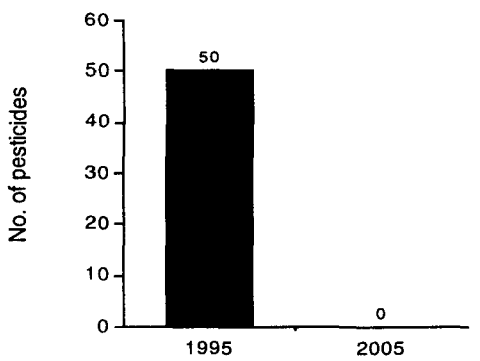
### *Past Trends and 2005 Target*

As of 1995, about 50 pesticide active ingredients (out of a total of 453 pesticide active ingredients that have established tolerance levels) had significant RfD exceedances, taking into account anticipated residues and estimated percent of crop treated. Achieving the milestone will eliminate all instances where the RfD is exceeded.

### *Tracking Results*

Each year, EPA will report the number of RfD exceedances by pesticides used in food production. In addition, EPA will develop baseline data on aggregate exposure as a percentage of the RfD. EPA will use these data to establish new targets for reducing the number of pesticides for which the estimated exposures are greater than 75 percent of the RfD.

**M.3—Number of pesticides with food tolerances that potentially exceed "reasonable certainty of no harm" (RfD).**




*The number charted in 1995 (50) represents 11% of a total of 453 pesticides.*

# Strategy

Pollution prevention is the heart of the strategy for achieving the food safety goal. The strategy involves encouraging safer means of pest control and reducing exposure to higher-risk pesticides. It is designed to maintain appropriate policies and standards for pesticides and other chemicals; implement and enforce regulatory policies, standards, and specific product controls; use cooperative, voluntary, and educational approaches to achieve program goals; and monitor and evaluate program performance to ensure cost-effectiveness.

A very important aspect of EPA's food safety strategy is reliance on the initiative and cooperation of many partners. State and tribal pesticide regulatory agencies have important roles in implementing and enforcing pesticide policies and educating the public. Other partners include the pesticide manufacturers and users, environmental and public interest groups, the news media, and other federal and international agencies.

**Costs**

In a 1990 report, *Environmental Investments: The Cost of a Clean Environment,* EPA estimated that the annual public and private costs of meeting all pesticide standards (not just those for food safety) were approximately $980 million in 1990 and would rise to $1.7 billion by 2000 to fully meet standards expected to be in place by then (constant 1986 dollars). Achievement of the proposed milestones might require implementation of some programs not anticipated when these estimates were prepared, which would add to the costs. Over the next few years, the costs and benefits associated with food safety programs will be more fully assessed.

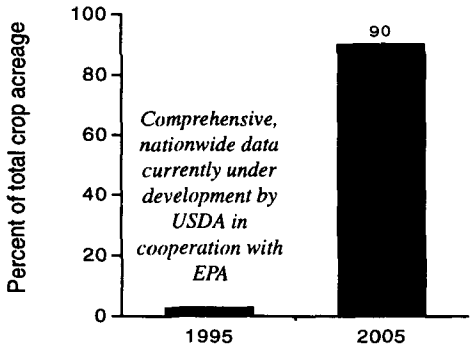
## *Reducing Unacceptable Health Risks*

All the milestones are concerned with reducing unacceptable health risks associated with pesticides used on food. To help achieve them, the federal government will agressively promote the use of integrated pest management (IPM). **By 2005, the percent of U.S. crop acreage under integrated pest management will increase to 90 percent.**

IPM is a pest control approach that minimizes pesticide use and maximizes reliance on nonchemical controls. It combines biological, cultural, physical, and chemical tools to minimize risks to human health and the environment, while providing economically sound levels of pest control. For example, rather than applying pesticides on a set schedule, IPM uses techniques such as field scouting to determine if pests numbers have reached a "damage threshold" before chemicals are used. IPM also emphasizes preservation of beneficial insects and slowing or preventing the development of pesticide resistance. The effectiveness of IPM requires the support of pesticide user groups, extension specialists, researchers, custom applicators, pest management consultants, pesticide suppliers, and agencies like USDA and EPA.

IPM programs have already begun to reduce our dependence on chemical controls. Consumers expect continued reductions in pesticide use. As IPM increases, human health risks will be reduced.

**Fig. 1—U.S. crop acreage under IPM.**




EPA is currently working with USDA and grower groups to promote IPM under the Pesticide Environmental Stewardship Program (PESP). Several partnerships with grower groups have been established in the last year, and many more are planned. Partnerships involve public commitments by users to the principles of IPM and particular goals for training and participation. Each year, EPA intends to present data on crop production under IPM, in terms of the number of PESP partnerships in place and the scope of crop coverage.

Other mechanisms that EPA will use to reduce unacceptable risks include:

- *Implementation of FQPA.* The Food Quality Protection Act of 1996 contains many provisions that will assist EPA in addressing unacceptable health risks. These provisions include a

review of all existing tolerances to ensure that they meet the new, health-based standard, and incentives for the registration of safer pesticides and the use of alternatives to pesticides.

- *Reregistration of existing pesticides.* Congress has directed EPA to reregister or take off the market all existing pesticides originally registered when standards for government approval were less stringent than they are today. Reregistration reduces risk by eliminating uses that do not meet current standards. All residue limits for pesticides in food or animal feed are being reassessed to ensure they are appropriate.
- *Special review.* A formal process is used for determining whether use of a suspect pesticide poses unreasonable risks to people or the environment. During the process, a detailed review of a pesticide's risks and benefits is conducted, and a decision is made as to whether future use will be authorized. EPA has evaluated more than 100 pesticides or groups of pesticides through this program. Many chemicals and uses have been eliminated or restricted to reduce dietary and other risks since the program began in the early 1970s.
- *Field implementation and communication.* EPA uses a range of outreach approaches for pesticide users, for agencies implementing various pesticide programs and projects, and for the general public. Outreach is essential to protect workers, endangered species, and ground water; to provide training of pesticide applicators; to promote integrated pest management and environmental stewardship; and to support compliance through EPA's regional programs and those of the states and tribes. EPA also is working to make pesticide registration information more easily available to the public.
- *Policy, regulations, and guidelines.* EPA is continually developing new policies and streamlining existing ones to keep up with newly discovered risks and scientific advances, to be more flexible and cost-effective, and to harmonize its pesticide program requirements with those of other nations.

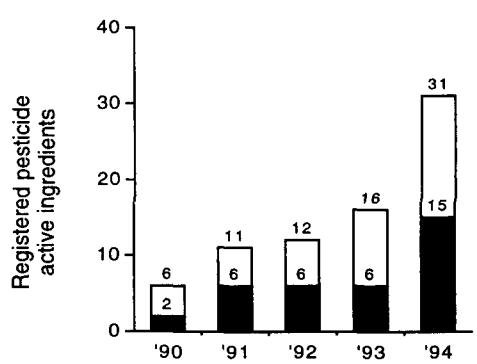
### *Increasing the Use of Safer Pesticides*

Milestones 2 and 3 move toward the long-range goal by using safer pesticide ingredients. Pesticide registration strategies provide a key to achieving these milestones. **By 2005, 75 percent of new pesticide registrations will be for safer (reduced risk) pesticides.** In addition, **by 2005, all "inert" ingredients in registered pesticide products will be safe** (see Fig. 3).

Compared to conventional pesticides, certain chemical and biological pesticides have a lower potential for human health risks. These are referred to as "safer" pesticides. Naturally occurring compounds and biological pesticides, such as fungi, bacteria, viruses, and other microbial pesticides, can be classified as safer pesticides if they have a nontoxic mode of action. The number of new active pesticide ingredients that fall into the biological or reduced risk category has varied in recent years, from 2 in FY 1990 to a high of 15 in FY 1994. As more of these safer pesticides are registered and then used by growers as alternatives, the risk to food consumers will be reduced.

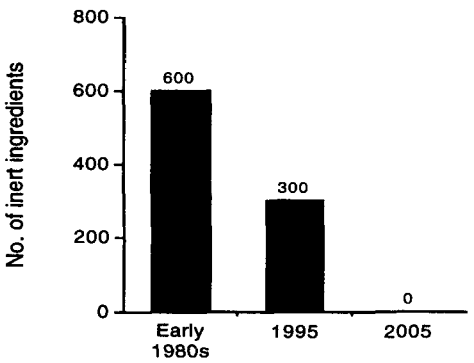
EPA is adopting a program goal to demonstrate a preference for the registration of safer pesticides, which will encourage their development, registration, and manufacture. Criteria for characterizing safer active ingredients are being developed, taking into consideration factors like toxicity, persistence, environmental mobility, and bioconcentration potential. EPA is granting regulatory

**Fig. 2—Number of new pesticide active ingredients registered that are classified safer (reduced risk).**




*The number above each black column is the number of pesticides classified as safer. The topmost number is the total number of new pesticides.*

**Fig. 3—Number of food-use inert ingredients in pesticides that have not been reviewed and approved.**




relief for products with nontoxic modes of action so that developing and marketing these products is less expensive. EPA is also forming a new organizational unit to focus on registration of safer pesticides and pollution prevention activities. Based on increases over the past year, EPA expects the percentage of new reduced-risk active ingredients to increase each year, to 75 percent by 2005.

Pesticides used in food production can contain chemical components other than the active ingredients. These "inert" components can be found in foods, and, in some cases, might present unacceptable health risks. Their risks might be comparable to those of active ingredients, including both long-term risks, such as cancer or nervous system disorders, and short-term risks, such as nausea, dizziness, and skin or eye irritation.

In the mid-1980s EPA established a new policy that required more stringent review of inert ingredients. The requirements included submission of safety data by applicants and review by the Agency to determine the acceptability of any risks. All new inerts contained in proposed pesticide registrations must have a database adequate to evaluate risks, dependent on toxicity and the use pattern of the chemical. The policy requires inerts in food-use pesticides to undergo the most extensive testing.

In addition to new inerts, EPA is reevaluating inerts in previously registered pesticides, categorizing them based on their known toxicity, and making determinations on them. EPA has reviewed about 300 of the existing food use inerts and will make determinations on the remaining 300 food use inerts and 1,400 non-food use inerts by 2005, eliminating the use of those which have been demonstrated to cause health problems.

EPA also will approve new pesticides for use in line with current health and safety standards, with special emphasis on encouraging the use of safer pesticides and better application technology/practices. Finally, EPA will promote special initiatives to reduce pesticide users' dependency on pesticides and increase the use of both integrated pest management programs and safer pesticide products.

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M.1 FDA. 1995. *Pesticide Program: Residue Monitoring 1994; Surveillance Sample Violation Rates for Foods, 1987-1994.* Washington, DC: U.S. Food and Drug Administration, Division of Programs and Enforcement Policy.

M.2a S. Nako. 1994. EPA staff estimates based on EPA/OPP cancer ratings and Doane Pesticide Usage Data Base to be included in OPP Annual Report for FY96 and later years and/or EPA Annual Pesticide Market Estimates Report. Washington, DC: U.S. Environmental Protection Agency, Office of Pesticide Programs.

M.2b Ibid.

M.3 USEPA. 1995. To be published in Office of Pesticide Programs Annual Report for FY96 and later years. Washington, DC: U.S. Environmental Protection Agency, Office of Pesticide Programs.

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1. USEPA. Estimates to be made by USDA in cooperation with EPA and to be published in OPP Annual Report for FY96 and later years. Washington, DC: U.S. Environmental Protection Agency, Office of Prevention, Pesticides, and Toxic Substances.

2. USEPA. *Chemicals Registered for the First Time as Pesticidal Active Ingredients under FIFRA*. EPA 733-B-94-001. Washington, DC: U.S. Environmental Protection Agency, Office of Pesticide Programs.
3. USEPA. To be reported in OPP Annual Report for FY96 and later years, based on Agency file data. Washington, DC: U.S. Environmental Protection Agency, Office of Pesticide Programs.

# 6. Safe Homes, Schools, and Workplaces

*Long-Range Goal*

**All Americans will live, learn, and work in safe and healthy environments.**

## The Challenge

Regardless of where we live or work in the United States—in rural areas, cities, or suburbs—we are exposed to pollutants that can affect our health and productivity. Toxic chemicals, including pesticides, used in and around the workplace can threaten the health of workers. Products used in the home can also contain harmful chemicals. Although environmental degradation of all kinds is increasingly a concern, environmental risks indoors and in workplaces are more severe than many other environmental risks facing this nation.[1]

### *Homes and Other Indoor Environments*

Most people are aware that outdoor pollution can be harmful to their health, but many are unaware that pollution inside their homes, schools, and workplaces (whether an office or a factory) can affect their health, comfort, and productivity.

Indoor pollution is of particular concern because people spend as much as 90 percent of their time indoors. Studies over the past two decades have shown that indoor levels of many air pollutants are two to five times higher than outdoor levels. Levels in new or renovated buildings can be up to 100 times higher than those outdoors because newer buildings are constructed with synthetic materials, furnished with chemically formulated products, and tightly sealed to save energy.

Long-term health effects, which include respiratory diseases, damage to the brain and nervous system, and cancer, can be severely debilitating or fatal. They are associated with indoor pollutants such as radon, lead, and environmental tobacco smoke. Mold, dust mites, animal dander, bacteria, and viruses also contribute to a wide array of acute and chronic health problems, including asthma. Other harmful contaminants are pesticide residues, carbon monoxide from combustion appliances, and the volatile and semivolatile organic compounds in consumer and commercial products. Asbestos exposure causes debilitating respiratory problems and some forms of cancer.

In our homes and schools, children can be exposed to lead in paint, radon gas, pesticides, asbestos, and other toxics. Safeguarding children from exposure to toxic materials is a prime responsibility for EPA.

Poor indoor environments can result in substantial economic losses through medical costs, work absences, decreased productivity, and material damage. In its 1989 *Report to Congress on Indoor Air Quality*, EPA concluded that while current data do not permit a precise assessment of these costs, the direct economic losses alone amount to "tens of billions" of dollars per year.[2]

**Some Critical Indoor Environmental Problems**

***Lead:*** In 1991, the U.S. Department of Health and Human Services identified lead poisoning as the top environmental health hazard to U.S. children.

***Radon:*** Radon, a naturally occurring radioactive gas, is the second leading cause of lung cancer in the United States.

***Environmental Tobacco Smoke (ETS):*** ETS exposure is responsible for a large number of lung cancer deaths in nonsmokers, as well as lower respiratory tract infections in children.

***Biological Agents:*** Exposure to airborne biological agents indoors can result in infectious or allergic diseases such as Legionnaire's disease and asthma.

***Other Contaminants:*** Carbon monoxide, volatile organic compounds, asbestos, and other contaminants can cause toxic effects.

***Sick Building Syndrome:*** "Sick building syndrome" refers to a series of acute symptoms such as headaches, irritation and congestion of the mucous membranes, lethargy, and dizziness, which are experienced when one is present in a building but dissipate soon after one leaves.

### *Industrial and Agricultural Workplaces*

Acute systemic poisonings, cancer and other chronic health problems, reproductive complications, and birth defects are among the potential health effects of exposure to certain workplace chemicals. Conventional synthetic pesticides meant to have toxic effects on pests sometimes also produce human health problems such as acute illness and allergic reactions, as well as delayed health effects. Occupational exposure to carcinogens is of particular concern, but other materials—such as heavy metals or PCBs—known to cause neurological or reproductive effects also present significant threats because of the high concentrations that can be encountered in the workplace and the large size of the exposed worker population.

A lack of data makes reliable, comprehensive estimates of the acute and chronic health problems of workers difficult. The actual number of acute incidents, in particular, is likely to be considerably higher than estimated because occurrences go unreported for various reasons, including failure to recognize pesticide or chemical poisoning and failure of health care providers to record incidents adequately. Some workers do not seek treatment, or they fail to disclose that they were working with pesticides or chemicals. One study suggests that only 8 to 15 percent of farm workers who experience symptoms seek medical treatment.[3]

The challenge is first, to help all Americans understand the relatively high risks of exposure to contaminants indoors and in workplaces, and second, to implement and evaluate voluntary and required approaches to making these environments safer.

## Responsibilities

EPA plays an important role in ensuring that the American people have safe environments in which to live, learn, and work. The Agency is involved in the screening, testing, and control of chemicals. Additionally, EPA conducts research, disseminates information, and takes both regulatory and nonregulatory actions to improve indoor environments. The relevant statutes include:

- The **Federal Insecticide, Fungicide and Rodenticide Act (FIFRA)** gives EPA the authority to review and approve existing and new commercial pesticides via a registration or licensing process. As a part of this process, pesticide manufacturers are required to report on the health and environmental effects of their products.
- The **Toxic Substances Control Act (TSCA)** gives EPA the responsibility of regulating both existing and new chemicals.
- The **Worker Protection Standard** is designed to provide information and training so that agricultural workers and pesticide handlers can minimize their exposure to pesticides.
- The **Residential Lead-based Paint Hazard Act (Title X of the Housing and Community Development Act of 1992)** provides for consistency and quality control in evaluating and controlling lead hazards in public and private housing.

- The **Radon Abatement Act** establishes a long-term national goal of making indoor air as free of radon as the ambient air, and provides for a variety of voluntary mechanisms for achieving that goal.
- The **Radon Gas and Indoor Air Quality Act of 1986 (Title IV of the Superfund Amendments and Reauthorization Act (SARA))** authorizes EPA to conduct research and develop and disseminate information on all aspects of indoor air quality.
- The **Asbestos Hazard Emergency Response Act (AHERA)** calls for the inspection of all elementary and secondary schools in order to identify any asbestos-containing building materials, prepare an asbestos management plan for each school, and train school maintenance and custodial workers.

EPA shares its responsibilities with other federal and state agencies. The Occupational Safety and Health Administration (OSHA) regulates worker safety and health. The Centers for Disease Control and Prevention's (CDC's) National Institute for Occupational Safety and Health (NIOSH) conducts research on occupational hazards (including investigations of buildings with suspected indoor air quality problems) and recommends approaches to improve worker safety and health. The Department of Energy conducts research and provides information on ionizing radiation, including radon, and on the relationship between energy conservation and indoor environmental quality in buildings. The Consumer Product Safety Commission controls certain aspects of indoor environmental quality through regulations, guidelines, and research on consumer products. The Department of Housing and Urban Development administers the nation's housing policies under a mandate to provide decent, safe, and sanitary housing. In addition to federal legislation, a number of states have passed laws related to indoor environmental quality and worker safety.

## Environmental Milestones for 2005

Milestones are proposed for reducing risks in homes and other indoor environments and in workplaces, both indoors and outdoors.

The safe indoor environment milestones address lead, radon, and environmental tobacco smoke. These three contaminants were chosen for milestone development because they are considered to be among the top environmental risks to public health and enough data are available to measure progress. Environmental milestones for other indoor problems such as biological contaminants, volatile organic compounds, and sick building syndrome have not yet been developed because of limitations in technology and data. However, EPA has defined several actions to reduce these contaminants and progress measures for these actions are included in the strategy discussion. As information and our understanding improves, additional risk reduction milestones will be developed.

The safe workplace milestones (4-7) address only the *use* of toxic chemicals in the workplace, which is EPA's responsibility. The setting of occupational exposure limits for toxic chemicals or other workplace hazards is the responsibility of other agencies, principally the Occupational Safety and Health Administration.

***Federal Reviewers:***
*Please provide other related agency targets*

**MILESTONE**

**1**

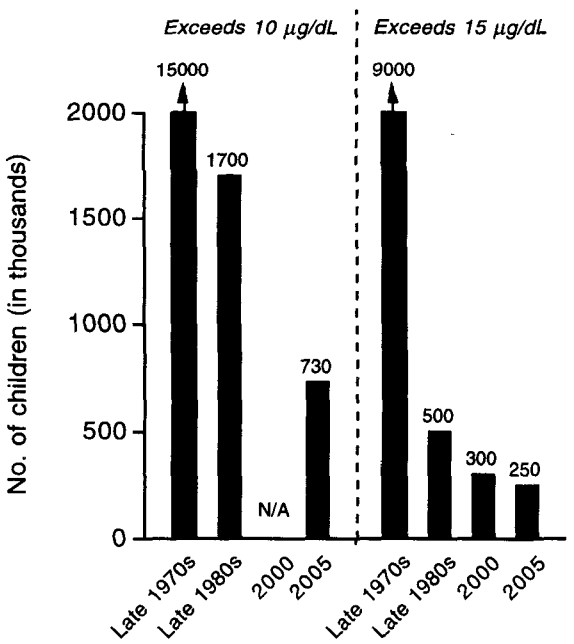
# *By 2005,*

**the number of young children with high levels of lead in their blood will be reduced by more than 50 percent compared to the late 1980s.**

### Special Population Target

- By 2005, the total number of inner-city, low-income, African-American children between the ages of 1 and 5 years with blood lead levels exceeding 10 µg/dL will be less than 175,000, compared with approximately 400,000 children in the late 1980s.
- By 2005, the total number of inner-city, low-income, African-American children between the ages of 1 and 5 years with blood lead levels exceeding 15 µg/dL will be less than 75,000, compared with approximately 160,000 children in the late 1980s.

**M.1a—Blood lead levels in U.S. children.**




In the United States, children's mean blood lead levels have significantly decreased since the 1970s. This reduction is primarily the result of the phaseout of lead in gasoline and reductions in other sources and pathways of exposure. However, high blood lead levels continue to be one of the most critical environmental threats to children's health. This threat is greatest to low-income minority children in urban settings, whose mean blood lead levels are about twice the U.S. average. This disproportion is the reason for separate milestones for inner-city, low-income, African-American children (see box). EPA had hoped to develop an additional goal for U.S. Hispanic children, but data limitations prevent doing so at this time.

Lead-based paint and lead in dust from lead-based paint remain the major sources of childhood exposure in the United States today. Although lead was banned from residential paint in 1978, it is estimated that 83 percent of all housing units built before 1980 contain some lead-based paint. Lead's potential health effects on children include impaired learning and behavior and hearing and growth deficits. Fetuses can be harmed through prenatal exposure. In adults, lead in the blood can interfere with hearing, increase blood pressure, and, at high levels, cause kidney damage and anemia.

### *Past Trends and 2005 Target*

In the late 1970s, approximately 15 million children between 6 months and 5 years old had blood lead levels greater than 10 micrograms per deciliter (µg/dL), which is the Centers for Disease Control and Prevention's definition of lead toxicity for children. In the late 1980s, approximately 1.7 million children between the ages of 1 and 5 in the United States had blood lead levels exceeding 10 µg/dL. At the same time, about 500,000 children had even higher blood lead levels, exceeding 15 µg/dL.

In 1990, the U.S. Department of Health and Human Services (DHHS) developed blood lead reduction goals for the year 2000 using data from the Second National Health and Nutrition Examination Survey (NHANES II), 1976-80.[4,5] NHANES provides the most representative national blood lead estimates. The blood lead level targets chosen were based on 1985 CDC childhood lead poisoning

prevention guidelines, which defined lead toxicity at 25 µg/dL. In 1991, CDC redefined lead toxicity for children at 10 µg/dL. EPA developed targets for the year 2005 using the CDC guidelines and data from the more current NHANES III, 1988-91.[6]

Achieving this milestone will reduce the total number of children between the ages of 1 and 5 years with blood lead levels exceeding 10 µg/dL to no more than 730,000 nationwide and will reduce the total number of children between the ages of 1 and 5 years with blood lead levels exceeding 15 µg/dL to no more than 250,000 nationwide.

### *Tracking Results*

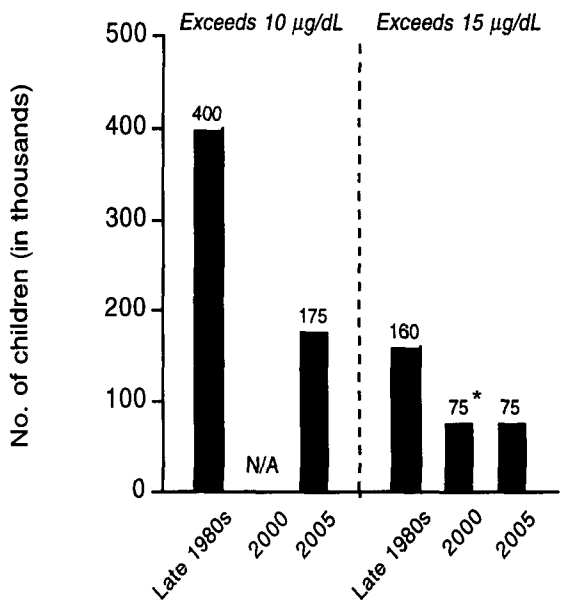
Progress will be measured through the NHANES surveys, which are conducted approximately every 10 years.

**RELATED FEDERAL TARGETS**

Dept. of Health and Human Services
*Healthy People 2000*

[By 2000,] reduce the prevalence of blood lead levels exceeding 15 µg/dL and 25 µg/dL among children aged 6 months through 5 years to no more than 300,000 and zero, respectively. (Baseline: An estimated 3 million children had levels exceeding 15 µg/dL, and 234,000 had levels exceeding 25 µg/dL in 1984.)

**M.1b—Blood lead levels in African-American, inner-city, low-income children.**




** For its midcourse review of Healthy People 2000, DHHS recalculated the goal using NHANES III data. The resulting projected number was 95,000. However, because DHHS does not revise its goals to make them less ambitious, it is keeping its original goal of 75,000.*

***Federal Reviewers:***
*Please provide other related agency targets*

**MILESTONE**
**2**

# *By 2005,*

**27 million homes will have been voluntarily tested for radon, corrective action will have been taken in 1 million homes, and 1.5 million new homes will have been built with radon-resistant features, resulting in a 25 percent reduction from 1985 levels in the number of Americans exposed to elevated radon in their homes.**

**RELATED FEDERAL TARGETS**

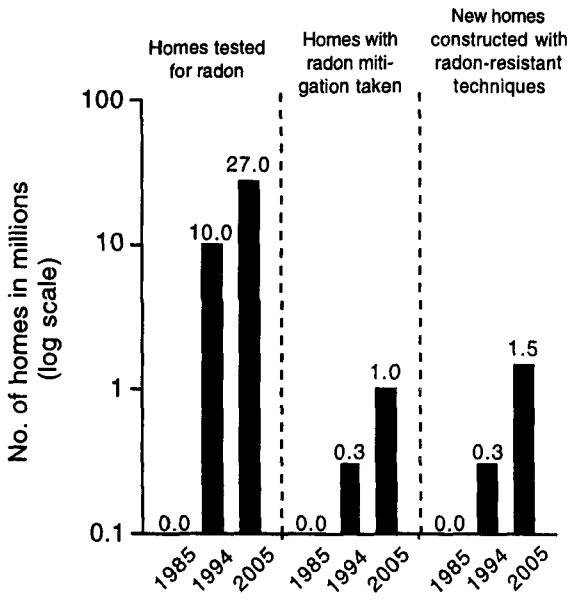
Dept. of Health and Human Services
*Healthy People 2000*

[By 2000,] increase to at least 40 percent the proportion of homes in which homeowners/ occupants have tested for radon concentrations and that have either been found to pose minimal risk or have been modified to reduce risk to health. (Baseline: Less than 5 percent of homes had been tested in 1989.)

[By 2000,] increase to at least 30 the number of states requiring that prospective buyers be informed of the presence of lead-based paint and radon concentrations in all buildings offered for sale.

[By 2000,] expand to at least 35 the number of states in which 75 percent of local jurisdictions have adopted construction standards and techniques that minimize elevated indoor radon levels in those new building areas locally determined to have elevated radon levels. (Baseline: 1 state in 1989.)

**M.2—Reducing health risks of radon.**




The Surgeon General, the Centers for Disease Control and Prevention, and EPA have warned that radon, a naturally occurring radioactive gas, is the second leading cause of lung cancer in the United States. At present, radon is estimated to account for 7,000 to 30,000 lung cancer deaths each year. EPA estimates that the reduction in exposure proposed in this milestone will eventually reduce the incidence of radon-related lung cancer deaths by approximately 500 deaths per year compared to the 1985 baseline.

### *Past Trends and 2005 Target*

Starting from a baseline of zero in 1985, by 1994 approximately 10 million homes had been tested for radon, 300,000 households had taken mitigative actions, and 300,000 new homes had been constructed using radon-resistant techniques. Approximately 6 million homes are now estimated to contain radon levels above the recommended level of 4 picocuries per liter. In 1990, the Public Health Service developed radon reduction goals for the year 2000 using 1989 as the baseline. EPA's milestone is based on data collected from 1989 through 1994.

### *Tracking Results*

The biennial Radon Risk Communications and Results Study conducted by the Conference of Radiation Control Program Directors provides data on the prevalence of radon testing and corrective actions taken in existing homes.[7] The annual Builders Survey conducted by the National Association of Home Builders provides data on the number of new homes built with radon-resistant features.[8] These data, along with data from EPA's National Residential Radon Survey, will be used to assess progress in achieving this milestone.

MILESTONE

3

# *By 2005,*

**children's exposure to environmental tobacco smoke will decrease through voluntary actions in the home. The proportion of households in which children 6 and younger are regularly exposed to smoking will be reduced to 15 percent from over 39 percent in 1986.**

***Federal Reviewers:***
*Please provide other related agency targets*

In 1992, EPA issued *Respiratory Health Effects of Passive Smoking: Lung Cancer and Other Disorders,* a major report and formal risk assessment on environmental tobacco smoke (ETS). This report concluded that ETS is a class-A carcinogen and is responsible for a large number of respiratory illnesses in children. EPA estimates that ETS is responsible for approximately 3,000 lung cancer deaths per year in U.S. nonsmokers and 150,000 to 300,000 lower respiratory tract infections in children under 18 months of age. In addition, environmental tobacco smoke exacerbates existing cases of childhood asthma and is a factor in new cases.

## *Past Trends and 2005 Target*

Over the past 30 years, smoking among adults has decreased by about 40 percent. The proportion of households that expose young children to ETS has declined from 39 percent in 1986 to 32 percent in 1991 to 29 percent in 1994.

The EPA milestone is based on the progress anticipated by the Department of Health and Human Services in achieving its goal for 2000 (see box). It also anticipates that EPA, the Centers for Disease Control and Prevention, and other organizations will continue to promote public awareness of the effects of ETS on children.

## *Tracking Results*

Historical data on the number of children regularly exposed to tobacco smoke in the home are taken from the National Health Interview Survey, an annual survey conducted by the Department of Health and Human Services.[9] Represented are households with children 6 and under and with a regular smoker in the home. Similar data, beginning in 1992, are available from the Conference of Radiation Control Program Directors' biennial survey. Both surveys will be used to track future progress toward this milestone.

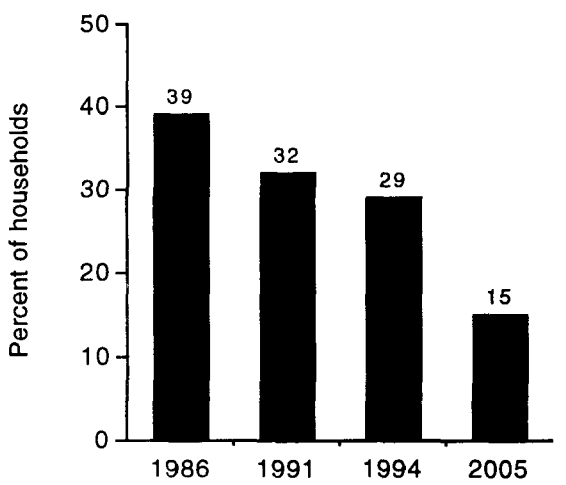
**RELATED FEDERAL TARGETS**

Dept. of Health and Human Services
*Healthy People 2000*

[By 2000,] reduce to no more than 20 percent the proportion of children aged 6 and younger who are regularly exposed to tobacco smoke at home. (Baseline: More than 39 percent in 1986, as 39 percent of households with one or more children aged 6 or younger had a cigarette smoker in the household.)

[By 2000,] reduce asthma morbidity, as measured by a reduction in hospitalizations to no more than 160 per 100,000 people. (Baseline: 188 per 100,000 in 1987.)

**M.3—Percent of households in which young children are regularly exposed to smoking.**



***Federal Reviewers:***
*Please provide other related agency targets*

**MILESTONE**
**4**

# *By 2005,*

**the number of workers suffering adverse health effects caused by acute poisoning from pesticides will be reduced significantly from 1992 levels.**

Pesticide poisonings can result in acute illnesses and even deaths. Beyond serious concerns for the well-being of workers and their families, deaths, hospitalizations, and physician visits also present costs to different sectors of society. These costs include increased medical expenses, reduced productivity of the workforce, increased liability risks for pesticide manufacturers, higher legal costs, and increased insurance rates. Deaths, hospitalizations, and visits to physicians attributable to acute poisonings from pesticides in the workplace are proposed as measures of progress in reducing health threats.

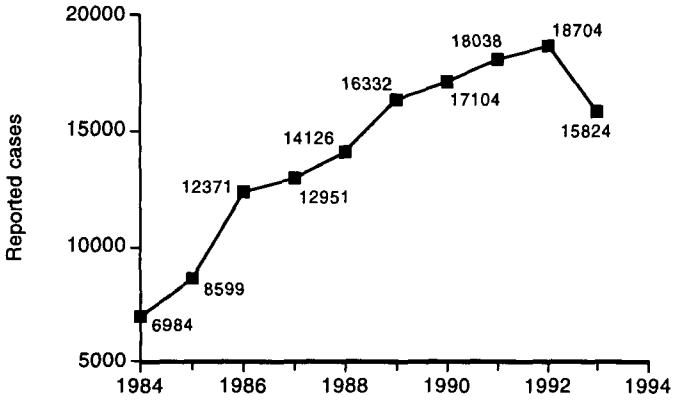
## *Past Trends and 2005 Targets*

Currently, the available national data regarding acute pesticide poisonings are not comprehensive. They consist mainly of poison control center data, national health statistics, and commissioned studies. They do not cover the entire U.S. population or workforce. Another limitation is that these data combine pesticide-related hospitalizations from both occupational and nonoccupational incidents. Because data on acute occupation-related pesticide poisonings are not directly available, EPA will work with the American Association of Poison Control Centers to obtain existing data for the years 1985-92 and will use these data to develop a baseline from which to measure progress.

## *Tracking Results*

Results in reducing acute hazards from pesticides in homes and workplaces will be assessed by counting or estimating the number of deaths, hospitalizations, and visits to physicians. Progress will be measured through evaluation of annual aggregate poison control center data published by the American Association of Poison Control Centers, annual statistics from the National Center for Health Statistics, and EPA-commissioned studies. It is important to note that the added emphasis on documenting and tracking pesticide-related poisonings might initially result in an increase in the number of reported cases. Nevertheless, EPA still expects a significant reduction in the number of cases by 2005.

**M.4—Numbers of acute pesticide poisonings reported to poison control centers participating in the national data collection system.**



MILESTONE

5

# By 2005,

## the use of safe agricultural biopesticides will double from 1995 levels.

***Federal Reviewers:***
*Please provide other related agency targets*

Biopesticides include both microbial pesticides, such as bacteria, viruses, or other microorganisms used to control pests, and biochemical pesticides, which include pheromones (insect sex attractants), insect or plant growth regulators, and hormones. Biopesticides typically pose less risk to agricultural workers than their conventional pesticide counterparts because of their unique modes of action, low use volumes, species specificity, and natural occurrence. To the extent that agricultural biopesticides are used in place of higher-risk conventional pesticides, risks to workers from pesticides will decrease. (See also Safe Food.)

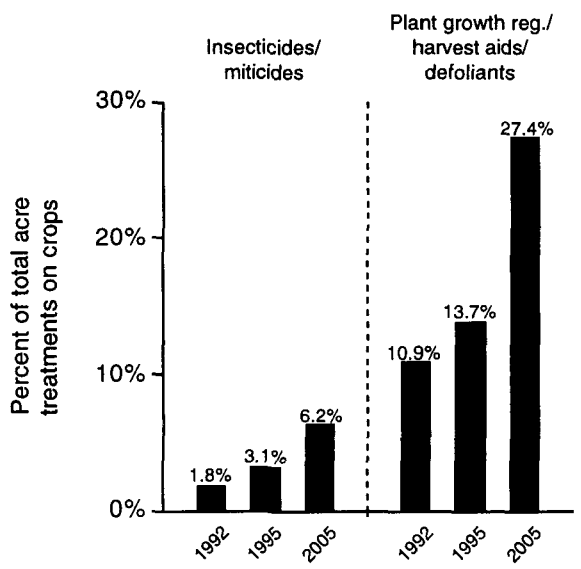
### *Past Trends and 2005 Target*

In recent years, an increasing number of biological pesticides have entered the market, reflecting a growing demand for and use of such pesticides. In fiscal year 1994, 15 of 31 new pesticide active ingredients registered by EPA were biological pesticides. Because these registration increases are so recent, usage surveys do not yet show a large aggregate use relative to conventional pesticides. However, EPA is confident that doubling the use of biological pesticides by the year 2005 is achievable, given the increasing number of new registrations for biopesticides, the growing use of integrated pest management practices, and the growing consumer demand for organically grown foods.

### *Tracking Results*

EPA will track the use of biopesticides through annual and biennial public and proprietary surveys. Relevant use information will include the crop acreage treated, percent of crop treated, and pounds of active ingredient used. Where existing information is inadequate, EPA will commission its own surveys to track biopesticide use.

**M.5—Use of safe agricultural biopesticides.**




*Safe biopesticides shown are insecticides/miticides and plant growth regulators/harvest aids/defoliants. No significant amounts of herbicides and fungicides are reported in the database.*

***Federal Reviewers:***
*Please provide other related agency targets*

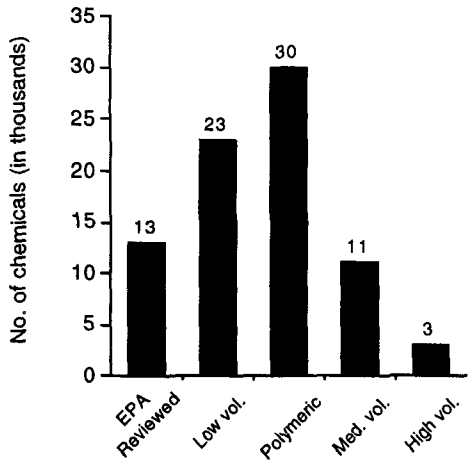
**MILESTONE**

**6**

# *By 2005,*

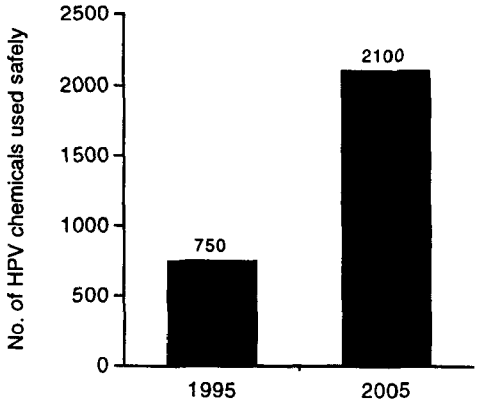
**the number of existing industrial high-production-volume chemicals shown to be used safely in the workplace will nearly triple.**

**M.6a—Categories of chemicals in commerce.**




*Of the chemicals that have not yet been reviewed by EPA, the polymers are usually of low toxicity. Low-volume chemicals are produced and used at levels below 10,000 lb/yr; intermediate-volume chemicals, in quantities between 10,000 and 1 million lb/yr. The highest priority for review is the high-production-volume chemicals produced or used in quantities over 1 million lb/yr.*

**M.6b—Number of high-production-volume chemicals reviewed and found to be used safely.**




Workers have the right to work with chemicals known to be safe and under conditions known to be safe. They also have the right to know the hazards associated with chemicals to which they could be exposed at work. The importance of this milestone is in its potential for reducing risks presented by chemicals and for making significant progress in identifying chemicals that can be used by industry and employees without fear of significant hazard. Determining the toxicity, exposure, and safe use of existing chemicals that came on the market prior to 1979, and continue to be used, is an EPA priority that protects workers. (See also Toxic-Free Communities, milestone 3.)

## *Past Trends and 2005 Targets*

Of the approximately 70,000 new and existing chemicals used in commerce, only about 13,000, or about 15 percent, are known to be of low risk to workers or to be manageable as low risks if existing safety precautions are used. The Office of Technology Assessment has pointed to approximately 3,000 to 4,000 chemicals produced in excess of 1 million pounds per year posing the greatest potential risk. These high-production-volume (HPV) chemicals are the highest priority in terms of understanding their effects on workers and placing adequate controls on their use. Under this milestone, 1,350 HPV chemicals will be evaluated and a determination made concerning the need for further risk reduction. Action will be taken where necessary to promote safe use.

Achievement of this milestone will nearly triple the number of existing chemicals reviewed—from 750 to about 2,100. Progress toward the milestone also includes voluntary action by the chemical industry to implement product stewardship programs, such as the "responsible care" program of the Chemical Manufacturers Association (CMA), which provides workers with necessary protection for use of commercial chemicals.

## *Tracking Results*

This milestone will be measured by tallying the evaluations of existing chemicals. The existing chemical program tracks past and ongoing chemical reviews, and submits completion reports to a publicly available docket. These data allow EPA to develop summary statistics to judge program effectiveness.

MILESTONE

7

# *By 2005,*

**worker protection will be promoted for as many as 10,000 new chemicals.**

***Federal Reviewers:***

*Please provide other related agency targets*

Workers have a right to expect that EPA will ensure the safety of new chemicals before they are introduced into the workplace. Achieving this milestone will help protect workers from health risks associated with the estimated 10,000 new chemicals that will enter production between now and 2005. EPA will establish exposure limits for all new chemicals that might present an unreasonable risk to workers. In addition to the exposure limits, other protective measures might include requirements for the use of equipment such as respirators or other controls that minimize risk.

New chemicals often are safer than older chemicals, and the additional 10,000 chemicals could provide companies with the flexibility to choose safer substitutes for existing chemicals that are known to be hazardous. Such substitutions can improve employee safety and health.

### *Past Trends and 2005 Target*

Since 1979, EPA has approved new chemicals that are safe when used as intended. To date, approximately 12,000 have been approved and have entered commerce. Achieving this milestone will mean at least 10,000 more will be approved as safe for intended uses by 2005.

### *Tracking Results*

Results will be determined by how many additional new chemicals are approved for manufacture, introduced on the market, and substituted for older chemicals. The quantity of production of new chemicals will be tracked in EPA's quadrennial updates of production volume. Tracking will include data on how often additional use or production precautions are needed after the initial EPA review has been concluded. This effort will be supported by reviews of industry data used to identify any previously unknown adverse effects.

## Strategy

The milestones for safe homes, schools, and workplaces will be achieved through a combination of voluntary and regulatory approaches. Increased public awareness and voluntary actions in the private sector are key parts of EPA's strategy to make indoor environments healthier for people. Voluntary actions also play a role in reducing risks to workers, but the safe workplaces strategy relies more on regulatory approaches to prevent pollution. Partnerships among all levels of government, industry, and health organizations—many of which are already in place—will provide the framework for these efforts.

**Costs**

In a 1990 report, *Environmental Investments: The Cost of a Clean Environment*, EPA estimated that the annual public and private costs of meeting the requirements of legislation related to radon and other indoor pollutants were approximately $440 million in 1990 and would rise to $900 million by 2000 to fully meet requirements expected to be in place (constant 1986 dollars). A 1990 study by the U.S. Department of Housing and Urban Development estimated that the cost of remediating housing with lead-based paint will range from $60 billion to $230 billion over the first 10 years, depending on the abatement criterion used.[12] (See Chapters 5 and 7 for related costs of meeting standards for pesticides and other toxic chemicals.) Achievement of the proposed milestones might require implementation of some programs not anticipated when these estimates were prepared, which would add to the costs. Over the next few years, the costs and benefits of indoor environment and workplace protection programs will be more fully assessed.

### *Safe Homes and Other Indoor Environments*

*Lead.* EPA's 1991 strategy to reduce lead exposure calls for research, development of safe and cost-effective methods for abatement and management of lead paint hazards in homes, and regulatory and pollution prevention programs. EPA coordinates its activities with other federal agencies such as the Department of Housing and Urban Development and the Centers for Disease Control and Prevention, as well as state and local programs. For example, EPA and HUD recently finalized a rule giving buyers and renters the right to know about known lead hazards in pre-1978 housing before sale or lease.

*Radon.* EPA encourages homeowners to test for radon and to take corrective actions when radon levels exceed the recommended level. EPA has developed and distributed information on the health risks of radon, methods for reducing radon in new and older homes, and standardized methods for radon testing. In addition, the Agency encourages radon testing as part of home real estate transactions and encourages radon testing and mitigation in schools. EPA communicates information through a variety of public educational programs conducted in partnership with states and local communities and more than 20 organizations like the American Lung Association, the Consumer Federation of America, and the National Association of Counties. Through training and technical assistance, EPA encourages the use of radon-resistant building techniques in new home construction. In 1994, the Council of American Building Officials adopted EPA-recommended model standards for radon-resistant new construction into its model residential building code.

*Environmental tobacco smoke.* Many organizations provide information to the public about the health effects of environmental tobacco smoke. Federal agencies include EPA and the U.S. Department of Health and Human Services; private sector organizations include the American Lung Association, the American Heart Association, and the American Cancer Society. EPA anticipates that increasing public awareness will continue to reduce exposure of children to environmental tobacco smoke in the home.

*Consumer and commercial products.* **By 2005, EPA will have reached agreements with manufacturers to substantially reduce emissions from 10 or more products whose emissions create a relatively high adverse impact on indoor air quality and public health.** The Carpet Policy Dialogue is the model for pollution prevention agreements with manufacturers. Completed in 1991, the year-long dialogue between carpet and associated industries, six federal agencies, unions, and public interest groups explored ways to reduce consumer exposure to emissions of volatile organic compounds (VOCs). As a result, carpet manufacturers have already accomplished significant reductions in

product emissions. Today, they test their product lines for total VOC emissions and conduct a voluntary industry-wide carpet certification program that assists consumers in selecting low-emitting products.

Through the Indoor Air Source Characterization Project, EPA will characterize and prioritize emissions from other product sources. High-priority sources will be chosen yearly for pollution prevention initiatives. EPA will work with manufacturers to lower emissions whenever possible and improve the ability of consumers to make informed purchasing decisions.

*Commercial buildings and schools.* Through similar partnerships, EPA expects to improve indoor air quality in commercial buildings and schools by encouraging better operation and maintenance practices. **By 2005, 3,000 or more school or commercial buildings will have indoor air quality management plans that are in keeping with EPA guidelines.** *Building Air Quality: A Guide for Building Owners and Facility Managers* outlines methods for preventing and resolving indoor air quality problems in commercial office buildings.[10] Developed jointly by EPA and NIOSH, it is the basis for an extensive training program that EPA conducts with the Building Owners and Managers Association. EPA has recently published *Indoor Air Quality Tools for Schools*, which provides similar guidance for school systems.[11] In addition, EPA will continue to work with states to establish State Model Accreditation Plans for training and accreditation of asbestos inspectors and abatement workers performing in schools and industrial and commercial buildings.

*Understanding indoor air quality in large buildings.* **By 2005, EPA will develop a database of environmental, building, occupant, and ventilation parameters in 300 or more buildings, from a baseline of 30 buildings in 1995, to assist in the development of public and private actions designed to improve indoor environments.** EPA is working with others in the scientific community to improve our understanding of indoor pollution. Currently, no comprehensive data are available to provide a baseline for measuring improvements of the overall air quality in buildings. In response, EPA has initiated the Building Assessment Survey and Evaluation program to collect indoor air quality data in a randomly selected sample of buildings nationwide. Data are collected regarding the building, ventilation system, occupants, and occupant perceptions. Each year, additional buildings will be selected, measurements and information will be taken, and data will be systematically added to the database. Data will be useful in developing public and private sector strategies and programs to improve indoor environments.

## Safe Industrial and Agricultural Workplaces

### *Pesticides in the Workplace*

*Safer pesticides.* EPA is advocating the use of biopesticides and is designing a streamlined registration process that will foster their adoption. EPA will continue to provide regulatory incentives to biopesticide manufacturers. Such incentives reduce the time and cost of bringing biopesticides to the market, thereby reducing their prices and giving pesticide users safer, economically viable choices for pest control.

*Safer pest management practices.* **By 2005, strategies for reducing exposure to higher-risk pesticides in the workplace will be implemented for at least 50 pesticide user groups representing major occupational sites.** In 1993, a number of agencies developed the Pesticide Environmental Stewardship Program (PESP) to foster voluntary public-private partnerships that implement environmental stewardship plans for agricultural and nonagricultural sites. Major organizations representing agriculture, golf courses, and lawn and garden care are participating. Pesticide user groups that become PESP partners commit to working with EPA to develop strategies for reducing risks associated with higher-risk conventional pesticides. The strategies include integrated pest manage-

ment practices and, once implemented, are monitored to evaluate their success.

As of August 1, 1995, the PESP had 16 partners representing 12 agricultural use sites and 4 nonagricultural use sites. EPA is actively seeking new partners, covering pesticide use sites such as utility rights-of-way, lawn care, golf courses, California citrus, California pears, potatoes, apples, and corn. Annual PESP reports will detail progress toward the target of 50 PESP partners by 2005. Regulatory and nonregulatory (financial) incentives will be made available to support research and the adoption of safe pest management practices. EPA has provided funding through grants to several of its partners to facilitate strategy development. Exchange of ideas, strategies, and information is an important part of PESP. EPA provides a liaison to support communication among PESP partners.

*Worker training.* **By 2005, 95 percent of handlers and farm workers using pesticides will be adequately trained in the safe handling, use, and disposal of pesticides.** A lack of adequate training can often lead to unnecessary worker exposure to pesticides, possibly causing adverse health effects. Programs for training users of restricted-use pesticides have existed for some time. EPA sets national standards for these training programs, which certify more than 1 million applicators nationwide. Such certification programs are conducted by states, territories, and tribes to ensure that users are knowledgeable about risks and appropriate uses.

The Worker Protection Standard (WPS) is the keystone in mitigating occupational exposure to pesticides for agricultural use sites. It requires expanded handler training and mandates, for the first time, safety training for all farm workers who might be exposed to pesticides. In addition, it requires improved labeling, more protective restricted entry intervals, broader use of personal protective equipment, and the posting of warning signs when areas are unsafe to enter. Progress toward this target will be measured by comparing state, tribal, EPA, and USDA estimates of the numbers trained to the total number of farm workers and handlers reported in the census data, compliance surveys, and other baseline estimates.

*Better pesticide labeling.* **By 2005, more than 95 percent of agricultural pesticide products will have label language that is clear enough for workers to be able to reduce their potential for health-threatening occupational exposure.** Guaranteeing that agricultural pesticide product labeling conveys information adequate to protect workers is another critical component in reducing worker risk. Although many labels have adequate safety information, inconsistent and inadequate label language regarding the safe use and handling of products has been a problem, especially for pesticides registered years ago. EPA will work with pesticide registrants to ensure that the labeling of all agricultural pesticide products conveys information adequate to protect workers, including the use of personal protective equipment and restrictions on reentry into areas recently treated with pesticides.

EPA's new Label Audit Program will be useful in measuring progress toward this target. The program will identify agricultural pesticide labels with insufficient safety information and will require that inadequate labels be updated in a timely fashion so that workers can obtain better information about using or handling specific products.

### *Other Chemicals in the Workplace*

Although OSHA and NIOSH have the lead federal responsibilities for work safety and health issues, EPA plays an important role in protecting workers from toxic chemicals. The Toxic-Free Communities chapter describes some of EPA's capabilities in overall protection of public health from chemical risks, whereas this strategy focuses on protecting workers from high-risk industrial chemicals.

Many of the tens of thousands of new and existing chemicals are of little concern to workers, but thousands of others pose potential risks. For these chemicals, the lack of crucial toxicity and exposure data can affect workers' health and their rights to know about risks to which they might be exposed. EPA is using its authorities under TSCA to

assess and reduce the risks in the workplace from proposed new chemicals and chemicals that are already in use.

*New chemicals.* Each new chemical proposed by the chemical industry is reviewed for its impact on workers. If its effects are considered too serious, EPA will not allow production. If, however, the chemical is deemed of low concern for its intended use or can be made safe by appropriate handling by workers, the company is allowed to produce the chemical. Requirements for special handling and use precautions are often written into agreements with chemical manufacturers so that workers, the general public, and the environment are protected.

OSHA and NIOSH have worked with EPA to develop guidelines for new chemicals that might present significant risks to workers. The ONE Committee—a group of OSHA, NIOSH, EPA, and Mine Safety and Health Administration officials who coordinate worker toxics information—oversees this effort. This cooperation has resulted in an EPA program for setting occupational exposure levels for certain new chemicals. Manufacturers of these chemicals are required to institute exposure safeguards that remain in place unless production volumes increase to a point where OSHA decides to issue a permissible exposure limit on its own authority.

*Existing chemicals.* EPA uses the Toxic Substances Control Act (TSCA) to protect workers from existing chemicals by, among other means, requiring additional chemical testing to quantify effects; reaching voluntary control agreements with manufacturers; providing expanded chemical information resources for workers and the public; cooperating with other EPA, state, and federal agencies to control a chemical in a specific medium (e.g., air, water, land); and, if necessary, using regulatory powers to curtail or even ban uses.

Better information on chemical uses will be provided to health and safety professionals and the public through the establishment of a Chemical Use Inventory. The inventory will ensure adequate data on chemical uses in the workplace to support analysis of use trends and to assist in the management of occupational exposures.

*Green chemistry.* "Green chemistry" techniques for the development of chemical products will reduce the use and generation of toxic substances in the workplace. Green chemistry incorporates basic chemical transformation techniques and principles as a way of reaching source and risk reduction. EPA has developed the green chemistry program over the last 5 years as part of its commitment to work with industry to encourage innovative approaches to pollution prevention. A good example now in development is the substitution of supercritical carbon dioxide for more toxic solvents used in manufacturing and processing. Also in development is the use of harmless simple sugars to replace the carcinogen benzene in the manufacture of certain chemicals.

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NHANES II data refers to children 6 months to 5 years. NHANES III data refers to children 1 to 5 years.

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T. L. Litovitz, T.G. Martin, and B. Schmitz. 1987. Annual Report of the American Association of Poison Control Centers National Data Collection System. *American Journal of Emergency Medicine* 5:405-445.

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# 7. Toxic-Free Communities

*Long-Range Goal*

**By relying on pollution prevention, reuse, and recycling in the way we produce and consume materials, all Americans will live in communities free of toxic impacts.**

## The Challenge

Every time a person throws something into the garbage or a business disposes of wastes, energy and natural resources are squandered. In some cases, public health and environmental quality are put at risk from toxic chemicals that are not only in wastes, but also in consumer products.

Over 70,000 chemicals are available for use in commerce, and about a thousand more new chemicals are produced each year. Toxicity and exposure data remain inadequate for thousands of these chemicals of potential concern.[1] The National Research Council, in a 1984 report, stressed that only about 20 percent of chemicals in commerce have even minimal toxicity information.[2] The lack of information limits industry and government in their ability to ensure the safe use of chemicals, and it deprives the public of its right to know the hazards it faces.

People generate municipal solid waste in their homes and yards and at stores and businesses. At 4.4 pounds a day per person, the municipal solid waste stream totaled over 209 million tons in 1994. Residents and commercial establishments can make a tremendous positive impact on their communities through source reduction and recycling programs. By rising to the challenge of producing less waste and recycling more, people can conserve energy and natural resources.

**Pollution Prevention—The Preferred Approach**

Pollution prevention is a bold approach to protecting public health and the environment. It means avoiding the creation of pollution in the first place by eliminating or minimizing the generation of wastes and harmful by-products at their source.

Prevention is ranked first in EPA's hierarchy of approaches to environmental protection. This preference is grounded in two fundamental principles: protection of public health and the environment, and economic growth. Pollution prevention is preferred because it

- Avoids the inadvertent transfer of pollutants from one medium to another that can occur with end-of-pipe controls.
- Eliminates the risks that accompany any release of pollutants into the environment.
- Conserves natural resources for future generations by preventing excessive waste and residue, and by minimizing the depletion of resources.

Second, pollution that cannot be prevented should be recycled or recovered. Third, pollution that cannot be prevented, recycled, or recovered should be treated in an environmentally safe manner. Fourth, disposal or release into the environment should be employed only as a last resort.

This hierarchy is a set of preferences, not hard-and-fast rules that assume that prevention is always feasible or desirable. The value of prevention in a particular setting will depend on its effectiveness, cost, and feasibility.

### Toxics Release Inventory

The Toxics Release Inventory (TRI) is a national database of toxic chemical releases into the environment from manufacturing facilities (including federal facilities). Congress mandated its creation through section 313 of the Emergency Planning and Community Right-to-Know Act (EPCRA), also known as Title III of the Superfund Amendments and Reauthorization Act of 1986. Section 313 of EPCRA requires owners and operators of certain manufacturing facilities to report releases of over 580 different toxic chemicals and 20 chemical categories to EPA. Under the Pollution Prevention Act of 1990, reporting under TRI includes both the quantities of the toxic chemicals that are managed in wastes and efforts to reduce or eliminate those quantities. Since 1991, facilities have been required to report annually on the quantity of toxic chemicals that have been released, disposed of, treated, combusted for energy recovery, and recycled. Since 1993, federal facilities have also been required to comply with TRI and other right-to-know requirements.

Under TRI, the term "wastes" is not rigidly defined, but generally is understood to include all materials produced as unwanted by-products of industrial processes. TRI counts only the quantities of toxic chemicals contained in these wastes, not the total quantity of the wastes, which might also include organic and inorganic materials such as dirt, water, and oil. Under the Resource Conservation and Recovery Act, however, facilities are required to track and report on the total quantities of regulated hazardous wastes, not just the amount of toxic chemicals contained in the wastes.

Toxic chemicals, hazardous waste, and municipal waste—once considered "out of sight, out of mind"—have now become familiar environmental concerns to most Americans. With increased awareness about the national dimensions, pervasiveness, and risks of exposure to toxic and other waste, communities have begun to rise to the challenge. Many have instituted successful programs for reduction, reuse, or recycling of products that historically required disposal. Corporations have begun to equate environmental pollution with economic waste so that opportunities for recycling, reuse, and other improved waste management practices are increasing.

The common ground between economic prosperity and environmental sustainability has become evident. Partnerships between industries and government are taking hold throughout the country, shifting gears from confrontation to collaboration and redirecting funds from environmental lawsuits to cleanup and prevention.

The task for the immediate future is to gain consensus on these opportunities, set national priorities, and measure our progress in pollution reduction and prevention. The greater challenge before us is to create more economic wealth with less environmental impact and greater protection of public health.

Pollution prevention will be the dominant force in achieving our environmental goals. It is potentially the most cost-effective method of environmental protection because it reduces raw material and energy losses, the need for "end-of-pipe" treatment and disposal technologies, and the potential liabilities associated with the management of toxic chemicals.

## Responsibilities

Virtually every EPA authority has a role in supporting pollution prevention and recycling. The primary authorities include the Toxic Substances Control Act, Pollution Prevention Act, Resource Conservation and Recovery Act, and Superfund Amendments and Reauthorization Act. In addition, the Clean Air Act and the Clean Water Act promote source reduction and recycling in regulations, permits, and enforcement actions. Superfund indirectly encourages prevention with its strict liability requirements. Other federal authorities and executive orders encourage toxic-free communities through promotion of energy and resource efficiencies.

State and local governments also encourage greater prevention and recycling through regulatory and voluntary means. Local governments, in particular, have initiated solid waste recycling programs. Ultimately, however, every person and every business share in the responsibility of conserving energy and other natural resources, reducing the amount of waste they produce, and reducing the amount of hazardous materials released into the environment.

## Environmental Milestones for 2005

To avoid adverse environmental health effects, all wastes must be stored, treated, and disposed of properly (see Chapter 9, Safe Waste Management). But it is even more advantageous to reduce the amount of wastes and toxics produced in the first place. These milestones offer several measures of progress in preventing pollution of the environment.

MILESTONE

1

# By 2005,

**industrial facilities will reduce by 25 percent (from 1992 levels) the quantities of the toxic chemicals in waste streams that are released, disposed of, treated, or combusted for energy recovery. Half of this reduction will be achieved through pollution prevention practices.**

***Federal Reviewers:***

*Please provide other related agency targets*

Toxic chemicals in wastes can endanger public health and environmental resources and, as with other wastes, often represent an inefficient use of natural resources. Industrial facilities are among the largest sources of toxic chemicals in waste streams. Reducing toxic chemicals in industrial waste streams will result in more efficient use of natural resources and contribute significantly to the goal of toxic-free communities.

### *Past Trends and 2005 Target*

Approximately 18 billion pounds of toxic chemicals in production-related waste streams were released, treated, or combusted for energy recovery in 1992. In 1993, these quantities decreased to 17 billion pounds, a 6 percent drop. The quantities of toxic chemicals in waste streams are projected to continue to decrease. Achieving a 25 percent reduction by 2005 is an aggressive but realistic target, given current trends, and will result in a further reduction of 4.5 billion pounds of toxic chemicals in wastes. At least half of this reduction will be achieved through pollution prevention, with the remainder to be achieved through recycling.

### *Tracking Results*

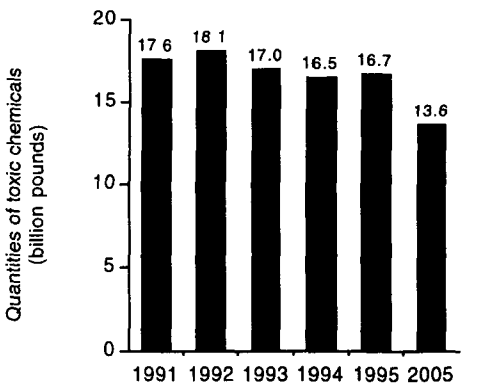
Progress will be measured annually against a baseline of 1992 TRI data. In 1992, approximately 27,000 industrial facilities reported on the quantities of over 300 toxic chemicals released, disposed of, treated, combusted for energy recovery, and recycled. (New chemicals were added to the TRI reporting system in 1994. These additional chemicals are not reflected in the graph. As initial data are received and analyzed, EPA will set reduction goals for these added chemicals.)

**RELATED FEDERAL TARGETS**

Dept. of Health and Human Services
*Healthy People 2000*

[By 2000,] reduce human exposure to toxic agents by confining total pounds of toxic agents released into the air, water, and soil each year to no more than: 0.24 billion pounds of those toxic agents included on the Department of Health and Human Services list of carcinogens (Baseline: 0.32 billion pounds in 1988) and 2.6 billion pounds of those toxic agents included on the Agency for Toxic Substances and Disease Registry list of the most toxic chemicals (Baseline: 2.62 billion pounds in 1988).

**M.1—Quantities of toxic chemicals in production-related wastes reported to TRI as released (including disposal), treated, or combusted for energy recovery.**




*1991-93 figures are actual, with 1992 serving as the milestone baseline; 1994, 1995, and 2005 figures are projected.*

***Federal Reviewers:***
*Please provide other related agency targets*

**MILESTONE**

**2**

# *By 2005,*

**more than 99 percent of new chemicals approved since 1995 will have been used safely and will not require additional controls.**

The review process for new chemicals helps ensure their safety before they are introduced into the marketplace, where they could harm workers, the general public, or the environment. The process, which is similar to the Food and Drug Administration's review of new drugs, prevents pollution in two ways. First, the review of about 10 to 15 percent of all new chemicals submitted by industry results in controls on their use, withdrawal, or suspension of production pending testing. Industry and EPA work cooperatively on many of the issues encountered in this process.

Second, the evaluation of new chemicals aids market forces in determining which chemicals are best for various applications, taking into account cost, risk, hazard, ease of disposal, and other factors. In this way, older chemicals, many of which either have not been reviewed for toxicity or have known hazardous properties, can be supplanted by newer, safer replacements. Some of the submissions are for genetically engineered microorganisms that are intended to replace conventional chemicals that present greater environmental and human health concerns. EPA's new chemicals program also reviews the safety of these microbial biotechnology products.

### *Past Trends and 2005 Target*

Approximately 2,000 new chemicals are submitted annually for EPA review. About half go into production. This milestone measures whether the estimated 10,000 additional new chemicals that will be introduced by 2005 will be safe for their intended uses. "Safety" will be judged by whether they later require additional controls on their production and use. The target is consistent with the record over the past 5 years of chemicals that have required additional controls after EPA's approval. Achieving the milestone means that no additional safety requirements will be needed for virtually all chemicals that EPA approves over the next 10 years.

### *Tracking Results*

Tracking will include the use of data on the frequency of additional controls placed on new chemicals after the initial EPA review. This effort will be supported by industry data on identification of any previously unknown adverse effects.

MILESTONE

3

# By 2005,

## the number of existing high-production-volume chemicals shown to be used safely will nearly triple.

***Federal Reviewers:***

*Please provide other related agency targets*

Certain chemicals pose the greatest risks to communities because of the large volumes in which they are produced and used. These "existing" high-priority, high-production-volume (HPV) chemicals were grandfathered into the Toxic Substances Control Act (TSCA) in 1979 without a requirement to show that the chemicals were safe. Because of a lack of sufficient resources in the past, basic toxicity information is lacking to gauge the health and environmental impacts of HPV chemicals. Thus, these chemicals pose a potential risk to public health. One of EPA's top priorities is to ensure that basic toxicity information is available so that these approximately 3,000 to 4,000 HPV chemicals are used safely. Achieving this milestone can reduce the risks presented by some of the most heavily used chemicals and will represent significant progress in reviewing chemicals for safe use by industry and consumers. (See also Safe Homes, Schools, and Workplaces, milestone 6.)

### *Past Trends and 2005 Target*

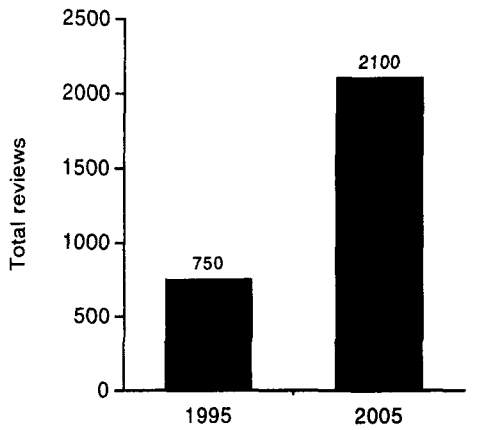
Over the last 5 years, safety reviews have been performed on about 750 HPV chemicals and risk management actions were taken where necessary. EPA's Toxics Agenda (in development) calls for an additional 1,350 safety reviews between now and 2005. Achievement of this milestone will nearly triple the number of safety reviews for HPV chemicals to 2,100.

### *Tracking Results*

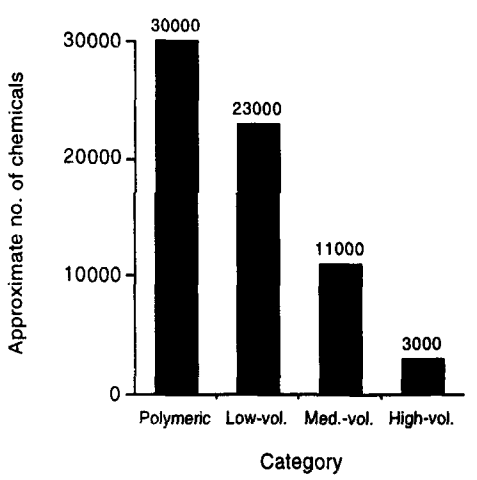
Achievement of this milestone will be measured by the numbers of assessments and risk management actions taken for high-volume toxic substances over the next 10 years.

The TSCA existing chemicals program has information systems for tracking both past and ongoing chemical reviews. These data systems will allow EPA to develop statistical summaries and thereby judge program effectiveness. EPA will track this milestone by using data on EPA actions such as dissemination of information about existing chemicals, voluntary agreements, and other nonregulatory or regulatory actions.

**M.3a—Number of high-production-volume chemicals reviewed and found to be used safely.**




**M.3b—Production of chemicals in TSCA chemical inventory.**




*Polymers present little health risk. Low-volume chemicals are produced at less than 10,000 pounds per year or are no longer produced. Intermediate-volume chemicals are produced at volumes of 10,000 to 1 million pounds per year. High-volume chemicals are produced at greater than 1 million pounds per year.*

***Federal Reviewers:***
*Please provide other related agency targets*

MILESTONE
**4**

# *By 2005,*

**municipal solid waste will be recovered for recycling or composting at a rate of 35 percent. Municipal solid waste generation will be reduced to the 1990 level of 4.3 pounds per person per day, with the amount of waste combusted or landfilled decreasing to 2.8 pounds per person per day.**

**RELATED FEDERAL TARGETS**

Dept. of Health and Human Services
*Healthy People 2000*

[By 2000,] reduce human exposure to solid waste-related water, air, and soil contamination, as measured by a reduction in average pounds of municipal solid waste produced per person each day to no more than 4.3 pounds before recovery and 3.2 pounds after recovery. (Baseline: 4.0 pounds per person each day in 1988)

[By 2000,] Establish curbside recycling programs that serve at least 50 percent of the U.S. population and continue to increase household hazardous waste collection programs [1,529 programs in 2000]. (Baseline 1988: 26% served by curbside recycling; 802 hazardous waste collection programs)

**RELATED FEDERAL TARGET**

President Clinton's Climate Change Action Plan

EPA has a target of increasing recycling to 30 percent in the year 2000. Recycling decreases the emission of greenhouse gases, such as methane from landfills. This target is part of the U.S. commitment made at the Earth Summit in Rio de Janeiro, Brazil, to reduce greenhouse gas emissions.

Additional EPA climate change commitments involving waste management include reducing the amount of waste generated in the United States. EPA will foster waste prevention practices in businesses (e.g., using lightweight packaging, reusing pallets), backyard composting, unit-based waste management fees, and other efforts that contribute to a reduction in per capita MSW generation rates.

Management of municipal solid waste (MSW) poses a challenge to the development of sustainable communities. Source reduction of municipal solid waste and recycling reduce air, water, and soil pollution and conserve energy and natural resources. Slowing the growth of MSW generation through source reduction and increased recycling is important from the perspective of climate change as well (see box).[3] Source reduction and recycling also prevent pollution from extraction and processing of raw materials, manufacturing, transportation, and waste management. One recycling option, composting, provides the added benefits of soil restoration, reduced need for fertilizers and pesticides, erosion control, storm runoff control, and bioremediation of soils contaminated with toxic organics and heavy metals.

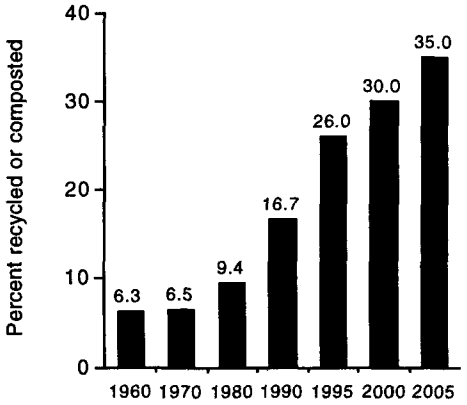
### *Past Trends and 2005 Target*

Targets for this milestone build on President Clinton's Climate Change Action Plan (see box). EPA expects that the nation can achieve 35 percent recycling by 2005. Per capita waste generation has been increasing by almost 20 percent per decade since 1960, when it was estimated to be 2.67 pounds per person per day. EPA's target for 2005 is to reduce per capita MSW generation to the 1990 level of 4.3 pounds per day, with the amount of per capita MSW combusted or landfilled decreasing to 2.8 pounds per person per day (as compared to 3.6 pounds per person per day in 1990).

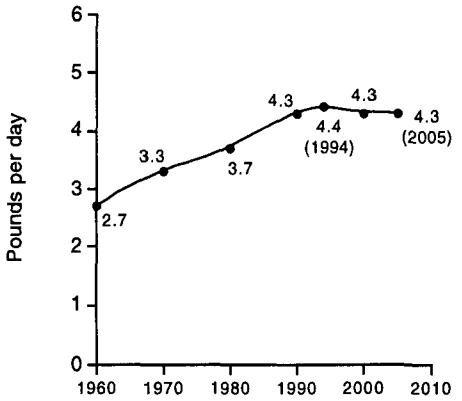
### *Tracking Results*

EPA's report, *Characterization of Municipal Solid Waste in the United States*, will provide data on municipal solid waste generation, recovery, and discards annually.

**M.4a—Percent of municipal solid waste recycled or composted, 1960-2005.**




**M.4b—Per capita generation of municipal solid waste, 1960-2005.**



***Federal Reviewers:***
*Please provide other related agency targets*

**MILESTONE**
**5**

# *By 2005,*

**the presence of the most persistent, bioaccumulative, and toxic constituents in hazardous waste will be reduced by 50 percent from 1991 levels.**

Hazardous waste can be acutely or chronically dangerous to people and other living things if managed improperly. It can be toxic, corrosive, ignitable, or reactive. "Persistent" refers to some chemical constituents of waste, such as certain metals and chlorinated organics, that generally do not break down into other substances once released into the environment. "Bioaccumulative" refers to substances that tend to concentrate in the tissues of plants and animals and then can be passed on to humans. "Toxic" refers to substances that have the potential to harm the environment or adversely impact human health (e.g., reproductive or mutagenic health effects, cancer). Long-term exposure to even small doses of toxic constituents can be harmful to many different types of living things.

## *Past Trends and 2005 Target*

The Waste Minimization National Plan, released in November 1994, outlines EPA's major goals, objectives, and action items to pave the way toward national reductions in the generation of hazardous waste. Because the persistent, bioaccumulative, and toxic constituents in waste are of great concern, regardless of how they are managed, EPA has set a target of a 50 percent reduction in the amount of each of these constituents in waste by 2005. The 50 percent target was established based on estimates of an ambitious, but attainable, reduction. EPA's Waste Minimization National Plan also establishes an interim target of a 25 percent reduction by the year 2000.

## *Tracking Results*

EPA is constructing a baseline for tracking the results, generally using 1991 data where available. The Agency is selecting data sources that already exist for the 1991 baseline. EPA is currently developing a list of the most persistent, bioaccumulative, and toxic chemicals, which is scheduled to be available by spring 1997. For monitoring progress toward the 2000 interim target and the 2005 milestone, EPA is identifying future data sources and data collection instruments through the Waste Information Needs (WIN) Initiative.

## Strategy

Achieving the goal of toxic-free communities requires a broad strategy that addresses not only pollution reduction technology, but also social and economic factors. As more Americans understand the costs of waste and toxic substances, in terms of both the economy and the environment, individuals and industries will adjust their ways of doing business.

The overarching principles guiding the strategy for toxic-free communities are contained in the pollution prevention hierarchy (see box in "The Challenge" section). The strategy has several interrelated focal points:

- Reviewing new and existing chemicals.
- Using market forces.
- Promoting stewardship and partnership.

### Costs

In a 1990 report, *Environmental Investments: The Cost of a Clean Environment*, EPA estimated that the annual public and private costs of meeting toxic chemical control standards (but excluding municipal solid waste management and recycling costs) were approximately $600 million in 1990 and would rise to $1.2 billion by 2000 to fully meet standards expected to be in place by then (constant 1986 dollars). Achievement of the proposed milestones might require implementation of some programs not anticipated when these estimates were prepared, which would add to the costs. Over the next few years, the costs and benefits associated with toxics reduction programs will be more fully assessed.

### *Chemical Review*

An important component of the strategy is EPA's chemical review program, which is designed to make sure that new chemicals are safe before they are introduced into the marketplace and that chemicals already in use are safe.

EPA is taking a two-pronged approach to help ensure community safety. First, all new industrial chemicals proposed by manufacturers are reviewed for their impacts on human health and the environment. If their effects are considered serious, EPA will not allow production. If, however, the health effects of a chemical's intended use are of low concern or if the chemical can be made safe by appropriate handling, production is allowed. Requirements for special precautions are frequently written into agreements with chemical manufacturers.

Second, EPA reviews risks posed by the plethora of "existing chemicals" already in commerce. The safe use of chemicals already in use in the United States requires that toxicity information be collected, critical exposures assessed, and appropriate controls put in place. This is being accomplished using a combination of voluntary industry actions, information dissemination, and federal, state, and local controls. EPA, in conjunction with other government agencies, industry, unions, and environmental partners, will develop an agenda that uses risk evaluation as its main criterion for decision making on chemicals. To develop its risk-based agenda, EPA will focus on high-volume chemicals because high production volume indicates greater exposure potential. In selecting 1,350 priority chemicals, EPA will use factors including relative toxicity, exposure, use patterns, and environmental persistence.

Progress toward the long-term goal will also be made though industry's voluntary risk-reduction, product stewardship programs such as the "responsible care" program of the Chemical Manufacturers Association, which is designed to improve the safety of chemicals in commerce.

### *Market Forces*

Because recycling and reducing waste often save money, businesses and consumers are quick to adopt such practices when they are available. Industry has developed many cost-effective methods to reduce the amount of waste generated or the amount that must be disposed of, stored, and treated.

Individuals, institutions, and private companies have tremendous potential to leverage their purchasing power toward products and services that pose fewer environmental problems. Although consumers have begun to consider environmental impacts when

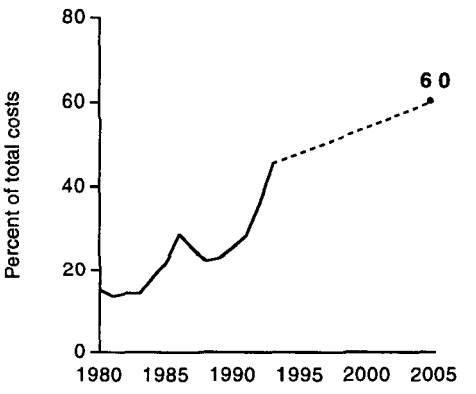
making purchasing decisions and there are a number of private sector environmental certification (eco-labeling) programs, significant changes in consumer buying patterns are not yet visible.

A number of forces, however, are beginning to increase consumer awareness of the environmental impacts of products and the important role that consumers can play in bringing environmental improvement. First, a recent study shows that although manufacturers have reduced emissions, those reductions have been offset by increases in the toxic components in finished products.[6] Second, a variety of new national environmental labeling programs have begun. Both of these trends may result in heightened consumer awareness of the environmental impacts of products and who is responsible for them—not just during processing, manufacturing, and distribution but during use and ultimate disposal as well.

Over the next 10 years, EPA expects that virtually every product and service will be redesigned by American businesses, which will increase opportunities to produce and purchase environmentally preferable products. Environmentally preferable products are those which have few unnecessary inputs of chemicals and natural resources, require less energy to produce and use, are safer to produce and use, have a long product life, and are more easily recycled or reused.

**By 2005, capital investments in prevention technologies will grow from 45 percent in 1992 to 60 percent of environmental investments.** This action is taking place as industry transforms pollution control from primarily end-of-pipe technologies to in-process pollution prevention. In the early 1980s, only 15 percent of capital budgets spent on pollution abatement was for prevention. In recent years, the proportion of expenditures for pollution prevention has increased significantly to approximately 45 percent (see Fig. 1).

**Fig. 1—Capital expenditures on in-process controls as percentage of total pollution abatement capital costs.**




**By 2005, 10 percent of consumer purchases (both public and private) will be for environmentally preferable products and services.** The federal government has the potential to create demand for "green" products and thereby jump-start public and private markets for such products. The federal government is increasing its own purchases of environmentally preferable products, with a target of 25 percent by 2005. President Clinton's 1993 Executive Order on Federal Acquisition, Recycling and Waste Prevention requires executive agencies to purchase "environmentally preferable" products and services. The primary goal of this Executive Order is to use some of the government's purchasing power—over $200 billion annually—to improve environmental quality.

Market share devoted to environmentally preferable products can provide impetus for investment, which, in turn, can make such products more competitive in the private marketplace. EPA has taken the first step by issuing guidelines for government purchases of products with recycled content. Currently, EPA is developing guidance to help government agencies purchase products with multiple environmental attributes. The guidance takes a product life-cycle perspective in determining the environmental preferability of products and services.

Eventually, EPA will expand its efforts to the general consumer marketplace, identifying education and technical assistance needs and the best ways to help consumers incorporate environmental considerations into their purchasing decisions.

### *Stewardship and Partnership*

A "next generation" of EPA's voluntary industrial pollution reduction program—the 33/50 Program—will help to achieve the milestone of 25 percent reduction in industrial toxic wastes. The original 33/50 program achieved its goals of reducing 1.5 billion

**Design for the Environment: Partnerships for a Cleaner Future**

Businesses operating in the 1990s and early 21st century face the competing demands of keeping costs low and quality high, staying competitive in a global market, and meeting consumer preferences for more environmentally benign products.

Design for the Environment (DfE) is a down-to-earth strategy for organizing and managing these challenging demands. Businesses design for the environment by implementing pollution prevention, energy efficiency, and other resource conservation measures; producing and using less toxic and nontoxic materials; making products that can be refurbished, disassembled, and recycled; and keeping careful track of the environmental costs associated with each product or process.

DfE helps businesses incorporate environmental considerations into the design and redesign of products, processes, and technical and management systems. The program creates voluntary partnerships with industry, professional organizations, state and local governments, other federal agencies, and the public. EPA provides businesses with the information and assessment tools they need to design for the environment and helps them use this information to make informed choices. Within each business, the DfE program works to make sure the information reaches the people who make the choices—from buyers to industrial design engineers.

pounds of pollution by 33 percent by 1992 and 50 percent by 1995 on a voluntary basis.

Companies participating in the 33/50 program cut emissions at nearly three times the rate of other TRI reporters. They often developed new products and services using less harmful materials, and they reengineered production processes to be more efficient and produce less waste.

Assistance and incentives will encourage industry to make more voluntary commitments to waste reduction goals. For example, EPA is working with hundreds of major businesses throughout the country in voluntary efforts to reduce municipal solid waste through the WasteWi$e program. WasteWi$e partners commit to actions of their choice to reduce, recycle, and buy recycled; in turn, EPA provides technical assistance and recognition to participants. In the first year, member corporations prevented 242,000 tons of waste.

Similarly, in the hazardous waste area, EPA and the states are focusing on reducing the amount and toxicity of the hazardous waste generated, particularly when such reductions lead to benefits in more than one environmental medium (air, water, or soil). EPA will meet these goals through a variety of voluntary programs and possibly regulatory programs. Federal and state governments will aid industry by providing information, establishing networks for information sharing, and providing tools to help industry set its own hazardous waste reduction priorities.

**Voluntary Programs**

EPA is encouraging innovative and flexible approaches to achieve better environmental results—tapping the creativity of industry, states, and local communities to increase protection for all Americans. With Project XL—eXcellence and Leadership—EPA offers businesses, states, and communities this challenge: If you can achieve greater environmental results, EPA will provide flexibility and cut red tape so that you can find the cheapest and most efficient way to do it.

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### *Text Notes*

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2. National Research Council. 1984. *Toxicity Testing: Strategies to Determine Needs and Priorities.* Washington, DC: National Academy Press.

3. 1993. *The Climate Change Action Plan.* Washington, DC: The White House.
4. USEPA. 1996. *Characterization of Municipal Solid Waste in the United States: 1995 Update.* EPA/530-R-96-001. Washington, DC: U.S. Environmental Protection Agency.
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6. Inform, Inc. 1995. *Toxics Watch.* New York, NY: Inform, Inc.

### *Milestone Data Sources*

M.1 USEPA. 1995. Toxics Release Inventory public data release. Washington, DC: U.S. Environmental Protection Agency.
M.3a EPA staff projections, Office of Prevention, Pesticides, and Toxic Substances.
M.3b U.S. Congress, Office of Technology Assessment. 1995. *Screening and Testing Chemicals in Commerce* (OTA-BP-ENV-166). Washington, DC: Office of Technology Assessment.
M.4a USEPA. 1996. *Characterization of Municipal Solid Waste in the United States: 1995 Update.* EPA/530-R-96-001. Washington, DC: U.S. Environmental Protection Agency.
M.4b Ibid.
M.5 USEPA. 1994. *The Waste Minimization National Plan.* EPA 530-R-94-045. Washington, DC: U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response.

# 8. Preventing Accidental Releases

*Long-Range Goal*

**Accidental releases of substances that endanger our communities and the natural environment will be reduced to as near zero as possible. Those which do occur will cause only negligible harm to people, animals, and plants.**

## The Challenge

Oil, chemicals, and radioactive materials are an integral part of modern life and major factors in our global economy. Accidental releases of these substances, however, can be very harmful to both human health and the environment. Many catastrophic accidents have released these substances, resulting in deaths, disruption of lives through injury and evacuation, widespread environmental damage, and destruction of valuable property. The 1984 chemical release in Bhopal, India, killed 3,000 people and injured more than 100,000 others. The Chernobyl disaster spread radioactive material over much of the Ukraine and northern Europe. Oil spills, such as the *Exxon Valdez* disaster, have damaged large ecosystems and affected the livelihoods of many people. Damage estimates for the *Exxon Valdez* incident alone are reported to be more than $2 billion.[1]

Although the United States has avoided a chemical catastrophe on the scale of Bhopal, more than 5,000 chemical accidents are reported each year to the National Response Center and EPA regional offices. Oil spills are even more common; more than 15,000 are reported yearly. Radiological accidents, though not nearly as common as other hazardous releases, can be just as devastating because of the serious health effects associated with radiation overexposure.

In the past, accidental releases were considered unavoidable. Government and industry focused their attention primarily on responding to them. Public concern about damages caused by accidental releases faded as time passed, until the next release or spill occurred. Catastrophic accidents, however, have changed attitudes on the part of government, industry, and the public. These groups now realize that environmental damage caused by major accidents can be long-term and, in some cases, irreversible. It is clear that such accidents often are avoidable and must be prevented. The challenge is to advance effective accident prevention efforts by all levels of government and the private sector.

## Responsibilities

Many federal, state, and local government and nongovernmental organizations play important roles in both lessening the effects of releases and preventing spills and accidents. On the federal level, multiple agencies, operating under different statutory authorities, are involved in coordinating accident prevention, mitigation, and response. Accident prevention regulations are developed to ensure transportation safety, worker safety, and

environmental and public safety. The U.S. Department of Transportation and its modal administrations, particularly the Research and Special Programs Administration and the U.S. Coast Guard, control transportation of hazardous materials. The Occupational Safety and Health Administration (OSHA) addresses worker protection. EPA addresses environmental and public health issues related to accidental releases under various statutes including the Clean Air Act; the Clean Water Act; the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); and the Emergency Planning and Community Right-to-Know Act. EPA's most recent regulations, under the Clean Air Act, require each regulated facility to submit a Risk Management Plan that summarizes hazards at the facility and describes the prevention and emergency response programs (see box, page 109).

The federal government also provides leadership and assistance to state and local governments and industry in their efforts to prevent and respond to accidental releases. The federal government champions efforts to reduce risk by providing tools to states and Local Emergency Planning Committees (LEPCs) to help them more effectively use the information on chemical hazards and risks available. The government reviews the trends and provides regulations and guidance to promote public safety, health, and protection of the environment.

To assist state and local governments in responding to emergencies that exceed their capabilities, three primary federal contingency plans have been developed:

- The National Contingency Plan is designed to address hazardous substance and oil pollution incidents. The National Response Team, made up of 15 federal agencies and departments, coordinates the plan.
- The Federal Radiological Emergency Response Plan, for which there are 17 signatory agencies, addresses significant radiological emergencies.
- The Federal Response Plan was developed for any type of catastrophe; 27 agencies make up the Catastrophe Disaster Response Group.

EPA and the U.S. Coast Guard cochair the National Response Team, and EPA is a primary agency for the other two federal contingency plans. In addition, federal rules issued under at least 10 statutes require industry and state and local agencies to develop contingency plans. In this capacity, one of EPA's top priorities is working with individuals and teams from local, state, and federal agencies to ensure that the actions they take are complementary and not duplicative.

Industry, professional and trade associations, interest groups, and the public also have important responsibilities in preventing, preparing for, and responding to oil spills and chemical and radiological accidents. Industry must acknowledge a general duty to prevent releases of oil, chemicals, and radiological substances, and must make information on risks and hazards available in a form that is understandable to the public. Professional and trade associations should direct their talents to encourage prevention by grappling with common problems, promoting innovative approaches to risk management, and supporting research. Environmental and labor groups should help their constituencies communicate with industry and government to promote a safer environment. The public must use the information available to make informed judgments and must work with local industries to find solutions that protect human health and make economic sense.

### Coordinated Planning Reduces Future Risks from Floods

After the Midwest floods of 1993, EPA took action to help prevent and prepare for environmental and health consequences from accidental releases in future floods. In addition, the Agency organized a committee to address issues and problems that arose during the floods. The committee, which included representatives from a number of federal agencies, met from February to April 1994. The committee addressed problems associated with assessing damage to water and wastewater facilities, conducting water quality monitoring, and measuring contamination of private wells during and after a major flooding event. In addition, public outreach, federal/state relationships, interagency planning issues, and the distribution of supplemental disaster funds to states were top priorities. The group identified activities that could help resolve these issues to better prepare for future floods, such as clear identification of tanks and drums and their contents.

The EPA regional office in Kansas City developed a training/outreach program, in cooperation with state and local organizations, to inform owners and operators of hazardous materials facilities about release prevention measures.

**Superfund Amendments and Reauthorization Act, Title III**

In October 1986, the Superfund Amendments and Reauthorization Act, commonly known as SARA, was signed into federal law. An important part of SARA, whose main thrust is to identify and clean up waste sites that are potentially toxic, is known as Title III, The Emergency Planning and Community Right-to-Know Act.

Title III has two important provisions:

(1) It provides for emergency response planning to cope with the accidental release of toxic chemicals into the air, land, and water.

(2) The community right-to-know provisions of Title III will help to increase the public's knowledge and access to information on the presence of hazardous chemicals in their communities and releases of these chemicals into the environment.

## Environmental Milestones for 2005

Attainment of the long-range goal of fewer and less severe accidental releases requires a focus on both preventing accidents and improving mitigation and response measures. To guide these efforts, EPA proposes a set of milestones that reflect the Agency's priorities of first preventing accidents, and second, when the possibility of an accident cannot be eliminated, assisting the state and locality in improving response and minimizing damage.

Environmental milestone 1 sets a target for reducing the number of accidental releases of oil, chemicals, and radioactive substances. Environmental milestone 2 calls for a large increase in the number of facilities in densely populated areas that have reduced hazardous chemical inventories to minimum levels or have eliminated them to prevent accidents. The percentages in these milestones were selected based on trends in the number of petroleum releases after passage of the Oil Pollution Act of 1990 and EPA's best professional judgment. Achieving these milestones is dependent on a number of economic and societal factors. It will be necessary to make allowances for these other factors when progress is evaluated.

**Local Emergency Planning Committee**

Under Title III, a locality is required to organize a Local Emergency Planning Committee (LEPC) that is responsible for:

- Collecting information about hazardous materials.
- Developing and updating, on an annual basis, the Hazardous Materials Emergency Response Plan (HMERP).
- Providing information to the public about the use, storage, and manufacture of hazardous materials.

***Federal Reviewers:***
*Please provide other related agency targets*

**MILESTONE**

**1**

# *By 2005,*

**there will be 25 percent fewer accidental releases of oil, chemicals, and radioactive substances than in 1993.**

**RELATED FEDERAL TARGETS**

United States Coast Guard
*Performance Plan for Marine Safety, Security, and Environmental Protection*

**Goal:** [By 1998,] reduce the amount of oil and chemicals spilled into the water from maritime sources by 20%.
**Primary Measure:** Gallons of oil and chemicals discharged from maritime sources per million gallons of oil and chemicals shipped. (Baseline: 4.77 gallons spilled per 1 million gallons shipped in 1993.)
**Goal:** [By 1998,] reduce the total number of major and medium oil spills by 50%.
**Primary Measure:** Number of major and medium oil spills per billion tons shipped. (Baseline: 16 medium/major oil spills per 1 billion tons shipped.)

* The amount of oil and chemicals spilled from maritime sources decreased from 13.05 million gallons in 1989 to 1.95 million gallons in 1994. The total number of medium/major oil spills decreased from 32 in 1990 to 9 in 1994.

The majority of accidental releases occur on water (for oil) and land (hazardous substances) from a variety of refineries, production facilities, and transportation-related sources. The graphs below provide detail on the type and frequency of the different kinds of accidental releases.[2]

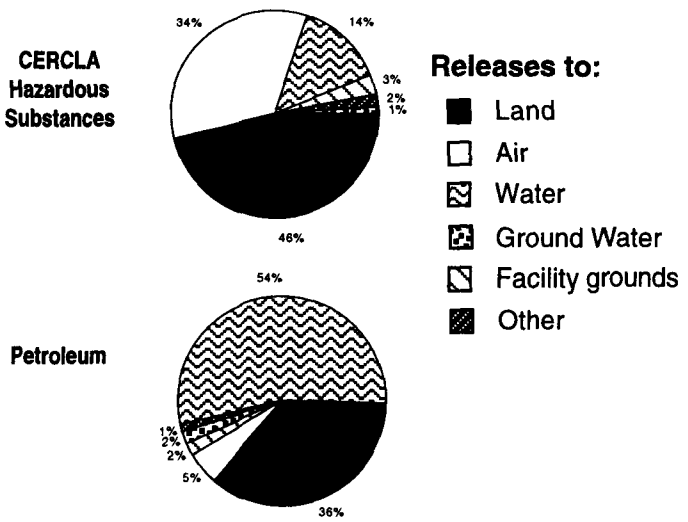
### *Past Trends and 2005 Target*

There have been few discernible trends in accidental releases. However, Coast Guard data on spills to maritime waters show that both the volume and total number of spills of oil and other chemicals have decreased in recent years. The number of other types of releases varies considerably from year to year. The 25 percent reduction target is based on best available general industry projections.

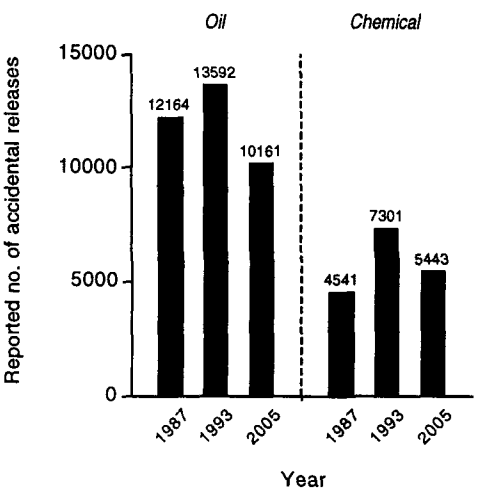
### *Tracking Results*

Progress will be tracked with data from EPA's Emergency Response Notification System, a computer database containing information on notifications of releases of oil and hazardous substances that have occurred throughout the United States. The sources of these data are private parties or various federal, state, or local response authorities.

**M.1a—Percentage breakdown of CERCLA hazardous substances and petroleum releases, 1994.**




**M.1b—Accidental releases of oil and hazardous substances.**



MILESTONE

2

# *By 2005,*

**there will be a 50 percent increase over 1993 levels in the number of *industrial facilities in high-risk areas* that have either eliminated hazardous substance inventories or reduced them to minimum levels.**

***Federal Reviewers:***

*Please provide other related agency targets*

A proposed baseline study of selected facilities will provide data on minimum levels and high-risk areas. The study will establish a system to examine the safe management programs and processes that facilities currently have in place and will track modifications after facilities have met Risk Management Plan requirements (see box at right).

### *Past Trends and 2005 Target*

No data exist on past trends. The target was set at 50 percent based on best available projections of economic information and industrial hazardous substance inventory information.

### *Tracking Results*

Data to track progress toward this milestone will be gathered in the baseline study from selected facilities reporting under EPA's Risk Management Plan Rule.

**Risk Management Plan Rule**

The Clean Air Act Amendments of 1990 included a section (112(r)(7)) designed to prevent accidental releases to the air by focusing on chemicals that pose the greatest risk to the public and the environment. To do this, EPA promulgated a list of regulated substances on January 31, 1994 (59 FR 4478). If a regulated substance is present at a stationary source in more than a threshold quantity, the owners or operators are required to prepare and implement a Risk Management Plan (RMP). An RMP includes a hazardous assessment, a prevention program, and an emergency response program. A hazardous assessment includes an assessment of a worst-case release and a 5-year accident history. The RMP must be registered with EPA and submitted to state and local authorities. The RMP must also be available to the public.

EPA is currently preparing a final rule for section 112(r)(7) regulations. Sources subject to these requirements must comply and submit an RMP within 3 years of the rule's effective date. EPA will also issue technical guidance and model risk management plans. EPA will prepare guidance for states and local planners on the use of the RMP information.

## Strategy

Accidental releases can be prevented through a variety of measures: well-designed facilities, maintenance, and training; public dialogue; and changes to equipment and processes, including substitution of less hazardous or nonhazardous chemicals. There are, however, formidable barriers to improved prevention efforts. These include an incomplete regulatory framework, inadequate public education and outreach, technology and equipment gaps, and a lack of accessible information. The strategies described below are designed to help overcome these barriers. Although this is not an exhaustive list, it represents important steps toward identifying key issues and stimulating progress toward achieving the milestones and, ultimately, the goal of preventing accidental releases.

**Costs**

In a 1990 report, *Environmental Investments: The Cost of a Clean Environment*, EPA estimated that the annual public and private costs of meeting "multimedia" pollution standards including, but not limited to, the cost of planning for emergency responses and providing information to communities on hazardous chemicals were approximately $1.6 billion in 1990 and would rise to $2.3 billion by 2000 to fully meet standards expected to be in place by then (constant 1986 dollars). Achievement of the proposed milestones might require implementation of some programs not anticipated when these estimates were prepared, which would add to the costs. Over the next few years, the costs and benefits associated with accident prevention programs will be more fully assessed.

### *Implementing Regulations*

EPA will complete the statutory, regulatory, and program implementation framework for industry to eliminate unintended releases and for states, tribes, and local governments to implement effective preparedness, prevention, and response programs. First, EPA will complete Clean Air Act regulations and guidance establishing risk management programs and risk management plans for facilities handling regulated substances. EPA will work with states and tribes to build strong local prevention programs. Over the next several years, the Agency will evaluate regulatory and nonregulatory programs that are in place and will identify and address gaps in chemical, oil, and radiological programs. EPA will assess the current status of accident response equipment at all levels and will demonstrate new technologies as they become available.

EPA, states, and tribes will continue to implement and enforce rules for the prevention of accidents. To stimulate industry to comply and to seek safety improvements, EPA will serve as facilitator, providing research support, acting as intermediary for information sharing, and bringing industry and the public together in a cooperative effort. Industry and labor must continue to work together to identify areas where safety improvements are possible. Professional organizations and academia will continue to work with industry on research for developing safer alternative processing technologies and possible chemical substitutions.

At present, there are no data on past trends for facilities in high-risk areas that have evaluated hazards and adopted approaches to ensure transportation safety, worker safety, and public and environmental safety. Nevertheless, EPA is proposing the following target: **By 2005, there will be a 30 percent increase in facilities in high-risk areas that have completed hazard evaluations and have adopted inherently safer approaches to managing chemicals.** This target is based on best available projections of economic and industrial use information. Data will be gathered in the baseline study from selected facilities reporting under EPA's Risk Management Plan Rule (see milestone 2), which will also be used to define "high-risk areas" and "inherently safer approaches."

EPA will also work with its state and tribal partners to develop voluntary compliance programs, and will help them develop monitoring systems to determine whether these programs are effective in preventing accidental releases. In cases where accidental releases have caused significant injury or have presented high risk for human health and the environment, EPA will assist them in taking legal actions.

### *Providing Education and Training*

EPA will educate industry, government agencies, labor, public interest groups, the general public, and the media about the risks associated with unintended releases of chemicals, oil, and radiological substances. An educated public is better prepared to discuss accident prevention issues at the local level and more likely to take voluntary actions, such as training, to prevent, prepare for, and respond to accidents.

- EPA will develop and implement a program for training national, regional, state, tribal, and local radiological emergency response planners on a protective action guidance for nuclear incidents.
- EPA will continue to build cooperative partnerships among industry, government, labor, academia, and the public to communicate clearly and persuasively the risks and hazards of spills and accidents and to train industry and community leaders in preventing, preparing for, and responding to incidents.
- By the year 2000, educational and training materials will have been prepared and an information clearinghouse established to promote and distribute these materials to community leaders, the media, and the public.
- By 2005, there will be fewer and less severe unintended releases because the public and community and industry leaders will be aware of the environmental and health risks associated with such releases. Educational and training programs and materials will be widely available and easily accessible.

### *Understanding Causes and Risks*

Working in partnership with industry, academia, other federal agencies, and professional organizations, EPA will develop a solid scientific understanding of the causes of unintended releases and the risks associated with them. Of particular interest is an understanding of interactions among chemical, oil, and radiological substances, and their risks to humans; the risk associated with unintended releases, especially the effects of newly introduced chemicals into the marketplace; and new communication technologies. EPA will also develop and promote the use of inherently safer technologies, technical tools, and approaches for preventing and responding to unintended releases of oil, chemicals, and radiological substances.

- By 2000, improved dispersion models, guidance, and other technical tools for predicting impact will be in use by relevant governmental agencies, industry, and the public.
- By 2000, EPA will develop incentives for continuous improvement in technologies and approaches.
- EPA will obtain, provide, improve, and use data to shape national policy on accident prevention and allow for the most appropriate, flexible, and cost-effective implementation of that policy.

### *Improving Information and Accountability*

EPA will assess the current status of accident data and their ability to fill the needs of environmental milestone 1 by 1997. EPA will clarify what is needed to provide sufficient data to describe the status quo and to track progress toward the long-range goal. EPA will identify short-term (generally cheaper and easier) modifications of the existing data systems, which can be accomplished by 1996-97, as well as more sweeping changes and improvements. Wider use of existing information should increase for stakeholders in accident prevention as well. For example, the Agency for Toxic Substance and Disease Registry (ATSDR) maintains an emergency event surveillance database that provides useful data on the nature and extent of emergency chemical releases.

- By 1998, EPA will design and implement a measurement system to track progress toward meeting the overall program goals. This system might include baseline

accident surveys, collection of other types of data, and other evaluation tools, either built entirely on existing systems or including new elements.

- EPA will work with other federal partners to streamline the Agency's and other federal agencies' data collection, distribution, and use practices aimed at improving the timeliness and utility of the data, and reducing data gaps and redundancies by 1999.

## References

### *Text Notes*

1. The National Response Team. 1989. *The Exxon Valdez Oil Spill, A Report to the President.*
2. The National Response Team. 1990. *Oil Spill Contingency Planning: National Status.*

### *Milestone Data Sources*

M.1a USEPA. 1994. Emergency Response Notification System. Washington, DC: U.S. Environmental Protection Agency.

M.1b Ibid.

# 9. Safe Waste Management

*Long-Range Goal*

**Wastes produced by every person, business, and unit of government in America will be stored, treated, and disposed of in ways that prevent harm to people and other living things.**

## The Challenge

Most industrial and commercial processes and many everyday activities produce wastes. Some of these wastes are classified as hazardous to human health and the environment. Depending on levels and routes of exposure, some hazardous wastes can damage the central nervous system, reproductive system, and major organs like the liver, lungs, kidneys, and heart. Industry can produce hazardous wastes as by-products of manufacturing processes or as commercial products, such as cleaning fluids, that become contaminated and are discarded. Radioactive wastes can be produced in nuclear power production, manufacturing, mining, medical practices, and research. Common household garbage, also referred to as municipal solid waste, is primarily nonhazardous, but it can contain wastes that spread disease or harm the environment. Additionally, this goal covers leakages of petroleum and other chemicals stored in underground tanks at gas stations and other businesses. If these tanks are substandard or improperly maintained, they can leak and contaminate ground water supplies.

Improper management of wastes can lead to fires, explosions, and contamination of the air, soil, and water, including ground water. Currently, there are several management techniques for wastes, including recycling, land disposal, and combustion. Different types of wastes require different means of treatment and disposal; what is suitable for one waste might not be suitable for another.

Over the past 15 years, enforcement of the Resource Conservation and Recovery Act (RCRA) has improved the management of hazardous and solid wastes and hazardous materials stored in underground tanks. There are now fewer fires and explosions and fewer toxic releases to air, land, and water. Workers and the public are less exposed to toxic constituents in the nation's wastes, which has reduced the risk of waste-related cancers and other health problems.

Recent management efforts have reduced the amount and toxicity of generated waste. Milestones for further reductions are included under the goal for toxic-free communities (Chapter 7). However, pollution prevention practices will not totally eliminate waste. The challenge is to manage the remaining household, commercial, and industrial wastes in cost-effective ways that are safe for both people and the environment.

## Responsibilities

Anyone who generates waste shares responsibility for ensuring that it is managed in ways that do not harm people or the environment. The federal government's role in

**Low- and High-Level Radioactive Wastes**

High-level wastes are liquid or solid radioactive wastes generated as a by-product of power generation from nuclear reactors. These wastes are a result of the processing of discharged spent fuel. They contain high-energy fission products, resulting in the need for heavy shielding to absorb the penetrating radiation.

Low-level wastes are radioactive wastes that are not classified as spent fuel, high-level waste, transuranic waste, or by-product materials such as uranium or thorium mill tailings. Typically, they are ordinary industrial or research wastes contaminated with radioactive material. Although termed "low-level wastes," some of them can pose the same handling and disposal hazards associated with the high-level and transuranic wastes.

ensuring safe waste management is to demonstrate leadership by establishing program direction, setting goals, and measuring success. A strong framework for safe waste management has been established by the Resource Conservation and Recovery Act, the Safe Drinking Water Act, and the Atomic Energy Act. These statutes outline the need for and scope of the federal role.

Enacted in 1976, RCRA establishes a federal leadership role in promoting the reduction of waste and unsalvageable materials and in providing for safe and economical solid and hazardous waste management practices. RCRA gives EPA the authority to draft regulations, set national policies, and provide guidance for regulated entities. Specifically, RCRA requires EPA to identify hazardous waste and establish standards that regulate handling, storage, treatment, and disposal. The Hazardous and Solid Waste Amendments (HSWA) of 1984 expanded RCRA's focus to include a greater number of regulated wastes, increased limitations on land disposal, and additional underground storage tank regulations. EPA, states, and tribes are responsible for implementing and enforcing RCRA requirements. EPA works closely with these partners—the primary implementers of the program under RCRA—to facilitate program development and implementation.

The Safe Drinking Water Act established the Underground Injection Control Program (UIC) to protect underground sources of drinking water from endangerment by the injection of fluids through wells. Among the higher-risk classes of wells regulated by EPA are shallow injection wells (Class V), which include industrial septic systems.

Under the Atomic Energy Act, the U.S. government has primary responsibility for ensuring safe management and disposal of highly radioactive wastes generated by nuclear power and the manufacture and development of nuclear weapons. EPA's primary responsibility is to develop standards to protect people and the environment from radioactive releases from waste management and disposal sites. The Low Level Waste Policy Act gives states responsibility for commercial low-level waste.

## Environmental Milestones for 2005

Ideally, EPA would like to measure progress in terms of the direct impact that waste programs have on emissions of contaminants into air, soil, and ground water. Such measurement should occur at all stages of waste management: at the point of generation and during transportation, storage, treatment, and disposal. Much of this information, however, is not collected on a national level, if at all.

EPA and the states have recently launched an effort to explore a broad range of waste-related information needs and technologies. The project will transform the existing processes for information collection and data management. Upon its completion, improved measurement of environmental progress will be possible.

Currently, several targets for safe waste management are for government actions, such as issuing permits or closing unsafe facilities, which are indirect measures of progress and appear in the Strategy section. They are not direct indicators of the health of people or the environment, but they do provide information on government efforts to improve waste management. Environmental milestones 1 through 5 are actual or surrogate estimates of pollutant reductions from waste facilities.

MILESTONE

1

# By 2005,

## chlorinated dioxin/furan emissions from waste-burning facilities will be reduced 98 percent from 1994 levels.

***Federal Reviewers:***

*Please provide other related agency targets*

Chlorinated dioxins and furans are toxic pollutants that are believed to cause cancer even in very small amounts. One way they are produced is the burning of substances that contain chlorine. Some of the highest emissions of these compounds come from facilities burning wastes.

### *Past Trends and 2005 Target*

Hazardous waste combustion facilities (incinerators and kilns used in manufacturing cement and other materials) emit dioxins and furans in small but toxic amounts. The earliest data submitted to EPA indicate that 937 grams of these compounds were emitted from hazardous waste combustors in 1991, and similar amounts have been emitted in subsequent years. EPA expects to achieve the 98 percent reduction target by means of implementation of new standards set in 1997. (Note that these figures are approximate and will be finalized later in 1996.)

Municipal waste incinerators burn garbage as fuel to generate steam and electricity. Because garbage contains small amounts of chlorine-containing chemicals, burning can produce dioxins and furans. EPA estimated in 1993 that 3,300 grams were emitted annually from municipal waste combustors. Reductions in emissions have occurred since 1993, and additional reductions are anticipated when EPA standards are fully implemented. By the year 2000, dioxin and furan emissions from municipal waste combustors will be less than 1 percent of the amount emitted in 1993.

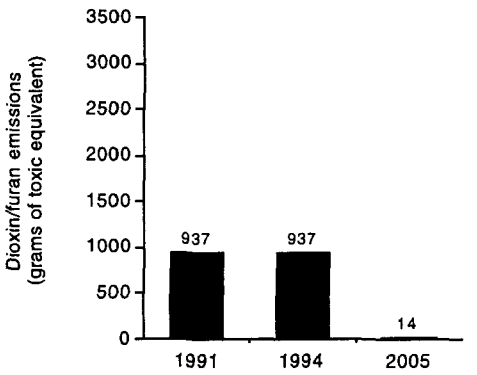
Medical waste incinerators also emit dioxins and furans. EPA is determining current emission levels and will set standards as necessary to reduce them.

### *Tracking Results*

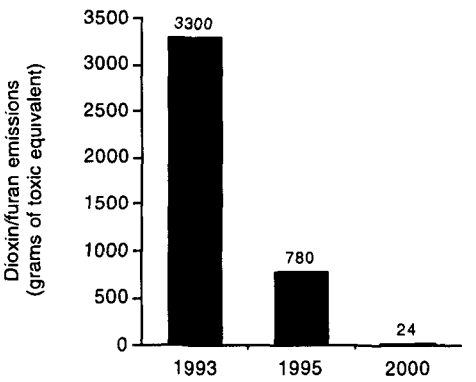
For hazardous waste combustors, EPA will track reduced emissions through facility reporting required as part of the emission standards that will be imposed in 1997. These requirements are likely to feature yearly, 3-year, and 5-year reporting frequencies depending on the size of the facility and its purpose in conducting emission testing. For municipal waste combustors, EPA will track results through required annual compliance testing and reporting.

**M.1—Dioxin/furan emissions from waste combustion facilities from 1991 through 2005.**

***a. Hazardous waste combustors***




***b. Municipal solid waste incinerators***




*The toxicity equivalency factor (TEQ) is used to express the relative toxicity of complex mixtures of chemicals such as chlorinated dioxins and furans.*

*Federal Reviewers:*
*Please provide other related agency targets*

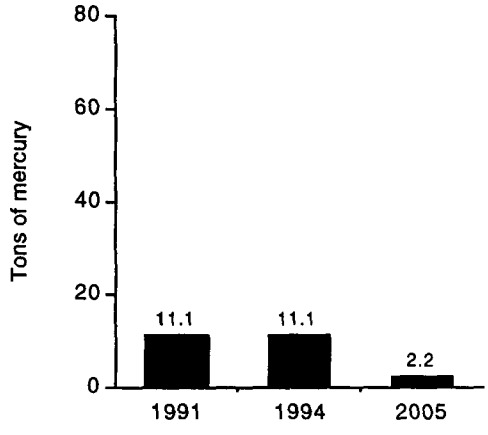
MILESTONE
2

# *By 2005,*

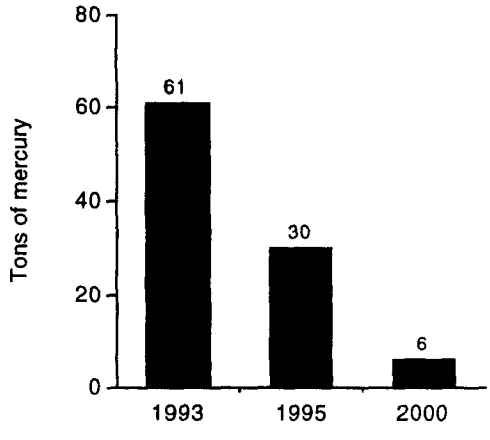
**emissions of mercury and other harmful pollutants from waste-burning facilities will be reduced by at least 80 percent from 1994 levels.**

**M.2—Mercury emissions from waste combustion facilities from 1991 through 2005.**

***a. Hazardous waste combustors***




***b. Municipal solid waste incinerators***




Mercury is a toxic metal that can damage the human central nervous system, kidneys, and lungs in adults, children, and fetuses. Mercury is widespread and persistent in the environment. Once in water or sediments, it can accumulate in increasing amounts up the food chain. Eating fish containing mercury is the main route of exposure. The combustion of wastes, fossil fuels (especially coal), and some raw materials used in industrial processes (e.g., in cement kilns) is an important source of mercury in the environment. (See also Reducing Global and Transboundary Environmental Risks.)

## *Past Trends and 2005 Target*

EPA estimates that more than 11 tons of mercury is emitted each year from hazardous waste incinerators and kilns manufacturing cement and other materials. EPA intends to achieve at least an 80 percent reduction in emissions of heavy metals, such as mercury, and other harmful pollutants by means of standards set in 1997 for hazardous waste combustors. (Note that precise reduction calculations will not be available until the standards are finalized in 1997.)

Municipal waste combustors burn garbage to generate steam and electricity. EPA estimated in 1993 that mercury emissions from municipal solid waste incinerators were about 61 tons per year. Notable reductions in emissions have occurred since 1993, and additional reductions are anticipated when EPA standards are fully implemented. By 2000, mercury emissions from these sources will be reduced by more than 90 percent from 1993 levels. EPA expects to achieve similar reductions for other heavy metals.

Medical waste combustors also emit mercury and other harmful pollutants. EPA is determining current emission levels and will set standards as necessary to reduce emissions.

## *Tracking Results*

For hazardous waste combustors, EPA will track results through facility reporting requirements that will likely feature yearly, 3-year, and 5-year reporting frequencies depending on the size of the facility and its purpose in conducting emission testing. For municipal waste combustors, EPA will track results through required annual compliance testing and reporting.

MILESTONE

3

# *By 2005,*

**the annual number of confirmed releases from underground storage tanks will be 80 percent lower than in 1994.**

***Federal Reviewers:***

*Please provide other related agency targets*

Underground storage tanks are tanks that are located at least partially underground and designed to hold gasoline or other petroleum products or chemicals. (See also Restoration of Contaminated Sites, milestone 5.) The most common causes of petroleum or other chemical releases from underground storage tanks are tank corrosion, corroded or failed piping, spills, and overfills. Releases can lead to fires, explosions, seepage of toxic fumes into homes and businesses, and contamination of ground water, an important drinking water source for nearly half of all Americans. These releases contain substances that are harmful to human health and the environment, such as benzene, a known cancer-causing substance.

EPA regulations cover approximately 1.1 million underground storage tanks in use at over 400,000 facilities nationwide. Most of these storage tanks contain petroleum, and approximately 30,000 hold hazardous chemicals covered by EPA regulations.

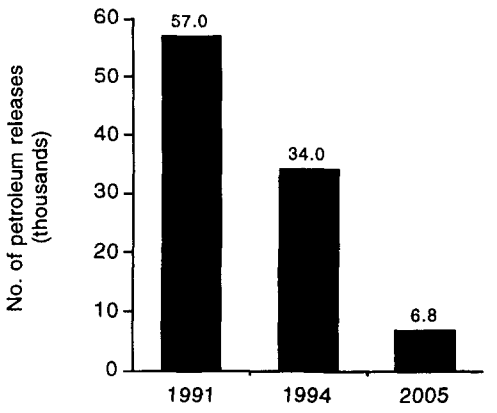
## *Past Trends and 2005 Target*

Over 300,000 releases from federally regulated underground storage tank systems have been confirmed. The graph shows annual releases from 1991 projected through 2005. Although this milestone is ambitious, it is achievable because of anticipated efforts to comply with EPA's 1998 deadline for upgrading or closing substandard systems. (The 1998 deadline will likely cause the rate of confirmed releases to rise temporarily as owners and operators discover additional contamination when closing or upgrading their tanks.) The requirements will ultimately prevent releases by eliminating substandard systems and improving tank management.

## *Tracking Results*

Progress will be tracked with semiannual reports from states to EPA. These reports include data on all confirmed releases from petroleum underground storage tanks, which constitute 97 percent of the federal regulated universe.

**M.3—Annual releases from underground storage tanks.**




*Improved tanks and piping will reduce releases of oil and chemicals from storage tanks.*

*Federal Reviewers:*
*Please provide other related agency targets*

MILESTONE
4

# *By 2005,*

**wellhead protection areas and vulnerable ground waters will no longer receive industrial wastewater discharges from septic systems.**

Septic systems discharge about 10 billion gallons of wastewater per year to the soil. EPA estimates that 10 percent of the wastewater contains toxic industrial wastes. These wastes pass through septic systems unchanged and eventually enter water table aquifers while still toxic.

EPA regulates septic systems used to dispose of industrial wastewater as Class V underground injection control wells. Ground water contamination associated with Class V injection wells has been documented by EPA as part of its strategy to reduce the risk of ground water contamination across the United States.

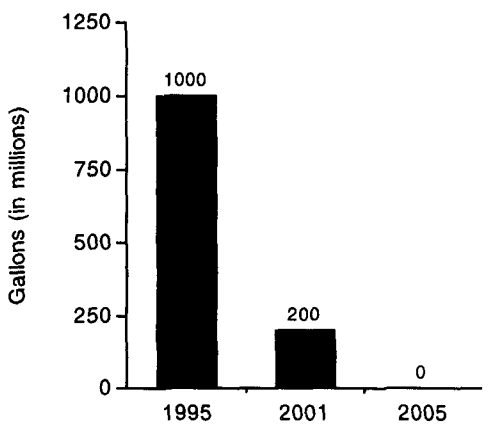
## *Past Trends and 2005 Target*

EPA will use 1995 as a baseline year to measure the effectiveness of its Class V management strategy.[1] EPA launched its strategy in mid-1995 and anticipates a modest reduction in the volume of toxic industrial wastes discharged from septic systems by 1997. By 2001, as this effort gains momentum and more Class V wells are closed, EPA expects to achieve an 80 percent reduction in the amount of toxic industrial wastes released through these wells. By 2005, if the Class V management strategy has fully succeeded, wellhead protection areas and vulnerable ground water resources will no longer receive industrial wastewater discharges from misused septic systems.

## *Tracking Results*

EPA will collect annual reports from state and EPA underground injection control programs that describe closures of industrial Class V wells. The volume of industrial wastewater no longer being injected as a result of well closure is based on the number of closures per year multiplied by the estimated number of gallons per well.

**Estimated volume of industrial wastewater discharged to the ground through septic systems.**



MILESTONE

5

# By 2005,

**10 percent of the amount of spent nuclear fuel, high-level waste, and transuranic radioactive waste currently stored across the nation will be disposed of in accordance with EPA disposal standards.**

***Federal Reviewers:***

*Please provide other related agency targets*

Nuclear power generation, some kinds of mining, and various processes in industry, defense, medicine, and scientific research produce radioactive waste. Gaseous, liquid, or solid radioactive waste can remain hazardous for hours, months, or hundreds of thousands of years, and its level of radioactivity can vary widely. These properties make it difficult to find disposal facilities that protect public health and safety as well as the air, soil, and water.

Radioactive waste has been disposed of at numerous sites around the nation, sometimes without proper consideration of the full environmental impact of the disposal method or waste form. Some waste, particularly spent nuclear fuel, remains stored at the generating facilities, awaiting the development of acceptable disposal facilities.

**What Is Transuranic Waste?**

Transuranic (TRU) waste is a class of radioactive waste that contains elements with atomic weights greater than 92 (excluding high-level waste). Most of this waste is generated during the manufacture of nuclear weapons. Most TRU waste does not emit high levels of penetrating radiation but poses a danger when small particles that emit radiation are inhaled or ingested, causing damage to internal organs. By keeping this type of TRU waste enclosed and contained, risks associated with handling, transport, and disposal are minimized. Some TRU wastes do emit high levels of penetrating radiation; they require protective shielding.

## *Past Trends and 2005 Target*

Low-level, high-level, and transuranic (TRU) wastes have been generated since the 1940s. Spent nuclear fuel from commercial nuclear reactors has been and is now generated and stored at the generation site until it can be disposed of in a suitable geologic repository. The reprocessing of the Department of Energy's (DOE's) spent nuclear fuel has yielded the volumes of high-level waste in the United States. Additionally, much of the radioactive waste has been a by-product of the nuclear weapons industry. By 1991, over 4.76 million cubic meters of radioactive waste under the purview of the Atomic Energy Act had accumulated, including a total of 658,000 cubic meters of spent nuclear fuel, high-level waste, and TRU waste, and waste volumes continue to increase as some facilities continue to operate and others are cleaned up.

Nine major DOE and commercial low-level waste disposal sites are operating in the United States. There are no operating disposal sites for TRU waste, high-level waste, and spent nuclear fuel. In the coming decades, the need for disposal sites will continue as nuclear weapons facilities are retired and cleaned up.

EPA is addressing the more serious concerns of disposing of the spent nuclear fuel, high-level waste, and TRU waste by developing standards for their disposal. By 2005, roughly 25 percent of all TRU waste generated since 1970 will be disposed of in the Waste Isolation Pilot Plant near Carlsbad, New Mexico, under the purview of EPA regulations (provided the facility can meet EPA-promulgated standards by DOE's 1997 certification deadline). This amount is equivalent to 10 percent of the total amount of TRU waste plus spent nuclear fuel plus high-level waste. The development of regulations or guidance for other types of wastes will facilitate the disposal of additional radioactive wastes.

## *Tracking Results*

Progress in the amount of waste disposed of in accordance with EPA standards and regulations will be measured against a baseline report developed annually by DOE.[2] The report describes radioactive wastes produced in both the government and commercial sectors.

## Strategy

EPA will continue to build state, tribal, and local government capacity to implement current safe waste management programs and will establish additional federal requirements where they are needed to protect human health and the environment. New standards will ultimately be adopted by the states and tribes.

EPA will work with its government partners to develop ways to assess the effectiveness of their permitting and inspection programs. The Agency will help them establish and evaluate compliance assistance programs and will assist them by taking enforcement action against noncompliers.

EPA is working hard with its partners and stakeholders to improve other elements of programs under the Resource Conservation and Recovery Act. For example, EPA recently revised regulations so that the public is able to provide earlier and better input to the permitting process for hazardous waste facilities. EPA and states also are working to focus RCRA on higher-risk wastes to improve the efficiency and cost-effectiveness of the overall RCRA program. EPA will continue to work with all stakeholders to develop flexible, cost-effective ways to achieve the nation's safe waste management goal.

**Costs**

In a 1990 report, *Environmental Investments: The Cost of a Clean Environment*, EPA estimated that the annual public and private costs of meeting safe waste management and underground storage tank standards were approximately $25 billion in 1990 and would rise to $38 billion by 2000 to fully meet standards expected to be in place by then (constant 1986 dollars). Achievement of the proposed milestones might require implementation of some programs not anticipated when these estimates were prepared, which would add to the costs. Over the next few years, the costs and benefits associated with safe waste management programs will be more fully assessed.

### *Municipal Solid Waste*

States are the primary implementers of municipal solid waste landfill permit programs. **By 2005, 100 percent of states will operate viable permit programs to ensure that municipal solid waste landfills have controls to prevent dangerous releases to soil and ground water.** EPA will continue to help states attain program approval. Those with EPA-approved programs have the authority to provide flexibility in meeting or exceeding minimum federal requirements for design and operation, location standards, ground water monitoring, corrective action, financial assurance, closure, and post-closure care. This framework ensures that national standards for environmental protection are met while applying local solutions that are flexible, reasonable, and cost-effective. EPA also is considering various environmentally sound, cost-effective solutions to the unique problems facing certain small landfills.

### *Hazardous Waste*

The hazardous waste program also is implemented primarily by authorized states. EPA is proposing to authorize tribes as well. EPA will work with states and tribes to help them become fully authorized. An owner and operator of a facility that treats, stores, or disposes of hazardous waste must obtain a permit to operate or to care for units that close with hazardous waste on the premises. **By 2005, 100 percent of existing hazardous waste facilities will have approved controls in place to prevent releases of harmful pollutants to soil and ground water.** Permits include a variety of conditions for the safe design, operation, and performance of the facility, including waste sampling and analysis, ground water monitoring, corrective action, and financial responsibility. EPA is supporting several efforts to streamline the permitting process by providing more cost-effective approaches. EPA also is working with its partners to reduce reporting and record-keeping burdens. For example, the Agency is considering electronic data exchange and periodic surveys rather than annual reports.

Hazardous waste placed on the land must first be treated to substantially diminish its toxicity or reduce the likelihood that hazardous constituents will leak into soil and ground water. Several different treatment techniques are available, depending on the hazards

associated with a particular type of waste: neutralization, which decreases the acidity or alkalinity of a substance; solidification or stabilization, which removes water from a waste or changes it chemically so that it is less likely to be washed away; biological treatment, which uses microorganisms to break down organic compounds; and incineration. The treatment standards are based on the performance of the best demonstrated available technology for treating each type of hazardous waste.

To eliminate the need for treatment and to reduce the risks associated with hazardous waste, the Agency is supporting the 1990 Pollution Prevention Act's emphasis on source reduction. EPA issued the Waste Minimization National Plan in 1994, which outlines goals, objectives, and action items to pave the way toward a national reduction in the generation of hazardous waste. The plan also establishes a flexible framework for states and generators of hazardous waste to set their own goals and targets, to track their own progress, and to achieve success in the most common-sense, cost-effective ways.

### *Underground Storage Tanks*

EPA requires that by December 1998 underground storage tank systems must be either properly closed or equipped with corrosion protection and spill/overfill devices. This requirement ultimately will eliminate substandard systems and improve tank management. Although most facilities will meet the 1998 deadline, a small number of additional substandard underground storage tanks will probably be discovered each year. (Sixty percent of the 2.1 million underground storage tanks known since 1988 already have been replaced, upgraded, or closed.) **By 2005, 95 percent of known active underground storage tank systems will have been replaced, upgraded, or closed.**

The overall strategy for underground storage tank systems focuses on creating conditions under which good management of UST systems is common business practice. Good tank management includes prevention of releases. EPA plans to continue to fulfill its commitment to work with states to encourage and enforce compliance with the 1998 UST requirements. EPA will encourage other public and private organizations to take over its role in providing education about the value of good tank management as a means of curtailing environmental and human health risks. The Agency also will work with the regulated community to develop messages and compliance options targeted to specific segments of the universe of UST owners and operators.

### *Underground Injection*

EPA will work with government and industry partners and stakeholders to carry out a strategy for the comprehensive management of Class V (shallow) wells to reduce the potential for ground water contamination. They will be managed so that the highest-risk wells in the most sensitive areas are addressed first. The strategy will:

- Encourage states to use current authority to address Class V wells.
- Reach operators of Class V wells through outreach, education, and technical assistance.
- Enlist the support of local governments and citizen groups to foster effective management.

The strategy relies more on voluntary compliance initiatives and less on regulation, penalties, and other traditional approaches to permitting and enforcement. Because of the vast number of shallow wastewater disposal wells, reliance on traditional enforcement and compliance methods alone is not feasible.

### *Radioactive Wastes*

EPA has developed generic standards for the handling and disposal of four types of radioactive waste: (1) uranium and thorium mill tailings, (2) spent nuclear fuel, (3) high-level waste, and (4) TRU waste. Development of appropriate (site-specific) standards or criteria for these wastes will provide improved guidance for waste disposal. Recent

improvements in modeling methods for evaluating exposure from disposal of radioactive wastes should facilitate compliance with disposal standards, although standard development for many wastes is still under way.

**By 2005, a regulatory framework that addresses all three of the major radioactive waste categories under the purview of the Atomic Energy Act—high-level wastes, TRU wastes, and low-level wastes—will be in place.** Guidance might also be developed for Naturally Occurring and Accelerator Produced Radioactive Material (NORM/NARM) and recycled material.

## References

### *Text Notes*


1. As laid out in proposed Class V rule (*Federal Register*, August 28, 1995, Vol. 60: 44652).
2. DOE. 1992. Integrated Database for 1991: United States Spent Fuel and Radioactive Waste Inventories, Projections, and Characteristics. DOE/RW-006. Washington, DC: Department of Energy.


### *Milestone Data Sources*


M.1a USEPA. 1996. *Proposed Rule: Revised Technical Standards for Hazardous Waste Combustion.* Washington, DC: U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response.

M.1b USEPA. 1995. *Final Rule: Standards of Performance for New Stationary Sources and Emission Guidelines for Existing Sources—Municipal Waste Combustors.* Washington, DC: U.S. Environmental Protection Agency, Office of Air and Radiation.

M.2a USEPA. 1996. *Proposed Rule: Revised Technical Standards for Hazardous Waste Combustion.* Washington, DC: U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response.

M.2b USEPA. 1995. *Final Rule: Standards of Performance for New Stationary Sources and Emission Guidelines for Existing Sources—Municipal Waste Combustors.* Washington, DC: U.S. Environmental Protection Agency, Office of Air and Radiation.

M.3 USEPA. 1994. Administrator's database. Washington, DC: U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response.

M.4 USEPA. 1994. *Class V Injection Well Regulatory Impact Analysis and Regulatory Flexibility Analysis.* Final draft. Washington, DC: U.S. Environmental Protection Agency, Office of Ground Water and Drinking Water.

M.5 DOE. 1992. Integrated Database for 1991: United States Spent Fuel and Radioactive Waste Inventories, Projections, and Characteristics. DOE/RW-006. Washington, DC: Department of Energy.

# 10. Restoration of Contaminated Sites

*Long-Range Goal*

**Places in America currently contaminated by hazardous or radioactive materials will not endanger public health or the natural environment and will be restored to uses desired by surrounding communities.**

## The Challenge

Parts of America's land surface are severely contaminated by industrial wastes. The two general categories of contamination at these sites are hazardous wastes and radioactive wastes. Hazardous wastes are by-products of societal activities that are potential hazards to human health and the environment when improperly managed. They usually are ignitable, corrosive, reactive, or toxic. Hazardous wastes typically found at contaminated sites include industrial chemicals and petroleum by-products. Radioactive wastes can be produced in nuclear power production, manufacturing, mining, medical practices, and research. Radioactive wastes are often highly toxic and contain radionuclides that can persist in the environment for thousands of years.

Improper disposal of these wastes can endanger both human health and the environment. A common result of improper hazardous waste disposal is the contamination of ground water, the source of drinking water for nearly half of all Americans. At some sites, toxic vapors from evaporating liquid wastes or from chemical reactions also contaminate the air. Some pollutants, such as metals and organic solvents, can damage vegetation, endanger wildlife, and harm the health of people who live in nearby communities. Toxic and hazardous substances deposited on land often are carried far from the sites by air, ground water, and surface water runoff into streams, lakes, and rivers and accumulate in the sediments beneath those waters.

Today, one in four Americans lives within 4 miles of a Superfund site. Over 90 percent of these sites pose a threat to the surrounding population or to sensitive environments. Various studies by the U.S. Department of Health and Human Services, Agency for Toxic Substance and Disease Registry (see box) clearly demonstrate that hazardous and radioactive waste sites pose a threat to public health. People are being exposed to hazardous and radioactive waste, resulting in health problems such as respiratory illnesses, cancers and immune system effects, birth defects and reproductive disorders, and neurologic problems.

**Agency for Toxic Substance and Disease Registry (ATSDR)**

ATSDR conducts health assessments at all sites proposed for the Superfund National Priorities List (NPL) and health studies at those sites when needed, investigates complaints of illness or disease related to exposure to hazardous substances, develops appropriate biological testing for exposed persons, and establishes and maintains registries of exposed persons and hazardous substances. The Superfund law (CERCLA) requires ATSDR to perform a health assessment within one year from the date a site is proposed for the NPL. Through these activities, ATSDR supports EPA's mandate to better assess risk at Superfund sites by focusing resources on the most significant threats.[1]

- Testing of approximately 6,000 persons living near 10 abandoned hazardous waste sites shows an increased rate of abnormal blood cells that have been associated with chronic lymphocytic leukemia.
- Preliminary findings from a study of 700 persons exposed to volatile organic compounds in drinking water indicate an increased prevalence of lupus, a potentially debilitating disease.
- Preliminary findings from a study of children living near 700 abandoned hazardous waste sites in California indicate that women exposed to the solvents toluene and xylene were more than twice as likely to give birth to children with neural tube birth defects such as spina bifida and anencephaly.
- Preliminary findings from a California study show that the children of women living near sites contaminated with semivolatile organic chemicals, pesticides, and heavy metals have elevated rates of limb reduction defects, central nervous system defects, and heart defects.
- A study in Texarkana, Texas, has shown that women living near an abandoned wood treatment facility had more difficulty becoming pregnant and had fewer pregnancies than a comparison population.

Since the problem of contaminated sites in the United States is so large and varied, no one solution can be applied everywhere. Decisions about cleanup must be made with community, public health, and environmental concerns in mind. At present, not every site can be cleaned up to a level that allows people to reside there safely. EPA works with nearby communities to determine how best to use the land after cleanup. In some cases an industrial park or factory might be a reasonable use; in other cases a wildlife refuge might be the best alternative. The Agency takes into account the cost of restoration and the desires of the community and then, with protection of public health and the environment as the paramount concern, determines how best to restore the land.

The challenge to achieve this goal centers on protecting public health and the environment by applying the fastest, most effective cleanup methods while involving affected communities in the restoration decision-making process. The restoration challenge addresses abandoned hazardous waste sites, contaminated federal facilities, active industrial facilities, underground storage tanks, contaminated radioactive sites, and contaminated sediments.

### National Priorities List

The National Priorities List (NPL) is a published list of hazardous waste sites that are eligible for extensive, long-term cleanup action under the Superfund program. EPA developed a Hazard Ranking System (HRS), which ranks sites based on the potential danger they pose to people and the environment. Sites that score high enough on the HRS are eligible for the NPL. Sites are then published in the *Federal Register* for public comment.

### The *Brownfields* Challenge: Removing Barriers to Reusing Sites

The change in industrial technology and world economy over the last two decades has left many cities with abandoned industrial buildings and hazardous waste sites inside their city limits. Fear of contamination by hazardous wastes and its associated liability sometimes prevents the sale of these sites or the lending of capital to renovate and reuse them. *Brownfields* is a program developed by EPA to help remove these barriers and facilitate the productive economic reuse of old industrial sites.

In the spring of 1995, public meetings to gain input from residents and political leaders were held across the nation. Although some people had reservations about reusing these sites, citizens were generally pleased with the idea of removing barriers to allow local communities to use them for industrial and economic development.

Dozens of sites have been nominated for participation in the Brownfields program in cities such as Sacramento, Trenton, Detroit, New Orleans, and St. Louis. This is the first step in a program designed to cover a total of 50 cities over the next few years.

## Responsibilities

Before passage of the major environmental laws affecting waste disposal and the restoration of contaminated sites, business and industry disposed of hazardous waste in ways that are unacceptable today. Now, several laws govern proper disposal of waste and the cleanup of contaminated sites. Other federal agencies, industry, states, and communities work with EPA to clean up the legacy of past contamination and to protect against future contamination.

To address past contamination and respond to concerns about health and environmental risks, Congress passed the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) in 1980. CERCLA established the Superfund program to regulate and fund the cleanup of abandoned or inactive hazardous waste sites. EPA is responsible for implementing this program with assistance from other federal, state, and local entities. Under Superfund, those sites with the highest potential to pose risks to human health and the environment are placed on the National Priorities List (NPL) and considered eligible for federal remedial action (cleanup). EPA is developing standardized remedies, known as *presumptive remedies*, for certain types of sites based on scientific and engineering analyses performed at similar Superfund sites. The use of presumptive remedies enables EPA to apply lessons learned at past sites to limit study costs and speed cleanups at similar sites.

To address past contamination specifically at federal facilities, Congress enacted the 1992 Community Environmental Response Facilitation Act (CERFA) and the 1992 Federal Facility Compliance Act (FFCA). CERFA expedites military base closure and reuse by requiring the identification and documentation of uncontaminated real property at closing or realigning installations. FFCA mandates federal agency compliance with both state and federal hazardous waste laws and requires the Department of Energy (DOE) to inventory and develop treatment plans for mixed waste (a combination of radioactive and otherwise hazardous wastes) generated by the facilities it operates.

To address the proper management of wastes once they have been generated, Congress passed the Resource Conservation and Recovery Act (RCRA) in 1976. RCRA gives EPA the responsibility of regulating the management of hazardous wastes from cradle to grave. (See Safe Waste Management.) Under Subtitle I of RCRA, enacted in 1988, EPA established the underground storage tank program. State, tribes, and local governments take the lead in implementing underground storage requirements, which include both leak prevention and cleanup.

In 1984, RCRA's scope was expanded through the Hazardous and Solid Waste Amendments (HSWA) to set more stringent hazardous waste management requirements. HSWA also called for the comprehensive cleanup of all hazardous waste management facilities regulated by RCRA. RCRA's corrective action program oversees this comprehensive cleanup.

To clean up contaminated radioactive sites, several agencies have important responsibilities. The Nuclear Regulatory Commission (NRC) or states with authority under the Atomic Energy Act (Agreement States) license sites and develop Site Decommissioning Management Plans for facilities ceasing operation. Licensees include nuclear power plants, universities, medical institutions, and industry. The NRC and Agreement States oversee cleanup activities. EPA is developing uniform national cleanup standards that will expedite the cleanup process. (See "Strategy" section for Radiation Cleanup Rule.)

**Formerly Utilized Sites Remedial Action Program (FUSRAP)**

The U.S. Department of Energy (DOE) is conducting remediation activities at 46 sites where the federal government contracted with private firms to process or perform research on radioactive materials. These sites are being addressed under DOE's Formerly Utilized Sites Remedial Action Program (FUSRAP). As of March 1996, cleanup had been completed at 21 of the 46 sites. The remaining FUSRAP sites are planned to be completed by 2016. DOE estimated the timing and budget for cleanup of its radioactively contaminated sites in its March 1995 *Baseline Environmental Management Report.*

**Uranium Mill Tailings Radiation Control Act**

The U.S. Department of Energy has responsibility for carrying out the Uranium Mill Tailings Radiation Control Act, which requires disposal, or stabilization and control, of uranium mill tailings at 24 sites in a safe and environmentally sound manner. As of September 1993, cleanup activities had been completed at 16 of the 24 sites (except for residual ground water contamination). As of September 1996, only four remaining sites required cleanup, and those will be completed by September 1998.

The Department of Energy has additional responsibility for the cleanup of radioactive waste. A large portion of DOE's cleanup activities are focused on nuclear weapons complex facilities like the Hanford, Washington, site. DOE is also cleaning up many smaller sites that were contaminated during private sector support of DOE programs (see box at left). In addition, DOE is responsible for carrying out national mandates such as the Uranium Mill Tailings Radiation Control Act (see box at left).

## Environmental Milestones for 2005

The overall goal of EPA's cleanup programs is to protect human health and the environment through fast and effective cleanup of priority sites and releases, while maximizing the participation of responsible parties and other stakeholders in cleanup efforts. EPA has undertaken a major effort to develop measures of progress using risk reduction as the primary indicator of improvement. The Agency is employing cutting-edge statistical and scientific methods to determine objective ways to measure risk reduction. Risk reduction is a decrease in the measurable chance that damage to life, health, property, or the environment will occur. In the future, EPA might be able to say with certainty that the chances of a person near a contaminated site contracting cancer or another serious illness were reduced by some percentage as a result of specific actions.

Although these new risk-based measures are just beginning to come into general use at EPA, revision and refinement will occur before they are officially adopted as a means of quantifying improvement at a restored site. Until then, more general, but objective measures of progress, such as number of cleanup actions taken, will be used to measure program progress. The following milestones reflect the best available indicator data for assessing progress in restoring contaminated lands. Targets for 2005 are based on the current universe of sites and reflect recent EPA program trends and EPA administrative reforms.

**Fast Action Prevents More Contamination**

Frontier Chemical in Niagara Falls, New York, was an abandoned commercial hazardous waste treatment, storage, and disposal facility. After several hazardous substance releases, in December 1992 the New York State Department of Environmental Conservation requested that EPA stabilize the site, restrict access, and reactivate utilities. EPA found more than 4,100 drums, 366,000 gallons of hazardous wastes, and two laboratories containing more than 6,000 pounds of laboratory chemicals. Most of the facility was in a general state of disrepair. EPA stabilized the facility, preventing the release of hazardous substances into the environment. EPA identified more than 430 potentially responsible parties who, on September 30, 1993, entered into an Administrative Order on Consent with EPA to remove the drums and lab chemicals. Cleanup work was completed in May 1995. EPA has also identified approximately 1,500 potentially responsible parties for the tank removal and decontamination phase of the project.

MILESTONE

1

# By 2005,

**long-term health threats will be eliminated and cleanup will be completed at 95 percent of the 1,212 non-federal facility contaminated sites on the 1995 Superfund National Priorities List.**

***Federal Reviewers:***
*Please provide other related agency targets*

Abandoned hazardous waste sites are numerous and pose significant threats to the public. Since 1980, EPA has identified more than 40,000 potential hazardous waste sites. Of these 40,000 sites, EPA has determined that 24,000 do not currently warrant further Superfund involvement and is removing them from the inventory. EPA expects that more than 800 sites will be added to the inventory each year. Of these potential sites, there are currently 1,212 non-federal facility sites on the 1995 National Priorities List (see milestone 3 for federal facility sites). Cleanup completion of these sites is defined as when all necessary physical construction is completed, when the site is deleted from the National Priorities List, or when response actions, which are the agreed-upon site remedies, do not involve construction. Cleanup completion allows communities to put Superfund sites to productive use.

## Past Trends and 2005 Target

In the first decade of the Superfund program, cleanup was completed at 63 sites. In recent years, the pace of cleanup has accelerated. Between 1993 and 1995, EPA completed 197 cleanups—more than were completed in the first decade of the program. Recent administrative reforms, including streamlined cleanup techniques, presumptive remedies, and other reforms, are expected to further accelerate the cleanup rate.

By 2005, nearly all nonfederal facility sites on the NPL (95 percent) will have cleanup completed. The remaining sites (5 percent) will require extensive long-term cleanup due to the complexity of contamination. The 2005 target reflects the fact that sites that have been in the cleanup phase for years are now reaching the end of the cleanup process.

The target assumes increased federal funding for Superfund, consistent with the President's August 1996 proposal for accelerating toxic waste cleanups in our communities.

## Tracking Results

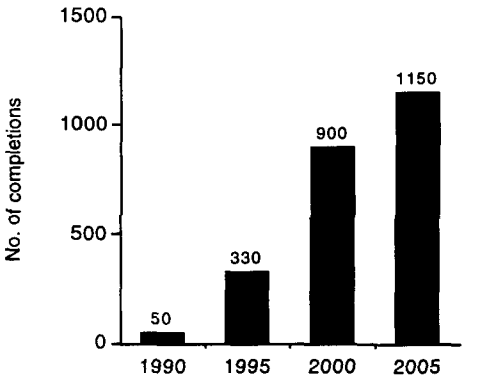
The Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) will provide data to track progress on hazardous waste cleanup. CERCLIS data include the results of investigations to determine whether a site should be placed on the NPL.

**RELATED FEDERAL TARGETS**

Dept. of Health and Human Services
*Healthy People 2000*

[By 2000,] eliminate significant health risks from National Priorities List hazardous waste sites as measured by performance of cleanup at these sites sufficient to eliminate immediate and significant health threats as specified in health assessments completed at all sites. (Baseline: 1,082 sites were on the list in March 1990; of these, health assessments have been conducted for approximately 1,000.)

**M.1—Construction completions at Superfund National Priorities List sites.**



***Federal Reviewers:***
*Please provide other related agency targets*

**MILESTONE**
**2**

# *By 2005,*

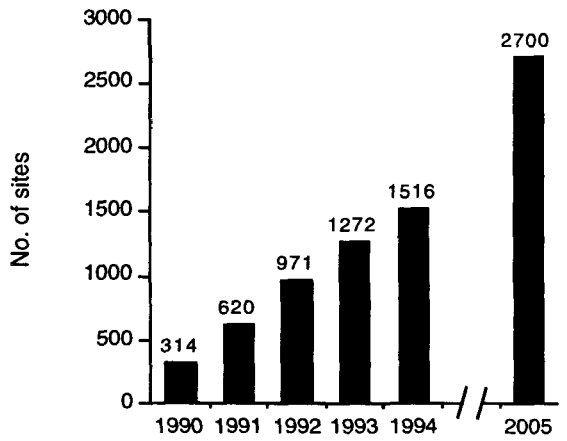
**immediate health threats will be eliminated and long-term cleanup will be under way at 85 percent of the estimated 3,200 Superfund sites (NPL and non-NPL) expected to require cleanup.**

**RELATED FEDERAL TARGETS**

Dept. of Health and Human Services
*Healthy People 2000*

[By 2000,] eliminate significant health risks from National Priorities List hazardous waste sites as measured by performance of cleanup at these sites sufficient to eliminate immediate and significant health threats as specified in health assessments completed at all sites. (Baseline: 1,082 sites were on the list in March 1990; of these, health assessments have been conducted for approximately 1,000).

**M.2—Cumulative number of Superfund sites (NPL and non-NPL) with removal actions completed.**




Removal actions at both NPL and non-NPL sites are fast ways to reduce the greatest risks to people and the environment. These actions include supplying alternative drinking water, removing leaking barrels or tanks, and containing the spread of wastes. Remedial actions (taken at NPL sites only) are the long-term cleanups required at severely contaminated sites. This milestone sets a target for EPA to carry out both removal and remedial cleanup actions at 85 percent of the sites requiring cleanup under Superfund. The estimated 3,200 sites expected to require cleanup between 1995 and 2005 include the 412 sites on the current NPL where construction is not yet complete, the 300 sites that EPA estimates will be added to the NPL between 1995 and 2005, and the estimated 2,500 NPL and non-NPL sites on which removal actions will have been completed but further cleanup might still be required.

### *Past Trends and 2005 Target*

During the initial stages of the Superfund program, cleanup action at many contaminated sites was too slow. EPA is now implementing Superfund reform initiatives that are resulting in faster, fairer, more efficient contaminated site cleanups.[2] By September 1995, more than 230 billion gallons of ground water, 1 billion gallons of liquid waste, and 1.6 billion gallons of surface water had been treated by the Superfund program. In addition, more than 64 million cubic yards of solid waste, 53 million cubic yards of soil, and 10 million cubic yards of sediment had been treated.

The 85 percent target indicates the positive results EPA expects from the Superfund Reform initiatives. The 2005 target means that at 85 percent of 3,200 sites, immediate threats requiring removal actions will be eliminated and construction or other remedial action will be ongoing.

### *Tracking Results*

CERCLIS will provide data to track progress. CERCLIS data include the results of investigations to determine whether a site should be placed on the NPL.

MILESTONE

3

# *By 2005,*

## at least 10 percent of contaminated federal lands currently on the National Priorities List will be cleaned up.

***Federal Reviewers:***

*Please provide other related agency targets*

Federal lands and facilities are among the sites contaminated by hazardous waste. Department of Defense military sites, in particular, have received a great deal of attention. Several of these sites are contaminated with chemical wastes such as fuels, solvents, and wastes from military equipment repair and servicing; unexploded ordnance; and wastes from munitions manufacture and testing. Department of Energy sites include many of these same types of materials plus high- and low-level radioactive wastes and mixed hazardous and radioactive wastes.

Cleaning up the nation's federal contaminated land is enormously time-consuming and costly. DOE's cleanup costs alone are estimated to range from $200 billion to $500 billion over the next 75 years. These figures do not include the cleanup of contaminated aquifers and restoration of ecosystems and watersheds damaged by DOE activities.

### *Past Trends and 2005 Target*

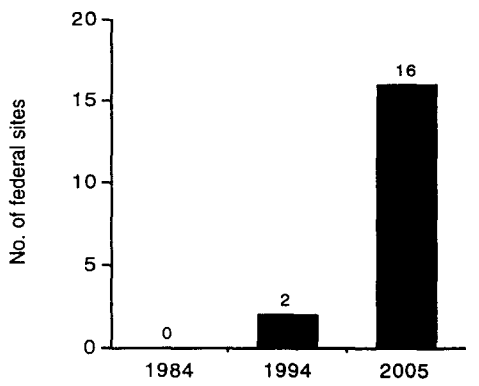
Currently, there are more than 160 federal facilities on the National Priorities List. Federal agencies estimate that there are over 100,000 contaminated sites on federal properties, but a complete inventory does not exist. The nature and types of contaminated sites on these facilities are generally more complex than private sites.

To date, only a handful of these sites have been addressed through remedial or removal action, mostly at DOE and DOD facilities. An accurate percentage of lands that have been cleaned up cannot be provided. The 10 percent cleanup target for facilities currently on the NPL has been established based on existing trends and projections of remedial action completions as recorded in CERCLIS.

### *Tracking Results*

Tracking will be based on final remedial action completions as recorded in CERCLIS. CERCLIS data include the results of investigations to determine whether a site should be placed on the NPL.

**M.3—Cleanup of contaminated federal lands.**



***Federal Reviewers:***
*Please provide other related agency targets*

**MILESTONE**
**4**

# *By 2005,*

**stabilization to prevent the spread of contamination will be under way or final cleanup completed at 100 percent of operating industrial waste facilities where people have been exposed to contamination. Seventy-five percent of all facilities estimated to require cleanup will be stabilized or cleaned up.**

Many industrial waste facilities pose a public health risk. These facilities contain unwanted materials produced in industrial operations, which may be categorized as liquid wastes, sludge, solid wastes, or hazardous wastes. EPA estimates that 4,000 facilities have contamination problems that will require some type of investigation, of which about 2,600 need remedial action. Regulated by the Resource Conservation and Recovery Act, Subtitle C, many of these facilities have ground water contamination that will continue to spread if they are not controlled. The most serious contamination problems occur when they contaminate public and private drinking water supplies and wetlands or other sensitive ecosystems. These situations are the highest priority for EPA.

### *Past Trends and 2005 Target*

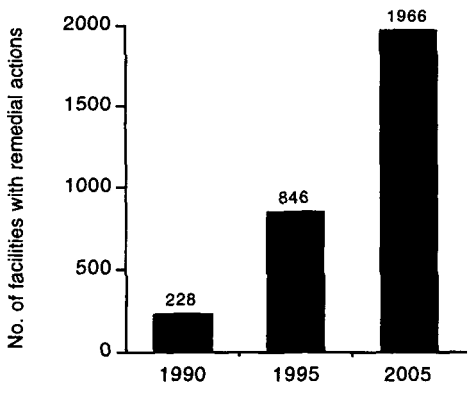
About 4,000 facilities are undergoing review or assessment with an eye toward determining any need for stabilization or cleanup. Stabilization includes isolation or containment of potentially hazardous materials and/or remediation.

Based on projections of current activity and schedules, by 2005, 75 percent of the 2,600 sites that need remedial action will be stabilized. This group of sites will include all of those with known potentially hazardous human exposures.

### *Tracking Results*

Data will be tracked using the Corrective Action Program Accomplishments Report from the Resource Conservation and Recovery Information System (RCRIS).[3] This system contains data tracked by EPA and states that manage the corrective action programs.

**M.4—Industrial facilities with remedial actions leading to stabilization and cleanup.**




*This strategy will ensure that actions will be implemented at 100 percent of all RCRA facilities where people have been exposed to contamination.*

MILESTONE

5

# *By 2005,*

## cleanups will be completed at 200,000 leaking underground storage tank sites—double the 1994 figure.

***Federal Reviewers:***

*Please provide other related agency targets*

Underground storage tanks (USTs) pose a significant threat to public health and the environment. The greatest hazard from a leaking UST is contamination of ground water, a source of drinking water for over half of all Americans. Leaking USTs present other health and environmental hazards, such as fires and explosions and seepage of toxic fumes into people's homes and businesses. More than 300,000 UST releases have been confirmed, and EPA estimates that the total could reach 400,000 in the next several years as more problem tanks are discovered. More than 100,000 cleanups had been completed as of fiscal year 1995. Currently, approximately 1.1 million federally regulated USTs are in use at about 400,000 sites nationwide.[4] (See also Safe Waste Management, milestone 3.)

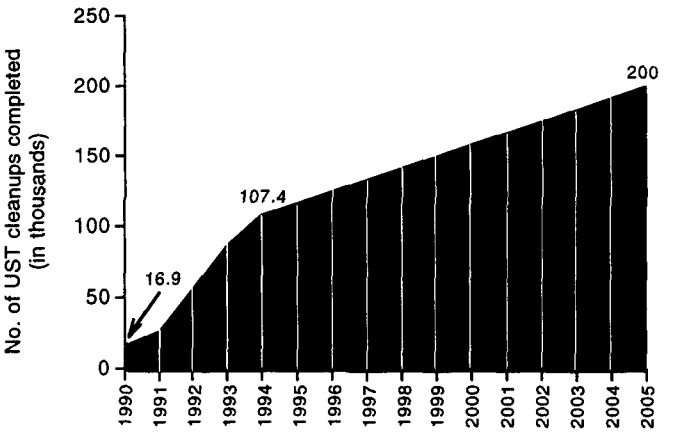
### *Past Trends and 2005 Target*

Doubling the number of cleanups completed by 2005 is an ambitious but achievable goal. According to federal law, by December 1998 all existing underground storage tanks must be upgraded or replaced to meet federal standards, or they must be closed. As owners and operators of storage tanks comply with the 1998 requirements, EPA and the states expect more leaks to be found. The expected increased number of leaks detected and the complexity of cleanups that remain will put a significant demand on state technical staff. By using risk-based decision making to direct cleanup activities, EPA believes 200,000 cleanups by 2005 is an attainable target.

### *Tracking Results*

Because states do much of the cleanup for USTs, results will be tracked through semi-annual progress reports submitted to EPA by states.

**M.5—Underground storage tank cleanups, 1990-2005.**



***Federal Reviewers:***
*Please provide other related agency targets*

**MILESTONE**
**6**

# *By 2005,*

**radioactivity will be cleaned up or contained at 6 percent of sites contaminated by radioactivity.**

Approximately 5,000 sites in the United States are contaminated with radioactive materials. They range from small, slightly contaminated rooms to very large, highly contaminated facilities. Some sites, such as nuclear material production plants and bombing and gunnery ranges contaminated with depleted uranium, are owned by the federal government, while others, such as hospitals and laboratories, are owned by the private sector.

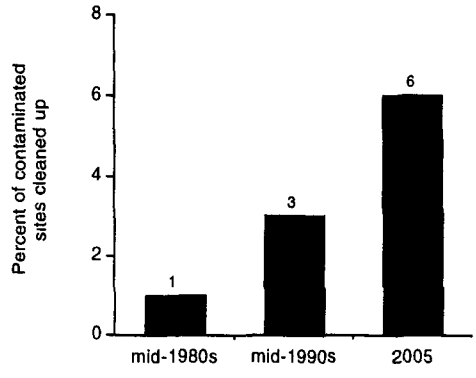
## *Past Trends and 2005 Target*

Cleanup of radioactive sites is slow. There are few cleanup technologies and limited places to store radioactive wastes. The 6 percent target is based on DOE, DOD, NRC, and EPA program schedules for cleanups. Approximately 317, or 6 percent, of the currently documented radioactive sites will be made available for restricted or unrestricted use by the year 2005. The majority of these sites will involve small-scale cleanups or decommissioning activities associated with licenses held by small or sealed radioactive source users.

## *Tracking Results*

Data to track progress toward this milestone will be collected from several federal agencies. Specifically, EPA maintains information on the status of CERCLA site cleanups under the CERCLIS database. DOE also maintains records of site cleanup activities under its Project Tracking System and Performance Measures Data Bases, and NRC and authorized states retain their own records on radioactive material licenses.

**M.6—Cleanup of radioactively contaminated sites.**



MILESTONE
7

# By 2005,

**point sources of contamination will be controlled in 10 percent of the watersheds where sediment contamination has currently been determined to be widespread.**

***Federal Reviewers:***
*Please provide other related agency targets*

Certain types of chemicals in water tend to bind to particles and collect in sediment. Chemicals often persist longer in sediment than in water because conditions might not favor natural degradation. When present at elevated concentrations in sediment, pollutants can be released back to water. Pollutants can also accumulate in bottom-dwelling organisms and in fish and shellfish (see Clean Waters) and move up the food chain. In both cases, excessive levels of chemicals in sediment might become hazardous to aquatic life and people and require cleanup or other remedial work as well as further controls on the sources of contamination.

EPA collects and analyzes sediment and fish tissue data from state, EPA region, and other monitoring programs as part of the National Sediment Inventory (NSI). The goals of the NSI are to survey data regarding sediment quality nationwide, identify locations that are potentially contaminated, and describe the sources of contaminants responsible for contamination.

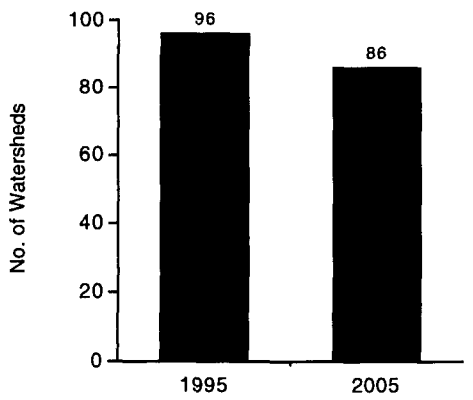
## Past Trends and 2005 Target

Until 1995, data on sediment contamination were not available on a national basis. Now environmental managers can use NSI data and assessments to determine the potential extent and severity of contamination and to identify areas that require closer inspection for further action.

Although the NSI currently has data representing over 20,000 locations, the data cover only 11 percent of the nation's waters. An evaluation of the available NSI data has identified 96 watersheds in the United States where sediment contamination is likely. There are 410 major facilities discharging sediment contaminants into these watersheds. EPA will continue to coordinate with the regional offices, states, and others to identify and compile additional data.

The 2005 target was chosen because each of EPA's 10 regions can reasonably be expected to evaluate and control point sources in at least one high-priority watershed by the year 2005. In many cases, controls on the contamination sources will allow clean sediment to "blanket" the contaminated sediment.

**M.7—Watersheds with high probability of widespread sediment contamination.**




*Watersheds where major facility discharge limits or monitoring requirements have not yet been evaluated and appropriately revised to protect sediment quality.*

## Tracking Results

EPA will report to Congress every 2 years on the condition of the nation's sediments. As the NSI grows to include information on more locations and future measurements, EPA and other stewards of environmental quality will gain a better idea of the full extent of contaminated sites. In time, NSI data and assessments will reveal trends and help measure progress in minimizing risk.

## Strategy

To achieve these milestones and to address the long-range goal of the restoration of contaminated sites, EPA will undertake a number of activities outlined below. Each of the following programs produces annual reports, strategic plans, and other documents that detail the specific actions taken to satisfy the legislative mandates to restore contaminated sites.

### *Superfund*

To facilitate fairer, faster, more efficient cleanups, EPA will continue to implement administrative reforms and to seek responsible reform of the Superfund law. EPA will take several actions under the Superfund program, including enforcement of the "polluter pays" principle and improvements in site assessment and remediation activities. Achieving milestones 1, 2, and 3 is contingent upon passage of a sound Superfund law that protects human health and the environment and compels responsible parties to pay for cleanup. The contribution of EPA's state partners in cleanups would supplement progress toward milestone 2 as more responsibilities are delegated to the states. In addition, EPA is working to improve coordination with its federal agency partners. An example is better integration of the Superfund program with ATSDR's public health assessments, which are more tailored to community needs.

**Costs**

In a 1990 report, *Environmental Investments: The Cost of a Clean Environment*, EPA estimated that the annual public and private costs of meeting Superfund requirements were approximately $1.7 billion in 1990 and would rise to $8.1 billion by 2000 to fully meet requirements expected to be in place by then (constant 1986 dollars). Achievement of the proposed milestones might require implementation of some programs not anticipated when these estimates were prepared, which would add to the costs. Over the next few years, the costs and benefits associated with cleanup programs will be more fully assessed.

*Polluter pays.* A key feature of hazardous site cleanup in the United States is that polluters themselves pay for site restoration rather than the public. At Superfund sites, "responsible parties" currently pay for more than 70 percent of the remedial work and approximately 20-25 percent of the removal work. EPA will seek to maintain the current level of cleanup by responsible parties, as well as promoting voluntary cleanup. EPA will also work with its state and tribal partners to take all necessary enforcement measures against responsible parties who fail to initiate cleanup activities in a timely manner. Such enforcement measures will ensure reimbursement of public funds expended for cleanup as much as possible. At the same time, EPA will continue to work to protect parties who have contributed insignificant amounts of waste to contaminated sites, and will take steps to reduce private sector transaction costs associated with site cleanup.

*Site assessment.* **By 2005, 99 percent of the universe of potential Superfund sites and 100 percent of all RCRA treatment, storage, and disposal facilities will have had an assessment decision made to determine whether the site will require federal action.** As of February 1996, 27,400 sites had been removed from the master list of potential Superfund sites after determination that they did not require action by the Superfund program. Approximately 12,800 potential sites remained on the master list. These sites are awaiting results of initial assessment of conditions and risks, which helps determine what types of programs or activities would best fit the cleanup needs at each site. EPA will make these decisions on virtually all the sites over the next 10 years. EPA will also make timely decisions on new sites as they are added to the master Superfund list over the next 10 years. To identify risks and to determine whether cleanup is necessary, initial assessments of all RCRA industrial waste facilities (approximately 5,000) must also be made. By the end of 1996, all RCRA treatment, storage, and disposal facilities will have been assessed and prioritized.

*Remediation.* Once a site has been added to the National Priorities List (NPL), remediation work toward cleanup begins. After conducting a detailed analysis of the

contaminants and alternative remedies, EPA publishes a Record of Decision outlining the action planned at the site. Remedial design and construction can then begin. As of June 14, 1996, EPA had completed construction at 355 NPL sites. Increased efforts by EPA, consistent with the President's proposal for accelerating toxic waste cleanups in our communities, are expected to increase this number to 900 by the year 2000. Construction is considered complete when the selected remedy is in full operation and its effectiveness has been tested. Because of the persistent nature of some types of hazardous waste, remedial actions can take years to adequately clean up a site. For example, a remedy to clean up ground water contamination can be expected to take more than 30 years to decontaminate the ground water adequately.

*Brownfields redevelopment.* The federal government's Brownfields initiative promotes local cleanup and reuse of contaminated and abandoned urban properties. The initiative began with the Brownfields Action Agenda in January 1995. In August 1996 the President announced new support for state and local efforts to revitalize brownfields, including expansion of EPA grants and support for revolving loans to finance cleanup efforts at the local level. HUD Economic Development Initiative grants will also be expanded to leverage private, state, and local funds for redeveloping the cleaned-up sites and to create jobs for the surrounding communities. EPA will launch new worker training initiatives for jobs in local remediation projects. These efforts will result in cleanup at approximately 5,000 sites by 2000. A proposed brownfields tax incentive will generate more than $10 billion in cleanup and redevelopment at 30,000 sites, including 17,000 sites by 2000. In addition to expanding local economies and improving quality of life in communities burdened by brownfields, the initiative will help preserve green open spaces by reducing the development of pristine or "greenfields" sites across America by an estimated 25 percent.

### Active Industrial Waste Facilities

EPA will focus on preventing or reducing human health risk and other detrimental impacts on ground water supplies, ecological systems, and property values at the worst industrial waste sites. In its RCRA program, the Agency is streamlining the corrective action process to conduct faster and more appropriate cleanups at the facilities of highest risk. In addition, more efficient, common-sense approaches are being adopted for handling the contaminated materials that must be removed or treated as part of cleanup activities.

### Underground Storage Tanks

EPA's UST program is encouraging scientifically sound, rapid, and cost-effective corrective action at leaking underground storage tank sites through the use of streamlined, risk-based processes, more effective technologies, and improved cross-program coordination. EPA will advance the goals for UST cleanups by working with state partners to ensure that the requirements for upgrading, replacing, or closing tanks are met. EPA will provide technical assistance and training to Native American tribes to build strong UST

**Radiation Cleanup Rule**

EPA will issue a Radiation Site Cleanup Rule in 1997 to set standards for the remediation of radioactively contaminated soil, water, and structures. Because currently there are no consistent nationwide standards for such cleanups, costly and time-consuming negotiations now precede each cleanup action. The EPA rule will allow release of sites for public use provided the overall protection standards for people and ground water supplies are satisfied. The rule does not require total cleanup, but only the level of cleanup required to allow public use. EPA, the NRC, and DOE worked in collaboration to develop this rule and to ensure consistency among federal agencies across the nation.

programs on tribal lands. The Agency will continue to develop private sector initiatives to ensure good tank management for the future (e.g., working with the banking, real estate, and insurance sectors). The Agency will also pilot private sector programs which will provide services to tank owners and operators (e.g., certifying inspectors to identify leaks or to ensure cleanups have been done properly).

### Contaminated Radioactive Sites

Of the approximately 5,000 sites in the United States identified by EPA that are contaminated with radioactive material, EPA manages cleanup for only the small number of radioactive sites addressed under CERCLA authority. EPA is developing site cleanup standards (see box on page 137) to help facilitate cleanups and to reduce the costs and delays associated with negotiated cleanup levels. The majority of contaminated sites, however, will be cleaned up under programs and schedules administered by DOE, DOD, NRC, and NRC Agreement States. Each of the agencies responsible for radioactive site management maintains its own site remediation schedules.

Many remediation projects at the larger, more contaminated sites managed by DOE, NRC, DOD, and EPA will be partially completed over the next 10 years. However, for many of these sites, particularly those with ground water contamination, remedial activities will continue well beyond 2005.

### Contaminated Sediments

EPA's Contaminated Sediment Management Strategy[5] presented a plan in 1994 for assessing, preventing, and remediating sediment contamination. These are most effectively done on a watershed basis where all contributing sources can be evaluated and managed with equitable, cost-effective controls. The goal of this strategy is to prevent ongoing contamination of sediments that might cause unacceptable risks to human health or ecosystems. The strategy aims to clean up existing sediment contamination when practical, to determine when conditions will enable natural recovery without unacceptable risk to humans, and to ensure that sediment dredging and disposal of dredged material continue to be managed in an environmentally sound manner.

Milestone 7 in the Clean Waters chapter establishes a target for prevention of future contamination by reducing the discharge of toxic pollutants from industrial facilities. Approximately 23 percent of toxic pollutants released to water can accumulate in sediment.

The National Sediment Inventory demonstrates the scope of contaminated sediments nationwide and identifies the watersheds with a high probability of widespread sediment contamination. To target the review of major facilities permits, EPA, states, and local environmental managers will use these data to evaluate the adequacy of pollution prevention or remedial controls to reduce pollution discharges that contribute to contamination. In addition, EPA will use the results of the NSI to target chemicals for sediment criteria development based on their geographic distribution and concentration in the sediments.

## References

### Text Notes

1. USEPA. 1994-97. *Strategic Plan.* Washington, DC: U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response.
2. USEPA. 1995. *Superfund Administrative Reforms Overview.* R-178. Washington, DC: U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response.

3. USEPA. 1995. *Resource Conservation and Recovery Act Implementation Plan, FY 1996-97.* Washington, DC: U.S. Environmental Protection Agency.
4. USEPA. 1995. *OUST Strategic Framework.* Washington, DC: U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. Office of Underground Storage Tanks.
5. USEPA. 1994. *EPA's Contaminated Sediment Management Strategy.* EPA 823-R-94-001. Washington DC: U.S. Environmental Protection Agency, Office of Water.

### *Milestone Data Sources*

M.1 USEPA. Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS).
M.2 Ibid.
M.3 Ibid.
M.4 USEPA. *Corrective Action Program Accomplishment Report.* Resource Conservation and Recovery Information System (RCRIS).
M.5 USEPA. Office of Underground Storage Tanks (OUST).
M.6 USEPA. CERCLIS.
DOE. Project Tracking System, Performance Measures Databases.
NRC. Radioactive Material Licenses
M.7 USEPA. 1996. *The National Sediment Quality Survey: A Report to Congress on the Extent and Severity of Sediment Contamination in Surface Waters of the U.S.* Draft. Washington, DC: U.S. Environmental Protection Agency, Office of Water.

# 11. Reducing Global and Transboundary Environmental Risks

*Long-Range Goal*

**The United States and other nations will eliminate significant risks to human health and ecosystems arising from climate change, stratospheric ozone depletion, and other environmental problems of concern at the transboundary and global level.**

## The Challenge

The United States is proposing a goal for reducing global and transboundary environmental risks because these problems affect the health of the American people as well as our ecosystems, our economy, and our interests in promoting a stable and prosperous world. Since many pollutants migrate across continents and oceans, global and regional environmental problems present transboundary threats to human health and the environment in the United States that cannot be solved by domestic action alone. Consequently, we must engage other nations in collective efforts.

Secretary of State Warren Christopher recently remarked that "Our ability to advance our global interests is inextricably linked to how we manage the earth's natural resources. That is why we are determined to put environmental issues where they belong: in the mainstream of American foreign policy. The environment has a profound impact on our national interests in two ways: first, environmental forces transcend borders and oceans to threaten directly the health, prosperity and jobs of American citizens. Second, addressing natural resource issues is frequently critical to achieving political and economic stability, and to pursuing our strategic goals around the world."

Global problems such as climate change, stratospheric ozone loss, global circulation of toxic compounds, and transboundary pollution pose direct long-term threats to human health and the environment in the United States and other nations. Pollution of the oceans and worldwide losses of species and habitats also have widespread and long-term consequences: they undermine the resource base essential for our well-being and quality of life, depriving the United States and other nations of commercially viable and potentially lifesaving genetic materials.

Some problems, such as pollution of the atmosphere and oceans, affect the entire planet. They require concerted global cooperation. Other problems are regional, crossing the boundaries between our nation and our neighbors. Some problems occur only in

### International Leadership

Since the early 1970s the United States has been in the forefront of international cooperation to protect the environment. Our nation is a world leader in environmental technologies and expertise. Twenty-five years of rigorous regulations have created an environmental industry in the United States second to none. EPA will use technical assistance and training, information exchange, and technology demonstrations to match environmental problems overseas with the suppliers of proven and cost-effective technologies and services in the United States. Enlisting the expertise and resources of the United States' private sector will greatly expand the range of environmental protection options worldwide.

**International Investment**

Strengthening environmental institutions and human resource capabilities abroad helps solve foreign environmental problems that have local, regional, and global impacts. EPA's international technical assistance, training, and other capacity-building programs help protect and restore environmental quality around the world while creating opportunities for investment. Encouraging private sector involvement in the international environmental technologies market also results in additional jobs and research and development investments in the United States.

localities, but their commonality and magnitude may undermine the security and well-being of thousands of people. In these circumstances, U.S. economic, foreign policy, and national security interests dictate the level of our involvement.

## Responsibilities

The United States pursues international environmental objectives through bilateral consultations with individual countries and multilateral efforts involving numerous countries at the regional or global scale. Working through treaties, agreements, international organizations, and country-to-country consultations, our nation is engaged in a number of activities designed to improve the environment here and abroad. To protect the global environment, international agreements and treaties build on existing environmental laws and programs. These agreements give countries certain responsibilities and obligate them to cooperate in achieving mutual goals.

## Environmental Milestones

EPA proposes 11 specific milestones that address climate change, the stratospheric ozone layer, ocean coral reefs, global toxic risks, and transboundary pollution along our borders with Canada, Mexico, and Russia. Some of the milestones are measures of U.S. performance (e.g., 1, 4, 7, 9, and 10). Others measure environmental results of collective action taken by the United States and other nations (e.g., 2, 3, 5, 6, 8, and 11). Although these latter milestones cannot be achieved by U.S. action alone, EPA is proposing them as global and transboundary improvement targets that the United States will use its influence to achieve.

**Major Global Environmental Treaties**

| | |
|---|---|
| 1994 | Framework Convention on Climate Change |
| 1992 | Convention on Biological Diversity |
| 1989 | Basal Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal |
| 1987 | Montreal Protocol |
| 1985 | Vienna Convention on the Protection of the Ozone Layer |
| 1982 | United Nations Convention on the Law of the Sea |
| 1979 | ECE Convention on Long-Range Transboundary Air Pollution |
| 1972 | Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter |

**Principal North American Environmental Agreements**

| | |
|---|---|
| 1992 | North American Free Trade Agreement (NAFTA) |
| 1991 | Canada-United States Air Quality Agreement |
| 1983 | Agreement Between the United States and Mexico on Cooperation for the Protection and Improvement of the Environment in the Border Area |
| 1983 | Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region |
| 1978 | Great Lakes Water Quality Agreement |
| 1909 | Boundary Waters Treaty (United States and Canada) |

MILESTONE

1

# By 2005

**and beyond, U.S. greenhouse gas emissions will be reduced to levels consistent with international commitments agreed upon under the Framework Convention on Climate Change, building on initial efforts under the Climate Change Action Plan.**

***Federal Reviewers:***

*Please provide other related agency targets*

Greenhouse gas concentrations have grown significantly over the past 200 years, largely due to human activities. Global climate has changed over the past century, and the balance of evidence suggests a discernible human influence. Climate is expected to continue to change in the future, and those changes may be unexpected, large, and rapid.[1]

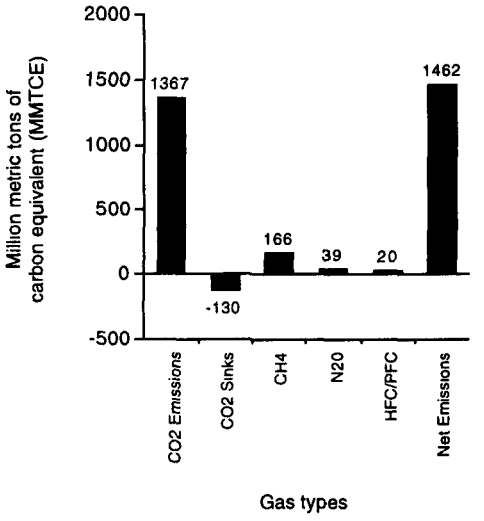
In 1990, carbon dioxide in the atmosphere was about 25 percent greater than in pre-industrial times (Fig. 1). Atmospheric methane in 1990 was more than double pre-industrial concentrations. Nitrogen oxide was approximately 8 percent greater. Burning of coal, oil, and gas is the primary source of emissions. Agricultural activities, landfills, and changing land-use patterns also contribute. In 1990, carbon dioxide emissions accounted for the largest share of U.S. greenhouse gas emissions. Although the United States continues to be the largest contributor of carbon dioxide emissions from burning fossil fuels, the U.S. share of worldwide emissions declined from 44 percent of global emissions in 1950 to 22 percent in 1990 (Fig. 2).

Over the past century, average global surface temperatures increased between 0.54 and 1.08 degrees Fahrenheit (°F) (Fig. 3). Recent years have been among the warmest since detailed temperature records have been kept. Internationally accepted scientific findings show that increasing concentrations of greenhouse gases will ultimately raise atmospheric and ocean temperatures, which might alter global weather patterns. Climate models project that by 2100 the earth's surface air temperatures might increase by an average of 1.8 to 6.3 °F relative to 1990 temperatures. A general warming is expected to lead to an increase in the number of extremely hot days in summer. Further, the average rate of warming would probably be greater than any seen in the last 10,000 years.

Scientists also expect evaporation to increase as the climate warms, leading to an increase in average global precipitation. Several models indicate an increase in precipitation intensity, suggesting the possibility for more extreme rainfall events. In some mid-latitude continental areas, however, decreases in precipitation and soil moisture are predicted. As oceans warm and expand and as polar ice and glaciers melt, average sea level is projected to rise by about 20 inches by the end of the next century.

Although the precise magnitude, timing, and regional patterns of climate change are uncertain, they will likely have adverse consequences for human health, ecological systems, and the world economy and settlement patterns. Climate change will not be reversed quickly because many greenhouse gases are persistent over decades, or even centuries, and the climate system is slow to respond.

**M.1—Total U.S. greenhouse gas emissions, 1990.**




*$CO_2$ Sinks: Trees and other plants take in carbon dioxide and release oxygen. The uptake of carbon by plants or plant matter in soils and oceans acts like a sink, holding carbon and preventing it from reaching the atmosphere.*

### What Are Greenhouse Gases?

Greenhouse gases include water vapor, carbon dioxide, methane, nitrogen oxide, chlorofluorocarbons, hydrochlorofluorocarbons, hydrofluorocarbons, perfluorocarbons, and ozone. Except for the fluorocarbons, these gases occur naturally and have always been in the atmosphere. However, since preindustrial times (about 1750), human activities have added to the natural greenhouse effect by releasing additional greenhouse gases to the atmosphere. Other gases, such as carbon monoxide, nitrogen oxides, and nonmethane volatile organic compounds, are not greenhouse gases but contribute indirectly to the greenhouse effect. Sulfur gases, primarily sulfur dioxide, are believed to counteract the greenhouse effect. Sulfur dioxide emissions are transformed into sulfate particles, which scatter sunlight back to space, thereby reducing the radiation reaching the earth, and they may also affect the physical characteristics of clouds.

Emissions of greenhouse gases are often reported in units of million metric tons of carbon equivalent (MMTCE). All gases are converted to MMTCE by conversion factors called Global Warming Potentials, which are based on the relative ability of each greenhouse gas to trap heat in the atmosphere.

### What Is the Greenhouse Effect?

The greenhouse effect occurs when certain gases in the atmosphere, primarily carbon dioxide and water vapor, trap heat from the sun. The sun's rays pass through the atmosphere and warm the surface of the earth, which then radiates this energy back into the air. Although some of the energy escapes into space, much of it is trapped by the greenhouse gases in the atmosphere. Without this trapped heat, life as we know it could not exist on earth. The greenhouse gases in the atmosphere trap enough heat to raise the average temperature of the earth from 0 °F (the temperature it would be without these natural greenhouse gases) to about 60 °F, far more comfortable for life on earth. Today, however, scientists are concerned that increasing concentrations of greenhouse gas emissions could further warm the earth and change our climate in an unknown number of ways.

## The Greenhouse Effect

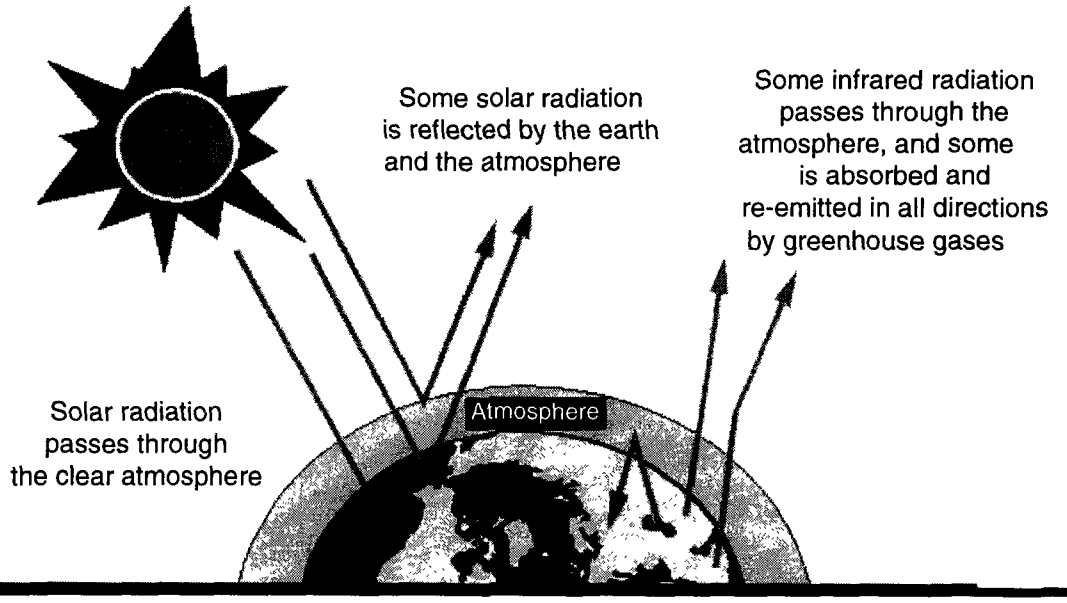


**Fig. 1—Carbon dioxide concentrations in the earth's atmosphere: 1744-1994.**

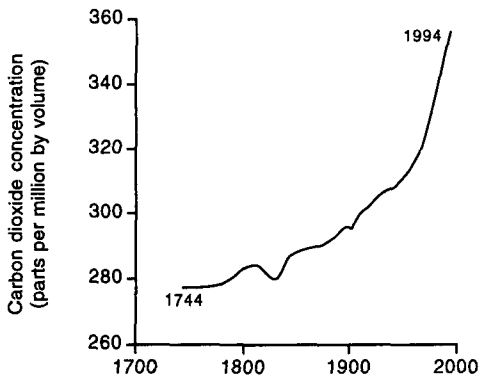
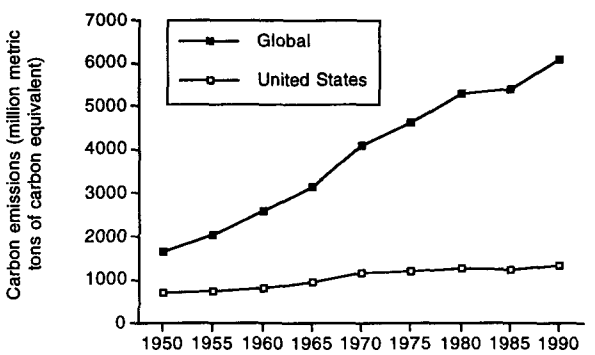
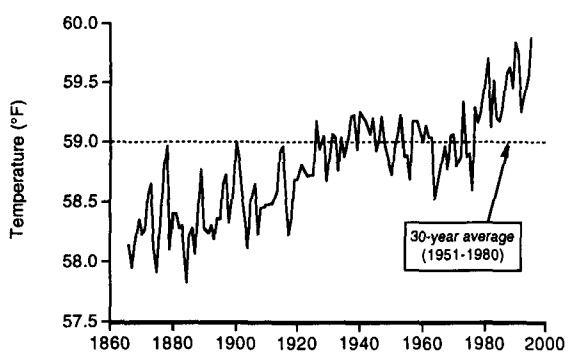



**Fig. 2—Global and U.S. carbon emissions from fossil fuel burning, cement production, and gas flaring: 1950-1990.**




*Notes:* 1. *Does not include other greenhouse gases.*
2. *Does not include sinks (i.e., carbon sequestered in forests) and other sources of $CO_2$.*
3. *Does not include emissions from bunker fuel used in international transport.*

**Fig. 3—Global temperature anomalies: 1880-1990 (shown relative to 1951-1980 average).**




## *Past Trends and 2000 Target*

Greenhouse gas concentrations in the atmosphere have been increasing since the mid-18th century. To begin the process of reversing the rise in greenhouse gas concentrations, the community of nations developed the historic Framework Convention on Climate Change (FCCC), which went into force on March 21, 1994. The FCCC includes a nonbinding greenhouse gas emission goal for the year 2000.[2] In 1993, President Clinton committed to reducing U.S. greenhouse gas emissions to 1990 levels by the year 2000.[3] To reach this goal, the Administration developed the Climate Change Action Plan (CCAP). The CCAP predicted U.S. greenhouse gas emissions to be 1,568 million metric tons of carbon equivalent (MMTCE) by the year 2000 if no actions were taken. The CCAP was expected to reduce the predicted total to 1,459 MMTCE. The United States has not yet set a target beyond 2000.

Uncertainty accompanies any attempt to project future emissions. The 1993 analysis supporting the CCAP emission estimates made assumptions about U.S. energy resources and use, congressional funding, economic factors, market behavior, and technologies. Since the projections were prepared, some of these factors have changed in ways not anticipated: energy prices have declined more rapidly than forecasted, congressional funding has been reduced, industrial efficiency has increased less than expected, and the economy has grown faster than anticipated. As a result, greenhouse gas emissions are now higher than those predicted in 1993.

Many programs have achieved the emission reductions described in the CCAP—some even more successfully than expected. Volunteer response not accounted for in the current CCAP could augment the emission reductions from programs that are accounted for. It is not yet possible to present modified projections of the effects of the CCAP although the United States is working actively on a full review of the plan.

International negotiations are due to conclude in late 1997, establishing a revised goal for limiting greenhouse gas emissions in the period after the year 2000.

## *Tracking Results*

A key element of the CCAP is a process for monitoring and biennially evaluating progress by the United States in reducing greenhouse gas emissions. EPA and the U.S. Department of Energy keep a national inventory of anthropogenic greenhouse gas emissions by sources, and removals by greenhouse gas "sinks." This inventory is routinely updated. EPA and other federal agencies have established tracking systems to monitor progress of their activities.

***Federal Reviewers:***
*Please provide other related agency targets*

**MILESTONE**
**2**

# *By 2005,*

**ozone concentrations in the stratosphere will have stopped declining and will have slowly begun the process of recovery.**

The stratospheric ozone layer is a veil of gas 9 to 18 miles above the earth. It protects living organisms from dangerous solar ultraviolet radiation, known as UV-b radiation. Depletion of the ozone layer means a greater amount of UV-b radiation is reaching the earth's surface, which increases human skin cancers and cataracts and impairs human immune systems. The increase of UV-b radiation also reduces crop yields and threatens plant and animal life.

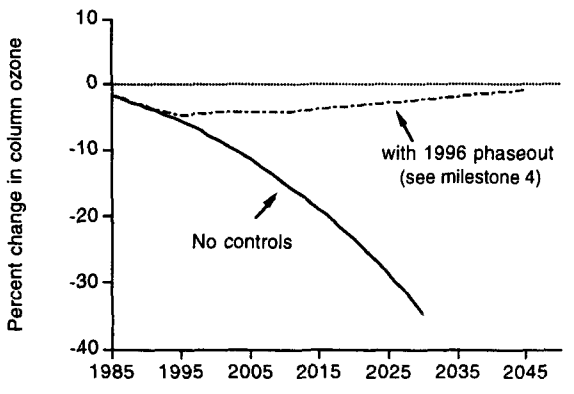
Over the last 20 years, the release of chlorine and bromine atoms from human-made chemicals, such as chlorofluorocarbons (CFCs), halons, carbon tetrachloride, methyl chloroform, and methyl bromide, has been responsible for depleting ozone in the stratosphere. Without action to solve this problem, exposure to greater UV-b radiation would result in approximately 311 million additional cases of skin cancer in the United States by 2075 and the economic cost to U.S. society from increased health problems, damage to crops, and lost productivity of ocean fisheries would likely be between $8 trillion and $32 trillion by 2075.

## *Past Trends and 2005 Target*

Measurements indicate an average 5 percent global loss of ozone since the mid-1960s. The cumulative loss over the United States and other populated areas has been about 10 percent in winter and spring and approximately 5 percent in summer and autumn. Since the late 1970s, the "ozone hole" over Antarctica has continued to increase. It is now equivalent to North America in size and represents a depletion of up to 60 percent of the ozone layer over Antarctica during the southern hemisphere's spring in September and October. Scientists estimate that without action, the average global loss of stratospheric ozone would reach 15 percent by 2010.

The Montreal Protocol calls for the phaseout of CFCs and other major ozone-depleting substances by 1996. However, even with concerted international action, stratospheric ozone is not expected to return to pre-1980 levels until 2045. This delay in recovery is largely a result of the lag time between the production and release of ozone-depleting chemicals and the long atmospheric residence time of CFCs.

**M.2—Percent change since 1980 in stratospheric ozone.**




*As of 1995, Earth's stratospheric ozone layer was still in decline. Column ozone is a measure of total ozone concentration in a vertical column through the earth's atmosphere.*

## *Tracking Results*

Actual measurements of stratospheric ozone will be made by the National Aeronautics and Space Administration's (NASA's) Upper Atmospheric Research Satellite, the Total Ozone Mapping Spectrometer (see milestone 3), and also by the SBUV/2 and TOVS instruments on the NOAA POES and subsequent NPOESS. (See Appendix A for more detail on the data sources.) Progress will be measured through the use of atmospheric models, including NASA's Atmospheric Stabilization Framework Model. This model estimates atmospheric concentrations using data from industry reports to EPA.

### Good Ozone vs. Bad Ozone

Ozone is a colorless gas composed entirely of oxygen atoms. Depending on where the ozone is located and how it is formed, one of two distinct health and environmental effects is associated with this gas.

**Good Ozone–Stratospheric Ozone Layer:** The naturally occurring ozone layer found in the earth's stratosphere is essential for life. Stratospheric ozone absorbs much of the dangerous ultraviolet (UV-b) radiation coming into the atmosphere. The destruction of this ozone layer is a serious health and environmental problem.

**Bad Ozone–Ground-Level Ozone Pollution:** Ozone also is formed through emission of air pollutants such as nitrogen oxides (from power plants and cars) and hydrocarbons (from cars and petroleum-based chemicals). This human-made, ground-level ozone is commonly called smog. It is a serious air pollutant that damages people's lungs, as well as forests and crops. EPA's activities associated with reducing smog are discussed in the Clean Air chapter.

### Where Do Ozone-depleting Chemicals Come From?

Before the ban in the 1970s, chlorofluorocarbons (CFCs) were commonly found in aerosols. In the late 1980s, CFCs were used in refrigeration, foam production, air-conditioning, and solvents. Halons were used in fire extinguishers. Carbon tetrachloride and methyl chloroform were used to manufacture many other chemicals and products. Methyl bromide is a common pesticide.

### How Do Ozone-depleting Substances Destroy the Stratospheric Ozone Layer?

The stable ozone-depleting substances don't destroy just one ozone molecule—a chain reaction occurs. Using CFCs as an example, solar radiation breaks down the CFCs, which in turn releases chlorine atoms. With chlorine acting as a catalyst, a series of reactions takes place, resulting in the destruction of ozone and the formation of diatomic oxygen. The chlorine from the CFCs is available to begin the ozone destruction cycle again.

***Federal Reviewers:***
*Please provide other related agency targets*

**MILESTONE**

**3**

# *By 2005,*

**atmospheric concentrations of the ozone-depleting substances CFC-11 and CFC-12 will peak at no more than 332.4 and 572.3 parts per trillion, respectively.**

The previous milestone targets an improvement, or increase, in stratospheric ozone. This milestone to stop the increase in chlorofluorocarbon (CFC-11 and CFC-12) concentrations will contribute to the improvement in stratospheric ozone concentrations.

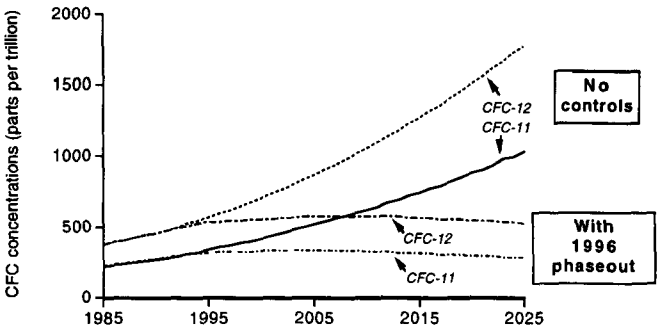
### *Past Trends and 2005 Target*

Atmospheric concentrations of CFC-11 grew from approximately 150 parts per trillion by volume (pptv) in 1978 to approximately 270 pptv by 1990 and to 310 pptv by most recent measurements. Concentrations of CFC-12 were approximately 250 pptv in 1978, then rose to approximately 450 pptv by 1990, and most recently to 520 pptv. These most recent measurements indicate that the rate of CFC increase has slowed, presumably as a result of reduced emissions. Without controls to limit the production and consumption of these substances (see milestone 4), atmospheric concentrations of CFC-11 and CFC-12 would increase at a rate of approximately 10 percent per decade. The 2005 target levels are predicted concentrations based on current controls.

### *Tracking Results*

Progress toward this milestone will be measured using atmospheric models, including NASA's Atmospheric Stabilization Framework Model. EPA is working with NASA, the National Oceanic and Atmospheric Administration (NOAA), the World Meteorological Organization, and the United Nations Environment Programme (UNEP) to obtain the most up-to-date data produced from active atmospheric research programs such as the Upper Atmospheric Research Satellite recently launched by NASA's shuttle and the series of Stratospheric Aerosol and Gas Experiment projects.

**M.3—Atmospheric CFC concentration (mixed ratios).**




*Without controls to limit the production and consumption of ozone-depleting chemicals, the levels of CFC-11 and CFC-12 would rise about 10% per decade.*

MILESTONE

4

# Through 2005,

**with the exception of HCFCs and very limited "essential uses," there will be no U.S. production of ozone-depleting substances.**

***Federal Reviewers:***
*Please provide other related agency targets*

Without current controls, production of all ozone-depleting substances would reach approximately 2.9 million metric tons by 2005. Production of CFC-11 and CFC-12 would reach 770 and 960 metric tons, respectively.

### *Past Trends and 2005 Target*

Production of ozone-depleting controlled substances peaked in 1987. That year, global production of CFC-11 and CFC-12 was 460 and 550 metric tons, respectively. U.S. production of all controlled substances in 1993 was approximately 350,000 metric tons, while the combined production of CFC-11 and CFC-12 was 780 metric tons.

The 2005 target of zero is consistent with U.S. commitments under the Montreal Protocol and with Title VI of the Clean Air Act Amendments of 1990, which states "the United States will halt production of ozone-depleting substances by January 1, 1996."

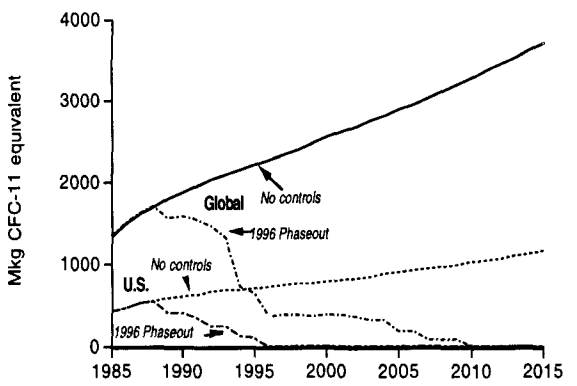
### *Tracking Results*

Progress will be tracked by monitoring industry reports of compliance with EPA's phaseout regulations. The Allowance Tracking System is located in EPA's Stratospheric Ozone Protection Program. Results are published in congressional reports.

**Title VI of the Clean Air Act Amendments of 1990**

Title VI of the Clean Air Act Amendments of 1990 provides for a phaseout of the production and importation of controlled substances that deplete the ozone layer, refrigerant recycling to avoid emissions, a ban on nonessential products that contain or are manufactured with controlled substances, a safe alternatives program to review replacement chemicals, and a federal procurement program.

**M.4—Production of controlled substances (ozone-depleting potential weighted).**




*The production in the United States of ozone-depleting substances as measured by "ozone-depleting potential" will be reduced to zero, well ahead of most other countries.*

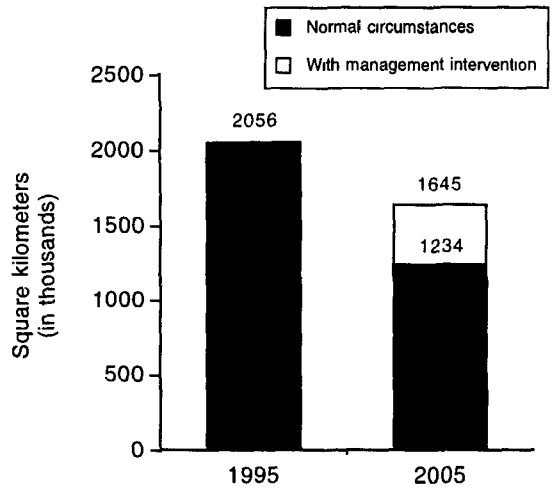
*Federal Reviewers:*
*Please provide other related agency targets*

MILESTONE
5

# *By 2005,*

**cooperative efforts between the United States and other countries will restrict the net loss of coral ecosystems to no more than 20 percent of the world's current reef area.**

**M.5—Projected global coral reef decline.**




The world's oceans are critical to the ecological and economic stability of the planet. Coral reefs are an excellent indicator of the health of our marine environment and exhibit signs of stress related to pollution and human activity, due to their proximity to land. The reefs serve as the "canary in the coal mine" for a significant portion of the world's oceans. Coral reefs are the earth's most diverse marine ecosystems and are generally recognized as one of the most productive ecosystems in the marine environment. As many as 3,000 different animal species may be supported by a single reef, and many marine species are solely dependent on coral reef systems for their survival. Coral reefs also are significant economic resources. They provide opportunities for recreation, such as fishing and diving, and supply raw materials for pharmaceutical drug production.

The Florida Keys is one of the three largest barrier reef systems in the world and is the most accessible reef habitat in the United States. Other reef systems in the United States and U.S. territories are found in Puerto Rico, the U.S. Virgin Islands, Hawaii, Guam, American Samoa, and the Northern Mariana Islands.

Human activities are the primary cause of coral ecosystem degradation. Population growth, increased surface and ground water pollution, overexploitation of coral resources, and direct physical damage have all contributed to the rapid deterioration of coral ecosystems. This milestone cannot be achieved through U.S. action alone. Success will require cooperation and parallel action by other countries. As a result of the policy guidance and assistance provided by the U.S.-inspired International Coral Reef Initiative (ICRI), cooperative work has begun.

## *Past Trends and 2005 Target*

The world's coral reef area covers 2,056,666 square kilometers. An estimated 10 percent of these reefs have been degraded beyond recovery. Without changes in current human behavior and exploitation, an additional 40 percent of coral reefs will be lost by 2005. Intervention with appropriate ecosystem management, at the current level of U.S. government expenditure, might slow this loss to 20 percent.

## *Tracking Results*

Information collected by the International Union for Conservation of Nature and Natural Resources (IUCN) and the National Oceanic and Atmospheric Administration (NOAA) will be used to track progress. The IUCN and the International Center for Living Aquatic Resource Management are developing capabilities to refine estimates of total coral acreage. Remote sensing programs are being expanded. These data will be available to EPA and others to monitor trends. EPA will continue to work with NOAA and other government and nongovernment entities to develop and transfer technologies for assessment, monitoring, and management of coral ecosystems.

MILESTONE

6

# *By 2005,*

**the United States and other countries will reduce the risks to human health and the environment associated with aldrin, chlordane, dieldrin, DDT, endrin, heptachlor, toxaphene, hexachlorobenzene, mirex, PCBs, and chlorinated dioxins and furans.**

***Federal Reviewers:***

*Please provide other related agency targets*

Persistent organic pollutants (POPs) are a group of toxic chemicals that pose risks to people and many animals. In addition to being toxic, these compounds degrade very slowly and tend to accumulate in the body tissues of organisms. Moreover, they tend to be easily taken up (volatilized) into the atmosphere and transported long distances from their origin. Once POPs are dispersed to the environment, cleanup is rarely possible. Because they can volatilize and revolatilize at distant locations, they remain a threat over long periods of time and distances.

POPs include a wide variety of chemical compounds, many of which continue to be used commercially in various parts of the world. They include chlorinated pesticides like DDT, chlordane, and dieldrin, as well as industrial products like polychlorinated biphenyls (PCBs). In addition, certain POPs are also produced as unintended by-products during production, refining, and combustion processes. These by-products include substances such as dioxins, furans, and polycyclic aromatic hydrocarbons (PAHs), the latter being the product of incomplete combustion. The United States, together with a number of other countries, is seeking international commitments at the regional and global levels on aldrin, chlordane, dieldrin, dioxins, furans, DDT, endrin, heptachlor, hexachlorobenzene, mirex, PCBs, and toxaphene.

## *Past Trends and 2005 Target*

While the use and manufacture of many of these substances have been prohibited or severely restricted in the United States, Canada, and numerous European countries, many other countries continue to use them. Continuing use around the globe, combined with the revolatilization and transport of past emissions, has resulted in increased levels of many pollutants. Levels of certain pollutants continue to rise in some geographic areas even though no sources are present. These increasing levels can be traced to pollutants generated in distant areas that are transported via the atmosphere or ocean currents. The aim of the United States is to reduce or eliminate emissions and discharges of these substances to levels that do not pose unacceptable risks to human health or the environment throughout the world.

## *Tracking Results*

Global and transboundary trends will be tracked through a variety of national and international data sets. At the global level, the United Nations Environment Programme tracks air emissions through the Global Environmental Monitoring System (GEMS) and the Global Resource Information Database (GRID). Use and production data for some POPs are also being evaluated to estimate mass loadings to the environment. In North America, the United States and Canada monitor emissions and discharges through selected research and monitoring systems.

***Federal Reviewers:***
*Please provide other related agency targets*

MILESTONE
**7**

# *By 2005,*

**global air emissions of mercury will be reduced, in part through a 50 percent reduction from 1990 levels in the United States.**

Severe human health risks from exposure to high levels of mercury are well established. Mercury is also known for its persistence and ability to migrate long distances in the environment. Depending on the chemical form of the mercury released, it can be deposited locally or can enter long-range circulation patterns that are regional and global in scale. Mercury can change its form and toxicity as it moves from one location to another over time. Once in water, mercury can accumulate in fish, which might be eaten by humans and wildlife. Because of mercury's ability to move long distances, emissions in other countries contribute to mercury levels in the U.S. diet, and U.S. emissions contribute to exposures in other countries.

The United States is working with Canada, Mexico, and other countries to reduce emissions of mercury and to replace certain mercury-based technologies with more efficient and less harmful processes. To do this, the United States is working through the Great Lakes Water Quality Agreement, the North American Commission for Environmental Cooperation, and the UN Economic Commission for Europe's Convention on Long-Range Transboundary Air Pollution. (See also Safe Waste Management milestone 2 for mercury emissions from waste-burning facilities.)

## *Past Trends and 2005 Target*

Domestic mercury consumption in the United States and Europe is decreasing as certain uses are eliminated. However, significant emissions continue as a result of incineration activities, power production, product use, and recirculation of mercury residues in the environment. Although mercury is being eliminated from many product applications (e.g., alkaline battery production), uses in developing countries are growing. The milestone sets an ambitious, but realistic, target for reduction.

## *Tracking Results*

Through the North American Commission for Environmental Cooperation, the United States, Canada, and Mexico together are outlining steps to better track emissions, discharges, use, and recirculation of mercury in the North American environment. U.S. efforts with Canada to protect the Great Lakes will improve monitoring efforts critical to achieving agreed-upon reductions in the Great Lakes watershed. At the global level, national data and international trends are consolidated by the International Program on Chemical Safety and the United Nations Environment Programme. It is important to recognize that tracking emissions of mercury is complicated by the diversity of sources, significant natural emissions, and the recirculation of past emissions.

MILESTONE

8

# *By 2005,*

**with U.S. leadership and cooperation, many nations will have phased out the use of lead in gasoline, and worldwide use of lead in gasoline will be below 1993 levels.**

***Federal Reviewers:***

*Please provide other related agency targets*

Lead exposures can pose serious human health risks. Infants and children up to age 6 are especially susceptible to low doses of lead from many sources and can suffer brain damage and hearing and growth deficits as a result (see Safe Homes, Schools, and Workplaces, milestone 1). In adults, lead in the blood can affect hearing, increase blood pressure, and, at high levels, cause kidney damage and anemia. The principal short-term exposure route is through inhalation; longer-term exposure arises from ingestion of dust, soil, water, and foods that contain lead. Exposure can come from a variety of common products, such as gasoline, pottery glaze, house paint, toys, water pipes, and crystal, and from certain industrial processes.

In areas where motor vehicle traffic is densely concentrated and there are no large industrial sources (e.g., smelters), changes in total airborne lead concentrations correlate closely with changes in the use of leaded gasoline. There is also strong correlation between the use of leaded gasoline and blood lead levels in the population. Because lead accumulates in the environment and cannot be detoxified, current lead levels in products we use will expose people for decades to come.

## *Past Trends and 2005 Target*

U.S. consumption of lead in gasoline declined from over 269,000 tons in 1971 (when the United States accounted for roughly 75 percent of global use of lead in gasoline) to 5.1 tons in 1991 and to essentially zero in 1995. In the early 1960s children in the United States averaged more than 20 micrograms of lead per deciliter of blood. This level has dropped considerably as leaded gasoline has been phased out. By 1988-91, NHANES III data indicated that only 8.9 percent of young children had blood lead levels above 10 micrograms per deciliter.[4]

With the elimination of leaded gasoline in the United States, Canada, Japan, South Korea, some Western European nations, Brazil, and Columbia, plus the reduction of lead content in gasoline in some other countries, global use of lead in gasoline fell from about 380,000 tons in the early 1970s to about 70,000 tons in 1993. Even so, gasoline still accounts for about 50 percent of exposure to lead in developed countries. Moreover, most countries still use lead in gasoline, and use could increase dramatically given increases in population and economic activity. This is particularly a concern for densely populated, high-growth countries such as China and India. They could drive global consumption of leaded gasolines to ever higher levels despite phaseouts in many developed countries.

The World Bank has projected that by 2030 global emissions of lead from motor vehicles could increase to over five times the levels in 1990. Factors such as the phaseout of leaded gasolines and increased fuel efficiency, however, could result in lower growth of lead use, thereby counteracting higher consumption. Concerted international action should substantially reduce global use of lead in gasoline to below 1993 levels. While the United States might influence policies abroad, achievement of this target will depend on the actions of numerous countries to reduce lead use in gasoline.

## *Tracking Results*

Progress will be measured using data on country-by-country use of lead in gasoline, collected annually by Octel and the International Lead Zinc Group.

***Federal Reviewers:***
*Please provide other related agency targets*

**MILESTONE**
**9**

# *By 2005,*

**all seven nonattainment areas along the United States/Mexico border will have met ambient air quality health standards for particulate matter, sulfur dioxide, carbon monoxide, and ozone during the preceding 4 years.**

The U.S.-Mexican border region has, in recent years, supported a growing international economy that is expected to increase due to the implementation of NAFTA. A serious consequence of this growth has been sustained deterioration of the environment, especially air quality. The United States and Mexico each have air quality standards. Sources along the U.S.-Mexican border contribute to air pollution on both sides. Efforts are required by both countries to achieve clean air goals in the region. Federal, state, and local governments are working cooperatively to identify areas where air quality has become a problem, identify pollution sources, and develop cost-effective techniques to improve air quality.

## *Past Trends and 2005 Target*

In the border region, seven areas are in nonattainment for one or more of the U.S. standards for particulate matter (PM-10), sulfur dioxide ($SO_2$), carbon monoxide (CO), and ozone. There are limited trend data for all seven nonattainment areas; most of the information is based on data from 1984 through 1993. The nonattainment U.S. cities in the border area have shown a decrease in PM-10 over time, and cooperative efforts between the United States and Mexico have led to a general decrease in sulfur dioxide and carbon monoxide levels. Ozone problems vary by locality in the border area. Achieving this milestone will depend in part on the ability of Mexican border states to reduce emissions.

This milestone is consistent with the attainment schedule set forth in the U.S. 1990 Clean Air Act Amendments.

## *Tracking Results*

Air quality monitoring, as reported to EPA's Aerometric Information Retrieval System (AIRS database), will track progress in attainment of air quality goals. Results from a number of monitoring networks in Mexico are also reported to AIRS.

**M.9—U.S. border cities currently in nonattainment with air quality standards (1995).**

| Border Nonattainment Areas | PM–10 | $SO_2$ | CO | Ozone |
|---|---|---|---|---|
| El Paso, TX | X | | X | X |
| Dona Ana County, NM | X | | | X |
| Imperial County, CA | X | | –[a] | –[b] |
| San Diego, CA | | | X | X |
| Douglas, AZ | X | X | | |
| Nogales, AZ | X | | | |
| Yuma, AZ | X | | | |

[a] Currently designated as "unclassifiable/attainment"; in 1995 there were 11 violations.
[b] County currently designated as "transitional" nonattainment for ozone.

MILESTONE

10

# By 2005,

**the United States and Canada will reduce sulfur dioxide and nitrogen oxide emissions that cause acid rain. U.S. sulfur dioxide emissions will be reduced by nearly 10 million tons and nitrogen oxide emissions by more than 2 million tons from 1980 levels.**

***Federal Reviewers:***
*Please provide other related agency targets*

The U.S. Clean Air Act Amendments of 1990 allowed the United States to make a number of bilateral commitments with Canada, including the United States-Canada Air Quality Agreement of 1991. The Air Quality Agreement contains precise commitments for both countries, consistent with national policies to reduce nitrogen oxide and sulfur dioxide emissions from power plants and industry. The Air Quality Agreement serves as an effective framework for jointly addressing the protection and improvement of North American air quality and the protection of human health and ecosystems from the adverse effects of air pollution. The milestone reductions are expected to result in a significant improvement in North American air quality.

### *Past Trends and 2005 Target*

U.S. nitrogen oxide emissions in 1980 were 23.2 million tons. The United States' target to reduce its nitrogen oxide emissions by more than 2 million tons represents a nearly 10 percent decrease from 1980 levels. U.S. sulfur dioxide emissions in 1980 were 25.9 million tons. The United States' target to reduce its sulfur dioxide emissions by nearly 10 million tons by 2005 represents a 40 percent decrease from 1980 levels. (Also see milestone 5 under Clean Air.) Between 1979 and 1992, sulfate wet deposition over eastern North America declined by 20 percent in parallel with a decrease in emissions.

### *Tracking Results*

Progress toward these targets will be reported in EPA's Acid Rain Emissions Tracking System. Under the Air Quality Agreement, the United States and Canada cooperate in tracking nitrogen oxide and sulfur dioxide emissions. Since 1992 they have jointly published Air Quality Agreement Progress Reports every two years.

**M.10—Canada-United States $SO_2$ and $NO_x$ emission reduction goals.**

| Canada | United States |
|---|---|
| $SO_2$ emission reduction in seven easternmost provinces to 2.5 million tons by 1994 | $SO_2$ emission reduction of 10 million tons from 1980 levels by the year 2000* |
| Maintenance of 2.5 million ton annual cap on $SO_2$ for eastern Canada through December 1999 | Permanent national cap of 8.95 million tons of $SO_2$ emissions for electric utilities by the year 2010 |
| Permanent national cap on $SO_2$ emissions of 3.52 million tons by the year 2000 | National cap of 5.6 million tons for industrial source emissions beginning in 1995 |
| $NO_x$ emissions reduced 110,000 tons below forecasted levels by the year 2000 | $NO_x$ emission reduction of more than 2 million tons from 1980 levels by the year 2000 |

* With the exception of sources repowering with a qualifying clean coal technology, sources receiving bonus allowances, and sources using allowances earned for early reduction efforts earned prior to the year 2000.

*Federal Reviewers:*
*Please provide other related agency targets*

MILESTONE
**11**

# *By 2005,*

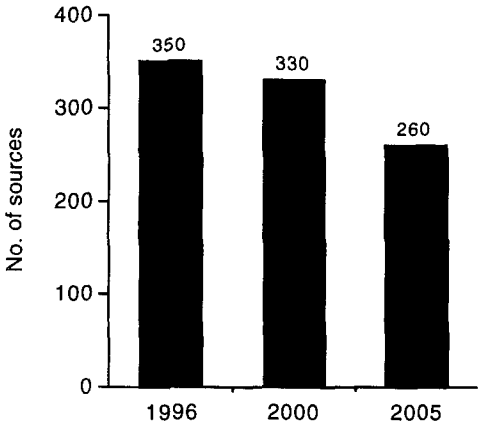
**existing sources of high-level radioactivity in northwest Russia with the potential for near-term release into the arctic environment will be reduced by 25 percent.**

The arctic marine environment is an extremely fragile ecosystem where small changes in contaminant levels can have significant and far-reaching impacts. Releases into the Arctic are quickly dispersed over long distances. The State of Alaska is particularly vulnerable to the release of high-level radioactive contaminants in any of the arctic seas due to the open circulation patterns found within the Arctic Basin. Additionally, any perceived increases in radionuclide levels in edible seafoods could have serious impacts on U.S. and international fisheries, and on indigenous populations in the region.

## *Past Trends and 2005 Target*

The Cold War left as a legacy a large inventory of radioactive wastes in the Russian Federation that were inadequately managed. Long-term storage and disposal is not yet assured. Most of these sources are land-based or are contained in floating storage vessels that include reactor cores and damaged fuel from decommissioned submarines. These sources are found along coastal areas of the Kola Peninsula in the Russian Arctic. While the full magnitude of the problem is still under study, at least 350 high-level waste sources in the Russian Arctic are known to be at risk of releasing radioactive materials into the arctic environment. Solutions to these problems are technology-dependent and require substantial front-end investment followed by rapid remedial efforts to achieve the 25 percent reduction target for high-risk sources. The United States, working with Norway as well as other countries and international organizations, will help Russia relocate those sources which pose the greatest risk of failure and place them in stable storage. These cooperative efforts should lead to removal of at least 25 percent of the known high-level sources by 2005.

**M.11—Estimated number of sources of high-level radioactivity in the Russian Arctic.**




## *Tracking Results*

The status of high-level sources will be tracked through a simple inventory system based on Russian and international efforts to identify, characterize, and remove the sources. The structural integrity of these sources will be verified through environmental monitoring programs in the Russian Arctic.

## Strategy

The U.S. approach to reducing global environmental risks depends on the nature of the problem, the environmental risks, and U.S. interests. Working with other countries to reduce the risks requires intensive negotiations on the nature of the problem, as well as agreement on solutions and obligations. Projects often aim at enhancing the ability of other countries to improve their institutional and technical capacity to control pollution. Efforts between the United States and other countries seeking solutions to shared problems can lead to greater efficiencies in solving problems at home through joint research, technology development, policy development, and compliance and enforcement strategies.

### *Reducing Climate Change Risks*

EPA has a key role in the Clinton Administration's broad strategy to reduce annual greenhouse gas emissions to 1990 emission levels by 2000. Federal programs to accomplish this near-term goal are based on the recognition that many profitable actions can and should be taken to make the economy more productive while reducing greenhouse gas emissions. The strategy calls for a research effort to increase knowledge of climate, to develop and examine approaches for reducing or adapting to climate change, and to estimate current greenhouse gas emission rates and project future emission levels.

The United States is working with other nations on a collective approach to climate change and is helping other countries develop their own climate change programs. The Clinton Administration is beginning negotiations with other countries on a mutual objective for reducing greenhouse gas emissions after 2000. This negotiation process should be completed in 2 to 3 years. Collectively, these activities will increase the understanding and action throughout the world to address climate change.

The most visible commitment of the federal government to address climate change is the Climate Change Action Plan (CCAP), published in October 1993. The CCAP is designed for rapid implementation, building on existing programs, technologies, and voluntary efforts to deliver cost-effective results. Calling for innovative public and private partnerships to attain environmental objectives, the CCAP targets all greenhouse gases and all sectors of the economy through nearly 50 actions. (See Toxic-Free Communities, milestone 4.)

The CCAP is a coordinated response involving several federal agencies including EPA and the Departments of Energy, Transportation, Agriculture, and State. New working relationships between federal officials and state government agencies have been developed to facilitate implementation. Finally, the CCAP encourages international greenhouse gas emission reductions through the U.S. Initiative on Joint Implementation.

The heart of the plan is its reliance on voluntary programs. In EPA's voluntary programs, participants commit to profitable pollution prevention activities and EPA provides them with state-of-

**Exchange of Innovative Ideas in Management**

Although the United States has often been at the forefront of incentive-based regulatory and enforcement approaches, it can also benefit from innovation elsewhere. The United States is learning about Germany's effluent fee systems while the Germans are learning about U.S. experience with "emission trading," which lets companies buy and sell rights to emit pollution, and the "bubble" concept, which gives companies greater flexibility in cleaning up pollution sources. The Netherlands and Sweden have also been sources of advanced concepts of "user-friendly" regulation.

**Costs**

The milestones for Reducing Global and Transboundary Environmental Risks will have significant costs and benefits. The U.S. Climate Change Action Plan estimates that $60 billion invested in greenhouse gas emission reductions during 1994-2000 would result in more than $60 billion in energy cost savings over that period and an additional $207 billion in energy cost savings during 2001-2010 (all estimates in undiscounted, constant 1991 dollars). The cost to industry for substituting non-ozone-depleting chemicals is estimated to be $1 billion per year for 10 years, or $56 billion through 2075. The benefits of full recovery of the ozone layer are estimated at $8 trillion to $32 trillion from now until 2075. U.S. costs of reducing acid-rain-causing emissions and attaining air quality standards along the Mexican border are absorbed in the Clean Air costs (see page 20). Firm estimates have not yet been prepared for the other milestones; over the next few years, the costs and benefits associated with global and transboundary environmental improvement programs will be more fully assessed.

### Green Lights—Partnerships in Energy Efficiency and Conservation

Green Lights, EPA's flagship voluntary program, encourages commercial businesses and government agencies to reduce their lighting energy consumption by introducing them to the economic and environmental benefits of investing in energy-efficient lighting technologies. Participants in Green Lights agree to survey the lighting in their domestic facilities, upgrade their lighting systems where profitable, and complete these upgrades within 5 years. EPA assists participants with a wide range of technical information and recognition opportunities, which did not exist prior to the program.

In 1995, Green Lights met its program target, having already reduced 3.5 billion pounds of carbon dioxide. The program is on course for its 1995 through 2000 program targets. It has:

- Signed up more than 2,000 participants committed to upgrading the lighting in over 5 billion square feet of commercial, manufacturing, retail, and government facilities nationwide (the equivalent of 1 out of every 14 commercial buildings).
- Produced over one billion square feet in lighting upgrades, saving Green Lights participants more than $190 million annually while reducing emissions of sulfur dioxide and nitrogen oxide.

Green Lights successfully demonstrates that substantial pollution can be prevented profitably and other benefits can be realized through nonregulatory approaches that lead to financial gains for U.S. businesses and federal agencies as well as the public.

*"Energy efficiency in the 1970s, under the term 'conservation,' was immediately associated with the discomfort resulting from problems such as restricted lighting levels. The Green Lights program broke this perception for Warner-Lambert by promoting energy-efficient technologies which provide superior lighting quality."*

— Daniel P. Patterson, Director, Energy and Environmental Compliance, Warner-Lambert Company

*"Through a cooperative agreement with Baltimore Gas & Electric, Baltimore County has implemented energy reduction programs such as Green Lights, which will save taxpayers over $500,000 annually."*

— Douglas Johnson, Green Lights Implementation Director, Baltimore County, Maryland

*"The money we have saved from upgrading our existing lighting systems has prevented additional budget cuts around the university. By upgrading over 40,000 fixtures we are realizing an annual energy savings of over $900,000."*

— Cliff Slaughter III, Manager of Special Projects, University of Cincinnati

*"We approached Green Lights with some concerns and preconceived ideas. We did not think that moderate power reduction at $0.05/kWh justified any major project activity. However, after demonstration areas were assessed for benefits and employee acceptance, we were pleasantly surprised to find that we had a win-win situation on our hands."*

— Ron Reid, Energy Conservation Officer, Balder Electric Company

the-art technical and financial information. EPA also publicly recognizes the participants' contributions to protecting the environment. A hallmark of the CCAP is the up-front involvement of businesses in constructing programs. EPA sets program objectives and requirements that enable businesses to be creative and flexible in taking actions tailored to their individual circumstances. Consequently, a large number of both large and small companies have joined at least one of these programs.

The programs are aimed at reducing barriers that prevent businesses from taking advantage of more efficient and cost-effective manufacturing processes. These barriers include the lack of knowledge about new cost-effective technologies, the inability to evaluate more efficient business operations, and the initial equipment cost of efficiency improvements, which is often higher than the cost of commonly used technologies. EPA has worked with many kinds of organizations to overcome these problems since the inception of its voluntary programs in 1991.

In addition to working with states, tribes, and industry to reduce greenhouse gas emissions, EPA will use its environmental review authorities under the Clean Air Act and

the National Environmental Policy Act to promote reductions of greenhouse gas emissions in actions undertaken by the federal government.

EPA also leads several aspects of climate change research. It participates in the broad research efforts of the Intergovernmental Panel on Climate Change. EPA has the lead role in assessing the problems posed by methane and hydrofluorocarbons, as well as developing approaches to address them nationally and internationally. With the U.S. Department of Energy, EPA leads government efforts to inventory domestic levels and sources of greenhouse gas emissions and helps developing countries to inventory their emission levels and sources of greenhouse gas emissions through the United States Country Studies program.

EPA has a critical role in efforts to quantify the damaging effects that greenhouse gas emissions will have and to consider market-based ways to increase energy efficiency in the transportation sector. EPA is heavily involved in an effort to work with automobile manufacturers to produce a much more efficient car by early next century.

### *Restoring the Stratospheric Ozone Layer*

The dangers of ozone depletion for human health and the environment led 27 countries to sign the Montreal Protocol in 1987, agreeing to limit their production and consumption of ozone-depleting chemicals. The United States played a central role in this process, encouraging international support for the Protocol in recognition of the global nature of this problem.

Since the signing of the Montreal Protocol, new research has indicated that the impact on the stratosphere is more severe than initially thought. In 1990 and 1992, the Protocol was significantly amended to hasten the phaseout of controlled substances, and additional chemicals were added to the list. The Protocol signatories (now more than 150 countries) agreed that industrialized countries would phase out production and consumption of chlorofluorocarbons (CFCs) and other major ozone-depleting substances by 1996. (The production of halons stopped at the end of 1993.) Furthermore, the Protocol limits the long-term production and consumption of hydrochlorofluorocarbons (HCFCs), which are the interim substitutes for CFCs. Methyl bromide was added to the list of ozone-depleting substances in 1992, and the 1990 Clean Air Act Amendments mandated that methyl bromide production will stop by 2001.

A cornerstone of the U.S. Stratospheric Protection Program is a market-based permit program that limits the production and importation of controlled substances and promotes flexibility in making the transition to chemicals and technologies that are safe for the stratospheric ozone layer. Central to the program is a group of permits or allowances that restrict the supply of ozone-destroying chemicals. These permits are allocated annually by EPA and can be traded both domestically and internationally.

The market-based permit program has already surpassed all expectations, and EPA anticipates that success will continue into the future. Market innovation will continue toward the development of alternative chemicals and processes for refrigeration, air-conditioning, solvents, foam-blowing agents, fire suppressants, and other industrial processes. By pursuing this market-based approach, EPA will minimize and avoid costs commonly associated with a more traditional command and control regulatory approach.

Another component of the Stratospheric Protection Program is pollution prevention. Regulations mandate a refrigerant recycling program. Through this program, refrigeration and air-conditioning technicians will ensure the reuse of existing refrigerants, thereby providing economic benefits and avoiding the production of additional quantities of ozone-depleting chemicals. In addition, EPA will review all substitutes for controlled substances through the Significant New Alternatives Policy (SNAP) program to make sure substitutes do not pose unacceptable health or environmental hazards.

**International Cooperative for Ozone Layer Protection**

In the 1980s, American companies were using chlorofluorocarbons (CFCs) to manufacture more than $100 billion in products each year. At the end of 1995, the production of CFCs was banned in the United States as well as in the rest of the industrialized world. The transition to ozone-safe substances in such a short period is a remarkable story, and a significant role in that story belongs to the International Cooperative for Ozone Layer Protection (ICOLP).

At the invitation of AT&T and Nortel (at that time Northern Telecom), 14 companies attended a meeting in Washington, D.C., to discuss the possibility of forming an organization devoted to exchanging information on alternatives to ozone-depleting solvents. Four days later, on October 10, 1989, ICOLP was officially announced. As one founding member put it, ICOLP was "an industry initiative with government participation," not a government initiative with industry participation.

Members agree that in its 5-year existence, ICOLP has achieved an "unprecedented show of cooperation among government, industry, and nongovernmental organizations." Digital Equipment Corporation developed an aqueous cleaning process and donated it to ICOLP. Japanese corporations contributed ultrasonic metal forming, which was then perfected by ICOLP engineers. Today, seven EPA/ICOLP manuals on alternatives are distributed around the world. Many developing countries have profited from ICOLP technical assistance projects.

Member companies credit ICOLP with helping them achieve their phaseouts ahead of schedule—in some cases up to 4 years ahead of the international treaty schedule. The substitutes have often turned out to be more economical than the technologies they replaced.

EPA is fostering U.S. industry leadership in stratospheric ozone protection through the formation of industry-government partnerships. For example, the International Cooperative for Ozone Layer Protection brings together U.S. and international companies to find alternatives to controlled substances, and provides technology transfer to other companies and countries. EPA will also continue working with the Halon Alternatives Research Center to provide similar services for the users of halons and to coordinate recovery and storage (banking) of existing halons.

Finally, the United States will remain actively involved in implementing the provisions of the Montreal Protocol. The Multilateral Fund, a component of the Protocol, provides capital to developing countries for the transition to alternatives. U.S. efforts to foster ozone-friendly technologies and substitute chemicals began in 1987, prior to establishment of the Multilateral Fund, with a budget of less than $100,000. Between 1994 and 1997, the United States' contribution to the Multilateral Fund will be approximately $72 million. The United States will continue to be a major contributor and will continue to encourage a shift to new technologies and chemicals. The use of the Fund, as well as U.S. industry cooperation in technology transfer to developing countries under the Montreal Protocol, is instrumental in the success of restoring the stratospheric ozone layer. If, however, some countries decide not to follow the controls agreed to under the Montreal Protocol, the predicted improvements in levels of stratospheric ozone could be negated.

To assist with the implementation of the Montreal Protocol, EPA will work with the United States Customs Service and Interpol to prevent international trafficking in banned ozone-depleting substances. In addition, EPA will continue its efforts to develop international enforcement and compliance assurance networks and will provide international enforcement training at international conferences and in other appropriate venues.

### *Protecting Oceans*

The United States works through numerous treaties at the global and regional levels to give greater effect to domestic laws and regulations relating to protection of the marine environment. The United States also works through numerous nonbinding programs and technical assistance projects to improve marine environment protection in other countries. For example, to help arrest the rate of coral reef decline in the United States and worldwide, the United States initiated the International Coral Reef Initiative (ICRI). The ICRI is a partnership between the United States, Australia, Japan, and other countries to improve the preservation and management of coral reef ecosystems. The United States works to help other countries develop their own capacity to oversee and manage systems to control pollution sources that damage marine waters, corals reefs, and marine living resources. The United States also works through the Agency for International Development, selected United Nations organizations, and a variety of other media to implement specific projects in support of U.S. environmental interests.

### *Reducing the Risks of Global Toxics*

Reducing risks associated with persistent toxics will require concerted international actions to reduce total emissions and discharges. Depending on the substance and the conditions under which it is being used, the approaches by which these emissions will be controlled and reduced will vary. These approaches include bans on use or production, limitations on certain uses, requirments for best use of available technology, improved waste management and disposal requirements, public reporting of pollutant releases, pollution prevention programs, voluntary compliance programs, public education, and economic incentives designed to minimize releases or promote the use of safe, environmentally benign products or processes.

International cooperation leading to meaningful action by governments requires action on two levels. On the policy level, global and multi-lateral agreements are needed to obtain the commitments of governments to reduce releases of specific persistent toxic compounds. Such agreements, aside from their environmental benefits, ensure that all governments share in the cost of establishing international norms and help to level the playing field from a U.S. trade perspective. On the technical level, many governments need technical assistance to build the capacity necessary to enable them to meet their commitments.

While the United States is pursuing action on reducing selected toxic contaminants both here and abroad, EPA's international toxics reduction strategy is focused on four major initiatives: (1) the United States-Canada Virtual Elimination Strategy for Persistent Toxics in the Great Lakes, (2) trilateral programs under the North American Commission for Environmental Cooperation, (3) the United Nations Economic Commission for Europe Convention on Long-Range Transboundary Air Pollution, and (4) global efforts coordinated through the United Nations Environment Programme (UNEP) and the Intergovernmental Forum on Chemical Safety.

### *Reducing Transboundary Pollution*

The United States is working through a variety of agreements and less formal mechanisms to help prevent the migration of pollution across our borders. While certain approaches are common to all transboundary work, the strategy summarizes four geographic initiatives:

- **Canada.** Bilateral agreements between the United States and Canada serve as the basis for an ongoing set of programs designed to improve environmental quality along the U.S.-Canadian border.
- **Mexico.** EPA's cooperative programs with Mexico, as well as the Agency's role in negotiating the Environmental Side Agreement to NAFTA, produced a series of bilateral and trilateral programs that will improve environmental conditions in the United States, Mexico, and Canada.
- **Caribbean.** Cooperative efforts in the Wider Caribbean[5] region focus on reducing coastal pollution in the Gulf of Mexico, the Straights of Florida, Puerto Rico, and the U.S. Virgin Islands.
- **Arctic.** EPA and other federal agencies, as well as various universities and nongovernment interests, are engaged in efforts to protect the fragile arctic environment. The United States is working with the eight arctic nations in a comprehensive assessment of environmental conditions in the Arctic as well as an examination of relevant sources of pollution within and outside the Arctic. To protect the Arctic from radioactive pollution, EPA and other agencies

**U.S./Canada Agreements**

While striving to further reduce current and future pollutants, the United States and Canada have already made significant progress in reducing pollution in areas of shared responsibility. Through the Great Lakes Water Quality Agreement and other cooperative agreements, mercury levels in fish in Lakes Michigan, Huron, and Erie have dropped by more than 75 percent since 1970. Phosphorus loadings into Lake Erie decreased by more than 50 percent over the same time period, thereby improving water quality and raising fish stocks.

are working to expand Russia's capability to process high-level nuclear waste. The project will prevent dumping of such wastes in the Arctic and Pacific oceans, and will help Russia decommission part of its nuclear submarine fleet in accordance with U.S.-Russian arms-control agreements.

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# 12. Empowering People with Information and Education and Expanding Their Right to Know

*Long-Range Goal*

**Americans will be empowered to make informed environmental decisions and participate in setting local and national priorities.**

## The Challenge

The challenge of this goal is to provide all sectors of the public with better environmental information and education. Informed decision making is essential for achieving the environmental goals in this report. Improved understanding of the environment empowers citizens and communities to make responsible decisions on ways to address environmental problems. This goal has two premises:

1. U.S. citizens have a *right to know,* which guarantees access to information about pollutants in their communities. This information includes:
   - the condition of the air they breathe and the water they drink and use;
   - easily available data on sources of pollution;
   - health-related information about foods, products, and chemicals they use.
2. Education programs can help citizens make informed decisions, resulting in improved environmental quality.

Information and education are an essential part of a comprehensive approach to environmental protection. Informed citizens can better understand the relative severity of environmental risks, the opportunities for preventing pollution, and the uncertainties that underlie many environmental decisions. People armed with information and education understand that pollution solutions for one part of the environment, such as water, can sometimes harm another part, such as air. For example, although a sewage treatment plant cleans up wastewater, it does so at the expense of generating solid waste and, in some cases, causing air pollution. Improved access to information and education aids in the public analysis of complex issues and enables people, individually and collectively, to communicate with each other, to become informed decision makers, and to find creative ways to improve environmental protection.

The principles of environmental justice will guide EPA's efforts to enhance the public's understanding of environmental issues. Environmental justice means that all people have the opportunity to live in a healthy environment and that environmental laws

apply without discrimination based on race, ethnicity, culture, or economic status.[2] Part of the challenge, therefore, will be to promote increased and improved access to information, education programs, and communication among historically under-served constituencies, such as poor persons, immigrants, and ethnic and racial minorities.

### Access to Information

EPA must meet the challenge of improving access to environmental data for citizens and local governments. Part of this challenge will be improving the ways in which EPA fulfills the public's right to know. The term *right to know* is based on the concept that people have a fundamental right to know what types of industrial chemicals are present in their communities. It ensures that the public is provided with access to information about pollutant releases, transfers, exposures, and risks.

Government agencies use scientific data on environmental trends and conditions to define environmental risks and help set priorities for communities and the nation. Data are helpful only if they are easily accessible to people. Hundreds of existing databases contain "raw" data on environmental trends and pollutant releases from industrial facilities, as well as data that have been interpreted for both technical and nontechnical audiences. Improved coordination of data collection, better coordination among database managers, and improvements in electronic and other communications technologies will make data more accessible by users. To further enhance the usefulness of its data, EPA must also characterize the quality of the data it provides, including the limits to its use.

**Toxics Release Inventory Spurs Emission Reductions**

Based on an analysis of information from the Toxics Release Inventory (TRI), residents in Northfield, Minnesota, found that a plant they had thought was "clean" (because it produced no obvious smoke or odors) released nearly 800,000 pounds a year of methylene chloride, a probable human carcinogen. The public outcry quickly led the facility to volunteer a 90 percent emission reduction by 1993 and elimination of emissions by 2000. Local community groups called for tougher state regulation of the facility, leading the state to include in the facility's proposed emission permit a requirement that the facility reduce methylene chloride emissions 93 percent by 1995.

According to a chemical industry executive, right-to-know requirements have had a powerful impact on industry and in a relatively short time have resulted in a major reduction in emissions. For example, the chemical industry, which leads all other industries in emissions, reduced its TRI emissions by 41 percent from 1988 to 1991, even though chemical production grew about 11 percent in that period.

### Communication

EPA must meet the challenge of improving communication among citizens, scientists, community and environmental groups, industries, and policy makers. Open communication helps diverse groups of people find common ground when seeking consensus on local, national, and international environmental issues. Communication involves an exchange of information and discussion among stakeholders so that all groups gain a better understanding of other perspectives, issues, concerns, and values. Having public discussion about national environmental goals is one step in EPA's effort to improve communication.

### Education

EPA must help improve environmental education so that people can analyze complex environmental issues and make well-informed decisions. Many groups—from individual schools and government agencies to nonprofit organizations and businesses—are involved in developing and delivering environmental education programs. Although outstanding education takes place in schools, colleges, universities, museums, and nature centers, and through broadcast and print media, these efforts are highly fragmented; there are excellent programs in some areas of the country and few in others. The quality of programs varies in part because of limited access to educational materials and resources for teacher training, as well as a lack of standards for high-quality environmental education.

## Responsibilities

Responsibility for improving environmental education, information, and access to information is located at all levels of govern-

ment. Providing environmental education and information is also a core responsibility of many nonprofit organizations.

Governments are responsible for offering opportunities to participate in local and national decision-making processes. Federal agencies provide nationwide public forums to identify and frame environmental issues so that they are addressed consistently across the nation. In setting national policies and standards, the government attempts to build consensus around national priorities by sharing information and giving people a chance to communicate their ideas and concerns. The federal government also supports information and education programs by developing and distributing materials and providing funds.

Many states, tribes, and local governments support educational programs in schools and public forums to explain natural processes, pollution sources, and pollution prevention. They support the educational efforts of museums, nature centers, the news media, nonprofit organizations, and others. In addition, states and local governments receive and disseminate information on hazardous chemicals at facilities and in communities.

Most major federal environmental statutes have provisions for information gathering and dissemination. Some provisions focus on a single medium (air databases, for example), whereas others look broadly across all media (test submissions under the Toxic Substances Control Act, for example). The federal government is responsible for coordinating the flow of information among all of its databases, sharing data with states and the public, and making nonconfidential data more accessible through electronic and other means. The federal government also shares data and information with foreign governments to support international environmental programs.

## Information and Education Milestones for 2005

The milestones in this chapter represent some interrelated steps toward improving understanding of the environment through better information and education and increased access to information and education. They measure progress in providing:

- Access to information on environmental conditions.
- Information on the pollution sources affecting communities.
- Information about the toxic effects of the products and chemicals people use.
- Electronic access to information, including one-stop access to and reporting of facility information.
- Support for environmental education programs.
- International collaboration to share information about releases, transfers, and movement of hazardous and toxic materials.

***Federal Reviewers:***
*Please provide other related agency targets*

**MILESTONE**

**1**

# *By 2005,*

**current, accurate, and easily accessible information on environmental conditions will be available for at least 75 of the largest metropolitan areas.**

Americans have a right to know the environmental conditions in the places where they live, work, and play. For environmental information to be useful in decision making, up-to-date data from government and private sources needs to be pulled together and made easily available.

Similar to weather reports, "environmental reports" will provide Americans with the information they need to make decisions related to the quality of their air, water, and land. This information will be useful in a variety of ways. It might affect decisions on economic activities, such as agriculture and industry, or decisions on recreational activities like swimming and fishing. It might be useful as a guide for everyday activities. For example, Americans need to know what is in their drinking water so they can take appropriate action to protect their families. Residents of urban areas need to know the quality of the air they breathe, especially as it might affect the health of children and older persons. Timely air quality information can mean the difference between hospitalization and a healthy day for an asthmatic child. (Asthma is now the leading cause of hospitalization for young children in the United States.) Providing reliable and up-to-date environmental information will expand the ability of families, businesses, and communities to assess significant environmental problems and make better choices for themselves.

A national right-to-know network of key indicators on the environmental conditions of communities and ecosystems will be available in 75 of the largest metropolitan areas. It will include information from EPA, states, local sources, and other federal agencies. This information will be accessible through a comprehensive computer system with links to schools, libraries, community centers, and homes.

### *Tracking Results*

Progress will be measured by periodic evaluations of customers' use of local and regional environmental reports.

MILESTONE

2

# *By 2005,*

**the public's right to know what materials are released in their communities will be more fully addressed by the collection and publication of more comprehensive measures of the pollution sources.**

***Federal Reviewers:***
*Please provide other related agency targets*

Americans should have accurate, easily accessible information about major sources of pollution. They should be able to find out which facilities are contributing significantly to surface water and beach contamination, smog, acid rain, and other contamination. Pollution sources include routine releases from facilities, sudden (or emergency) releases, and nonpoint source releases. Important emissions data for many chemicals and facilities—covering emissions to air, land, and water—are already available to communities through EPA's Toxics Release Inventory (TRI). Federal and state governments collect other kinds of source-specific data. EPA provides facility information through data collections in the air, water, and accidental release programs. For example, facilities that discharge into rivers and streams report routine discharge information.

EPA is working to expand its data on chemical releases as part of its efforts to support the public's right to know. TRI, which contains facility-specific data on releases and the management of hundreds of toxic chemicals across the nation, will be expanded to provide a more comprehensive picture of toxic chemical releases in the United States. EPA recently added 286 reportable chemicals and has proposed expansion of TRI to include additional industries such as the coal- and oil-burning utilities, metal mining, and chemical processors. EPA is also considering the addition of chemical use information. The intention of Congress was for TRI to provide information to local communities in order to improve understanding of the impacts of releases at the local level and estimate local risks. TRI is a cornerstone of local empowerment in that it has helped communities determine which risks are acceptable. Expanded TRI reports, together with information collections in air, water, and waste programs, will provide critical parts of the comprehensive picture of facility releases.

As part of its Community Right-To-Know initiative to increase the availability of chemical use information, EPA is considering the collection of "materials accounting" data. This type of information would inform the public of the amount of a toxic chemical coming into a facility, the amount transformed into products or waste, and the resulting amount leaving the facility. Materials accounting would provide a more detailed and accurate picture of environmental performance and toxic materials.

### *Tracking Results*

EPA will complete its rulemaking on expanding TRI to include additional industries and will provide periodic reports on the source-specific data that are available to the public.

***Federal Reviewers:***
*Please provide other related agency targets*

**MILESTONE**
**3**

# *By 2005,*

**Americans will have improved environmental information about the products and chemicals they use, including data on toxic effects such as hormonal, reproductive, growth, and developmental risks.**

Consumers have a right to know about the potential effects of the food, products, and chemicals they use. Everyone needs better information as a tool for better decision making. EPA will build on the success of existing right-to-know programs to provide information that can assist governments and citizens in assessing and avoiding environmental and health risks.

Environmental and health data are not available for many commonly used chemicals. In particular, there is not sufficient knowledge of the effects of cumulative and simultaneous exposures from different chemicals. More information needs to be made available about the risks to children from environmental pollution. Children are more sensitive to many pollutants, and the way they play exposes them to added environmental hazards.

For people to understand the risk of a product or chemical, they need to know the potential toxic effects of exposure. Industry and government must develop this information and provide clear and publicly available results of toxicity studies.

Government and industry will develop toxicological information on the most widely used chemicals and pesticides, including endocrine disrupters, where there is a potentially significant risk of exposures for families, workers, and the environment. As part of the Food Quality Protection Act, EPA will develop right-to-know provisions for increased public information concerning the risks of pesticides on foods. EPA will ensure that pesticide use is safe for workers and consumers, with particular attention to children. EPA will coordinate with other agencies (such as OSHA, NIOSH, and HHS) that have responsibility in these areas.

### *Tracking Results*

EPA will produce reports on its progress in making health-related information available. Chemical Fact Sheets available to the public will be listed and published in full on the Internet.

MILESTONE

4

# *By 2005,*

**more information on environmental programs will be publicly available, including one-stop access to and reporting of this information. EPA will make 90 per cent of its databases with raw environmental data and 100 percent of its major reports, policy statements, and *Federal Register* notices available electronically.**

***Federal Reviewers:***

*Please provide other related agency targets*

An important facet of right to know is that data are easily accessible. Currently, environmental data on industrial facilities and other pollution sources are collected under a patchwork of regulatory and statutory authorities at the federal, state, and local levels. This approach is sometimes unnecessarily duplicative for industries reporting the data and can make it difficult for people to use the information. Consolidating, streamlining, and integrating reporting and access mechanisms will help make the information more understandable, usable, and consistent across environmental areas of concern. Consolidating the information required by EPA can empower individuals and organizations to address environmental problems at the local level.

EPA is developing a "one-stop" system for both easy public access to environmental information in a timely manner and routine reporting of pollutant emissions by the regulated community. "One-stop" means easy public access to multi-agency pollution information at a facility and community level. "One-stop" also means that a regulated entity will submit only one set of environmental data to one location. These new approaches and information systems will reduce duplicative reporting for industry, foster multimedia and geographic strategies for solving environmental problems, and provide the public with meaningful, timely access to environmental data.

EPA will upgrade its communication of nonconfidential environmental information through electronic media. EPA will build partnerships with states to coordinate national and state environmental data in a single framework. Partnerships will ensure that the information is widely disseminated and available at reasonable cost by enhancing electronic access both directly and through third parties (e.g., universities, nonprofit organizations). EPA will expand and improve its system for identifying and locating information across the Agency. Greater availability will also include expanding public access to analytical tools (e.g., risk assessment and hazard evaluation models) that individuals and organizations can use to interpret environmental data.

### *Tracking Results*

States and EPA will give every major industrial and other type of facility that generates, stores, or disposes of hazardous and toxic wastes a unique identifying number and will use this number to link all environmental information related to the facility. EPA will track progress toward assigning these identifying numbers and consolidating requirements into a single system, reported on an annual basis.

EPA will also track progress in making its nonconfidential environmental databases with facility information available electronically and progress in publishing the Agency's notices, policies, and major reports electronically. EPA will provide software to search all of its major databases in electronic format.

***Federal Reviewers:***
*Please provide other related agency targets*

**MILESTONE**

**5**

# *By 2005,*

**there will be substantial growth in the number and quality of environmental education programs in schools, colleges, and communities.**

Environmental education programs can help people become more active and effective participants in environmental decision making by increasing their knowledge, skills, and abilities and helping them make informed decisions that affect the environment. Currently, however, environmental education efforts are highly fragmented, with quality and funding varying from program to program. EPA will strive to improve communication and coordination among environmental programs within EPA and other federal agencies and between the federal government and other key players such as states, nonprofit organizations, and the private sector.

EPA will encourage public and private partnerships to leverage scarce resources. The Agency will also support efforts by the environmental education community to better define goals and priorities and to complete the development of standards to ensure quality. EPA will continue to support quality environmental education programs by awarding grants to schools, states, and nonprofit organizations to help them implement and improve educational programs. Special emphasis will be placed on interdisciplinary program development and the delivery of training programs to teachers and other education professionals.

## *Tracking Results*

EPA's National Environmental Education Advisory Council will continue to assess the status of environmental education nationally and report the results of its assessment to Congress. This assessment will measure state progress in implementing programs in grades K to 12 and progress by universities and colleges in offering environmental degrees and incorporating environmental education throughout various disciplines. The assessment will also measure efforts by federal and state agencies and nonprofit organizations to provide teacher training, improve access to education materials, and target nontraditional audiences such as culturally diverse, low-income, and adult populations. EPA will develop additional measures in the next 2 years to further assess progress toward this milestone.

MILESTONE

6

# *By 2005,*

**nations will be better able to share information on the transport of pollutants and the movement of hazardous and toxic materials across borders.**

***Federal Reviewers:***

*Please provide other related agency targets*

Chemicals move across international borders through releases of pollutants and through the shipping of commercial chemicals and hazardous wastes. Toxic and hazardous shipments are of concern because of their potential risk to people and the environment if not handled properly. The movement of these shipments has gained wide attention over the past decade. For example, the Montreal Protocol, signed by more than 20 countries, asserts the willingness of the signatories to share information about the production of certain ozone-depleting chemicals and the effects of global pollution. Another step toward information sharing is the implementation of hazardous waste manifests that help track the movement of wastes across the Mexican border. Work has also proceeded on other international issues such as ocean dumping, disposal, and pollution releases.

The United States' Toxics Release Inventory has gained interest from other nations as a means to track a broad range of pollutants. In 1992, the United Nations' Conference on Environment and Development urged nations to establish pollutant release tracking systems to enhance environmental planning and citizens' right to know. Further, the U.N. Organization of Economic Cooperation and Development recommended establishing such tracking systems in member countries. These data will enable nations to track progress on reducing toxics and strengthen their ability to determine where international toxics reduction agreements are needed. EPA will continue to work with other countries to provide a more comprehensive picture of both pollutant releases and the movement of hazardous and toxic materials.

### *Tracking Results*

The United States will report progress on its work with other North American nations to help develop and expand right-to-know programs and to exchange information. The United States will help develop international information systems on pollutant transport. EPA will track the development of right-to-know programs in other nations and the establishment of international data sources leading to the successful exchange of information among nations. Additional measures will be developed over the next 2 years.

## Strategy

Levels of public empowerment are not easily defined or measured, but we can evaluate what is communicated or disseminated. It is possible to establish some surrogate measures; for example, the quality and availability of data, the quality and availability of explanatory information for a variety of audiences, and the delivery mechanisms for educating policy makers and the public. And it might become possible to establish measures for the nation's progress in awareness of environmental issues.

The strategy for achieving this goal focuses on improving information, providing better public access to it, improving the consistency of the information across national and international environmental programs, and helping to educate to improve our ability to use this information.

To achieve the milestones, EPA will use a variety of strategies focused on three areas: improving and increasing educational opportunities; improving information about environmental sources, conditions, and effects; and increasing access to this information. Critical to the success of these strategies will be cooperation and collaboration with all potential partners, including federal, state, tribal, and local governments, educational institutions, nonprofit organizations, and businesses.

### *Improving and Increasing Educational Opportunities*

EPA's environmental education activities will support public understanding of the importance of active participation in efforts to achieve a healthier environment. To achieve milestone 5, EPA will support and encourage the interdisciplinary environmental education programs of state and local governments, schools and universities, and nonprofit organizations through grants, teacher training, internships, and national recognition for outstanding efforts and model programs. EPA will build stronger partnerships with other governmental organizations and with the private sector to improve public understanding of the role of science in environmental decision making. EPA will also cooperate with its counterparts in other countries and with international organizations to advance common goals for environmental education.

EPA will promote increased coordination of federal and nonfederal efforts and will help its state, local, and tribal partners develop their environmental management, compliance, and enforcement skills. Through the National Enforcement Training Institute, EPA will develop and deliver courses to provide increased understanding of the principles and methods of preventing, investigating, and resolving violations of environmental laws.

### *Improving and Increasing Environmental Information*

*Expanding the coverage of pollution sources.* The Toxics Release Inventory (TRI) is one of EPA's best known environmental information reports. It is an annual accounting of toxic chemical releases, transfers, and waste generated by industrial facilities in communities across the country. EPA will increase the number of chemicals and the kinds of facilities covered in the TRI to make it a more comprehensive tool. EPA will develop a program to foster facility risk management planning under the 1990 Clean Air Act, which will make additional information available to the public. These actions will give the nation a more representative picture of toxic chemical releases, transfers, and management and will facilitate progress toward milestone 2.

*Providing additional information about local and regional conditions.* As a major element in progress toward milestone 1, EPA's Office of Water will expand the Internet "Surf Your Watershed" program, linking it to other environmental data of interest to citizens such as data related to air, pesticides, and hazardous waste sites. Surf Your Watershed will include the capability to search environmental information in large metropolitan areas. There will be a special effort to ensure that the information for the

largest city in each state is added to the Surf program, which will include links to local data sources. In addition to the largest metropolitan areas in each state, Surf will also cover 25 other large cities. EPA will also continue to issue a national report through the National Watershed Assessment Program (NWAP) that will characterize the overall health of watersheds throughout the nation based on a number of key environmental indicators.

*Expanding information about the health effects of products and chemicals.* EPA will make increasing amounts of information about risks of pesticides on foods available to the public. EPA will reassess 33 percent of all pesticide tolerances and 100 percent of all tolerances established for foods commonly consumed by infants and children by 2005. EPA will reregister pesticides every 15 years. Pesticides, paint strippers, and other potentially toxic materials will be labeled with updated safety, use, and disposal information, presented in easily understood terms. EPA will develop a Toxics Agenda to set priorities for addressing chemicals based on risk. EPA will continue to aggressively pursue the Screening Information Data Sets (SIDS) program, an international initiative to gather, summarize, and share data on major chemicals in commerce, and to establish minimum standards for necessary information about critical chemicals. This industry-supported effort has evaluated nearly 70 chemicals and is planning to evaluate over 200 more in the next several years. EPA and the Agency for Toxic Substances and Disease Registry will continue to publish chemical fact sheets summarizing in nontechnical language what is known about widely used chemicals. These efforts will help achieve milestone 3.

*Integrating environmental data interpretation and statistics.* Improved information collection and access to information make it more important than ever for EPA to provide sound statistical interpretation of this information. EPA is committed to increasing public access to quality information and statistics on environmental conditions and trends. EPA also will provide specialized assistance and analytic tools to communities so that they can address local problems. Emphasis will be placed on integrating data collected by national and local entities, rather than attempting to collect primary data.

### Improving and Increasing Access to Information

*Consolidating information and reducing duplication.* A key component of improving public access is the consolidation of information provided to EPA under a variety of statutory and regulatory authorities. The current approach is burdensome to industry and makes it difficult for everyone to use the data. EPA's one-stop access and reporting initiative, a major element of milestone 4, strives to fashion an unambiguous way to identify facilities; consolidate the EPA information collections on environmental releases, transfers, and emissions as much as possible; and otherwise reengineer the way in which reporting is accomplished. At the same time, EPA is working to create a single, clear, and easy-to-use point of public access to the Agency's environmental data holdings.

Achieving milestone 4 requires both a fundamental reengineering of how EPA, the states, and the regulated community manage information, and a sensitivity on the part of those who collect and manage data to the information needs of communities. EPA and the states will adopt a consistent approach to the identification of regulated facilities. Specific changes in reporting requirements in the state/EPA data management system will be pilot-tested and in place by 2000. In 1997, Arizona (under a grant from EPA) will initiate a pilot project to design and implement a comprehensive, uniform emergency response plan, which will consolidate more than a half-dozen environmental and health/safety plans. Arizona will make the consolidated plan available to the public on the Internet and through other means in real time. Eventually, these new systems will create a common set of basic information for all programs, starting with unified facility identification information and common chemical nomenclature.

*Improving electronic access.* EPA will build partnerships with state, tribal, and local governments and nongovernmental organizations to ensure that environmental information is widely available. EPA's Community-Based Environmental Protection Initiative (for all Agency programs) is one mechanism to achieve milestone 4. EPA will upgrade the electronic communication of environmental information by significantly expanding the type and amount of information on the Internet, and by providing easy access to data on major facilities and releases from them. Integrated public access to facility data will be available via the Internet within 2 years. An environmental "data warehouse" will be available containing easily accessed environmental information. Governmental environmental information will be fully indexed for easy retrieval of all EPA information resources.

EPA will continue to oversee the appropriate use of confidentiality claims to increase information available to the public. EPA will also establish an electronic interface for the data collections it makes and will strive to consolidate the periodic site- or region-specific reports submitted to EPA and the states.

*Expanding international collaboration on pollutant transport and chemical shipments.* To achieve milestone 6, EPA will continue to work with other nations to expand technical and administrative means for sharing information on the transport of pollutants and the shipment of chemical and hazardous materials across borders. The United States continues to participate in the Montreal Protocol to track and reduce ozone-depleting substances. Through the North American Free Trade Agreement (NAFTA) and its environmental side agreement, the United States will work with other North American nations to ensure sound management of chemicals across the continent. Through United Nations committees, the United States is addressing land-based sources of marine pollution and long-range air transport issues; particular attention is being given to persistent organic pollutants. EPA is responding to requests from other governments as they design and implement their own TRI programs, known internationally as PRTRs (Pollution Release and Transfer Registries). Several other nations will soon initiate such programs. In addition, EPA will continue to develop and offer international courses and conferences designed to assist foreign governments in developing their environmental programs and capacities, including economics, standard setting, evaluation, and enforcement and compliance assurance programs concerning transboundary issues.

## References

### *Text Notes*

1. USEPA. 1994. *The Environmental Justice Hotline 1-800-962-6215*. EPA-200-F-83-004. Washington, DC: U.S. Environmental Protection Agency, Office of Environmental Justice.
2. USEPA. 1994. *Serving a Diverse Society: EPA's Role in Environmental Justice*. EPA-200-F-93-001. Washington, DC: U.S. Environmental Protection Agency, Office of Environmental Justice.

# APPENDIX A:

# GOALS, MILESTONES, AND DATA

Appendix A contains a listing of all 66 milestones in this report. The "Data Source" column provides information supplied by EPA staff. "Contact Persons" are those in EPA's offices familiar with the milestone statements. Information in the "About the Data" column was compiled by EPA's Environmental Information Division from questionnaires filled out by staff in the program offices. This information has not yet been reviewed by EPA managers.

The ***milestones*** are environmental progress indicators with 9-year target levels using available national data to track results. The "Indicator Type" column characterizes the milestone data according to the Pressure-State-Response (P-S-R) Framework. This framework for organizing environmental information to support decision-making has been endorsed by the Council on Environmental Quality (CEQ) and the Organization for Economic Cooperation and Development (OECD).

An ***indicator*** is a measurable feature, value, or parameter that provides useful information about (1) patterns or trends in environmental conditions (which include human health, quality of life, and ecological integrity); (2) human activities that affect or are affected by the environment; and/or (3) the relationships among these variables. In general, an indicator has significance extending beyond what is directly obtained from observations; indicators simplify quantitative information to enhance communication.

**Indicator Types:**

**P** ***Pressure*** indicators describe causes of environmental problems, for example, pollutant emissions, land use, energy consumption, or other interventions that place a burden on the environment. They may relate to human activities or be natural events.

**S** ***State*** indicators describe conditions and changes in ecosystems or aspects of the environment (e.g., air, soil, water), human health, and environment-related human welfare. Other terms include "status and trends" or "condition" indicators. They include such measures as toxic chemical levels, physical conditions such as air temperature, ecological measures such as species diversity, and human health measures such as illnesses or exposure to toxic chemicals.

**R** ***Response*** indicators pertain to actions taken by society or individuals in response to or anticipation of damage to the environment. They would include cleanup or restoration activities, implementation and enforcement of environmental regulations, land use planning, and program strategic planning.

Note: For additional information on indicators see USEPA, *A Conceptual Framework to Support Development and Use of Environmental Information in Decision-Making*, EPA 239-R-95-012 (Washington, DC: U.S. Environmental Protection Agency, Environmental Statistics and Information Division, Office of Policy, Planning and Evaluation, 1995).

| MILESTONE | DATA SOURCE | CONTACT PERSON AND EPA OFFICE | INDICATOR TYPE [1] | ABOUT THE DATA |
|---|---|---|---|---|
| **CLEAN AIR**<br>**Long-Range Goal: Every American city and community will be free of air pollutants at levels that cause significant risk of cancer or respiratory and other health problems. The air will be clearer in many areas, and life in damaged forests and polluted waters will rebound as acid rain, ozone, and hazardous air pollutants are reduced.** | | | | |
| 1. By 2005, the number of cities where air quality does not meet national standards will be reduced more than 96 percent from 1995 levels, thereby making the air safer to breathe for an additional 85 million Americans in 164 metropolitan areas. | USEPA. 1995. *National Air Quality and Emissions Trends Report, 1994.* Washington, DC: U.S. Environmental Protection Agency.<br><br>Database: Findings and Required Elements Data System (FREDS) | Tom Eagles<br>(202) 560-5585<br><br>Office of Air and Radiation | State | Distribution of monitoring stations does not accurately represent the entire attainment area.<br>A major expansion of the monitoring network would better characterize exposure rather than to use data relating to number of people living in nonattainment areas. |
| 2. By 2005, emissions of unhealthy smog-causing volatile organic compounds will fall 68 percent per mile per car, compared to 1990 levels. | USEPA. 1995. Projections using Mobile 5 Database. Washington, DC: U.S. Environmental Protection Agency, Office of Air and Radiation. | Tom Eagles<br>(202) 560-5585<br><br>Office of Air and Radiation | Pressure | Data are estimates based on modeling and are not derived from direct measurements. Reporting is not consistent or standardized across states. |
| 3. By 2005, increases in miles driven by U.S. vehicles will not interfere with attainment or maintenance of air or water quality standards, nor will increases in driving interfere with fulfillment of the U.S. commitment to reduce greenhouse gas emissions. | USEPA. 1995. Projections using Mobile 5 Database. Washington, DC: U.S. Environmental Protection Agency, Office of Air and Radiation. | Will Schroeer<br>(202) 260-1126<br><br>Office of Policy, Planning, and Evaluation<br><br>Office of Air and Radiation | Pressure | Baseline data do not currently exist. |
| 4. By 2005, all 174 categories of major industrial facilities will meet toxic air emission standards. | USEPA 1995. *Schedule for Regulation of Toxic Source Categories, 40 CFR Parts 61 and 63.* Washington, DC: U.S. Environmental Protection Agency, Office of Pesticide Programs. | Tom Eagles<br>(202) 560-5585<br><br>Office of Air and Radiation | Response | This is a compliance milestone presented as a surrogate indicator; data on toxics emissions are limited. |

[1] **Pressure:** Pressure/emissions/loadings or other stressors **State:** State/condition of the environment or human health **Response:** Response by society in the form of actions

| MILESTONE | DATA SOURCE | CONTACT PERSON AND EPA OFFICE | INDICATOR TYPE [1] | ABOUT THE DATA |
|---|---|---|---|---|
| 5. By 2005, sulfur dioxide emissions, a primary cause of acid rain, will be reduced by nearly 10 million tons from 1980 levels. | USEPA. 1995. Projections. Washington, DC: U.S. Environmental Protection Agency, Office of Air and Radiation.<br><br>Database: Acid Rain Emissions Tracking System | Rosemary Wolfe<br>(202) 233-9176<br><br>Office of Air and Radiation | Pressure | Data quality is high because data is from actual emissions rather than model estimates. |
| 6. By 2005, annual average visibility in the eastern United States will improve 10 to 30 percent from 1995 levels. | Acid Rain Emissions Tracking System. Interagency Monitoring of Protected Visual Environments (IMPROVE). | Tom Eagles<br>(202) 560-5585<br><br>Office of Air and Radiation | State | Data exists for other U.S. areas (especially National Parks); Appalachia data is presented as an indicator that will show most change. |

[1] **Pressure:** Pressure/emissions/loadings or other stressors **State:** State/condition of the environment or human health **Response:** Response by society in the form of actions

| MILESTONE | DATA SOURCE | CONTACT PERSON AND EPA OFFICE | INDICATOR TYPE [1] | ABOUT THE DATA |
|---|---|---|---|---|
| **CLEAN WATERS**<br>**Long-Range Goal: All of America's rivers, lakes, and coastal waters will support healthy communities of fish, plants, and other aquatic life and uses such as fishing, swimming, and drinking water supply for people. Wetlands will be protected and rehabilitated to provide wildlife habitat, reduce floods, and improve water quality. Ground waters will be cleaner for drinking and other beneficial uses.** | | | | |
| 1. By 2005, there will be an annual net increase of at least 100,000 acres of wetlands, thereby supporting valuable aquatic life, improving water quality, and moderating the effects of health- and property-damaging floods and drought. | Dahl, T.E. 1990. *Wetland Losses in the United States 1780s to 1980s.* Washington, DC: U.S. Fish and Wildlife Service.<br><br>USDA. 1992. *Summary Report National Resource Inventory.* Washington, DC: U.S. Department of Agriculture, Soil Conservation Service.<br><br>Databases: National Wetlands Inventory and National Resource Inventory | Doreen Robb<br>(202 260-1906<br><br>Office of Water | State | Limitations of wetlands data collected by USFWS are well known and data collection system is under improvement. |
| 2. By 2005, 80 percent of the nation's surface waters will support healthy aquatic communities. | USEPA. 1995. *National Water Quality Inventory, 1994 Report to Congress.* EPA 841-R-95-005. Washington, DC: U.S. Environmental Protection Agency, Office of Water.<br><br>USEPA. 1994. *A Report on the Condition of the Estuaries of the United States in 1990-1993: A Program in Progress.* Washington, DC: U.S. Environmental Protection Agency, Office of Water.<br><br>Davis, W.S., B.D. Snyder, J.B. Stribling, and C. Stoughton. 1996. *Summary of State Biological Assessment Programs for Streams and Wadeable Rivers.* EPA 230-R-96-007. Washington, DC: U.S. Environmental Protection Agency, Office of Planning, Policy, and Evaluation.<br><br>Databases: Waterbody System (WBS) | Marjorie Pitts<br>(202) 260-6265<br><br>Elizabeth Fellows<br>(202) 260-7062<br><br>Office of Water | State | Bioassessment data presented are based on direct biological monitoring surveys. National Water Quality Inventory contains assessment results which may be based on methods other than direct biological measures (e.g. chemicals) of conditions for aquatic life. EMAP Estuaries is statistically excellent data, with percent of national impairment based on projections. EMAP-Estuaries program has been discontinued. It is anticipated 305(b) reporting process will integrate all three components in next reporting cycle to provide a more complete picture of national conditions for aquatic biological communities.The data represent a snapshot of water quality conditions, and direct comparisons with previous years are limited. |

[1] **Pressure:** Pressure/emissions/loadings or other stressors **State:** State/condition of the environment or human health **Response:** Response by society in the form of actions

| MILESTONE | DATA SOURCE | CONTACT PERSON AND EPA OFFICE | INDICATOR TYPE [1] | ABOUT THE DATA |
|---|---|---|---|---|
| 3. By 2005, 90 to 98 percent of the nation's fish and shellfish harvest areas will provide food safe for people and wildlife to eat. | USEPA. 1995. *National Water Quality Inventory, 1994 Report to Congress.* EPA 841-R-95-005. Washington, DC: U.S. Environmental Protection Agency, Office of Water.<br><br>USEPA. 1994. Data from National Listing of Fish Consumption Advisories database. Washington, DC: U.S. Environmental Protection Agency, Office of Science and Technology.<br><br>Databases: Waterbody System (WBS) and National Fish Consumption Advisories database. | Marjorie Pitts (202) 260-6265<br><br>Elizabeth Fellows (202) 260-7062<br><br>Office of Water | State | Fish advisory data is on track to become more consistent state to state. Fish advisory data will be integrated into next 305(b) reporting cycle enhancing state reports. Many problems exist in consistency and quality of 305(b) data and its limitations are well documented. Recent guidance for next reporting cycle began transformation of 305(b) reporting process addressing data quality, assessment coverage, and other issues. Data cannot be used for trends. The data represent a snapshot of water quality conditions, and direct comparisons with previous years are limited. |
| 4. By 2005, 95 percent of the nation's surface waters will be safe for recreation. | USEPA. 1995. *National Water Quality Inventory, 1994 Report to Congress.* EPA 841-R-95-005. Washington, DC: U.S. Environmental Protection Agency, Office of Water.<br><br>Databases: Waterbody System (WBS) | Elizabeth Fellows (202) 260-7062<br><br>Office of Water | State | Data contained in 305(b) report: milestone aggregates swimming and secondary contact use support. Many problems exist in consistency and quality of 305(b) data and its limitations are well documented. For example, states have adopted different water quality criteria and standards and use differing assessment methodologies. Recent guidance for next reporting cycle began transformation of 305(b) reporting process addressing data quality, assessment coverage, locational information, and other issues. Data cannot be used for trends. The data represent a snapshot of water quality conditions, and direct comparisons with previous years are limited. |

[1] **Pressure:** Pressure/emissions/loadings or other stressors **State:** State/condition of the environment or human health **Response:** Response by society in the form of actions

| MILESTONE | DATA SOURCE | CONTACT PERSON AND EPA OFFICE | INDICATOR TYPE [1] | ABOUT THE DATA |
|---|---|---|---|---|
| 5. By 2005, the number of Americans served by community and rural water wells containing high concentrations of nitrate in ground water will be reduced. | USEPA. 1990. *National Survey of Pesticides in Drinking Water Wells, Phase I Report.* Washington, DC: U.S. Environmental Protection Agency, Office of Drinking Water and Office of Pesticide Programs.<br><br>Databases: SDWIS, STORET, and USGS data and studies. | Roger Anzzolin<br>(202) 206-7782<br><br>Office of Water | State | Ambient ground water data at a national level (other than one time studies) is sparse. As a surrogate measure, ground water information found in SDWIS is presented since it can link ground water nitrate levels with potential exposure to population. |
| 6. By 2005, the annual rate of soil erosion from croplands will be reduced 20 percent from 1992 levels to a total of 948 million tons per year. | USDA. 1992. *Summary Report National Resource Inventory.* Washington, DC: U.S. Department of Agriculture, Soil Conservation Service.<br><br>Database: National Resource Inventory | Elizabeth Fellows<br>(202) 260-7062<br><br>Office of Water | Pressure | USDA National Resource Inventory is considered a statistically reliable data source especially for large areas and long-term trends. |
| 7. By 2005, total annual pollutant discharges from key point sources that threaten public health and aquatic ecosystems will be reduced by 3 billion pounds. | Office of Water Analyses based on EPA Support Documents for Effluent Limitation Guidelines and Pretreatment Standards and Toxic Release Inventory data.<br><br>USEPA. 1994. Data from National Sediment Inventory. Washington, DC: U.S. Environmental Protection Agency, Office of Science and Technology.<br><br>USEPA. 1993. 1992 Needs Survey Report to Congress. EPA 832-R-93-002. Washington, DC: U.S. Environmental Protection Agency, Office ofWater.<br><br>Analysis for President's Clean Water Initiative, March 1994.<br><br>Databases: TRI and PCS | Marjorie Pitts<br>(202) 260-1304<br><br>Jim Horne<br>(202) 260-5802<br><br>Office of Water | Pressure | For POTWs and CSOs point source data sources are based on 1992 Needs Survey which is considered a high quality analysis with statistically valid projections. The industrial point sources are based on analyses in developing effluent limitations for industries and from TRI for toxics that are estimated to settle into sediments. The four categories depicted track different groups of pollutants (see chapter 2 endnotes). |

[1] **Pressure:** Pressure/emissions/loadings or other stressors **State:** State/condition of the environment or human health **Response:** Response by society in the form of actions

| MILESTONE | DATA SOURCE | CONTACT PERSON AND EPA OFFICE | INDICATOR TYPE [1] | ABOUT THE DATA |
|---|---|---|---|---|
| **HEALTHY TERRESTRIAL ECOSYSTEMS**<br>**Long-Range Goal: America will safeguard its ecosystems to promote the health and diversity of natural and human communities and to sustain America's environmental, social, and economic potential.** | | | | |
| 1. By 2005, the loss of ecosystem types considered critically endangered, endangered, or threatened will be eliminated. | Noss, R.F., E.T. La Roe, III and J.M. Scott. 1995. Biol. Report 28, *Endangered Ecosystems of the United States: A Preliminary Assessment of Loss and Degradation.* Washington, DC: U.S. Department of the Interior, National Biological Service (NBS). | Brad Crowder (202) 260-3528<br><br>Molly Whitworth (202) 260-7561<br><br>Office of Policy, Planning, and Evaluation | State | Report cited (Noss et al.) explains how NBS developed a baseline (preliminary) depiction of ecosystems at risk. Measurements and monitoring techniques are rapidly changing and will provide a more comprehensive and accurate picture that potentially may change this baseline. Ecosystem condition, function and health will ultimately be integrated into this milestones as technology improves and as resources are available. |
| 2. By 2005, the populations of endangered, threatened, rare, and declining species of native terrestrial animals and plants will be stabilized or increased. | USFWS. 1994. *Recovery Program Endangered and Threatened Species, 1994 Report to Congress.* 62pp. Washington, DC: U.S. Department of the Interior, Fish and Wildlife Service. | Brad Crowder (202) 260-3528<br><br>Molly Whitworth (202) 260-7561<br><br>Office of Policy, Planning, and Evaluation | State | FWS listing program of endangered species is currently not funded and there is a moratorium on listing new species. Thus population trends depicted in this indicator will not necessarily reflect actual conditions. Data from NBS, The Nature Conservancy and state National Heritage Programs may be used to support FWS data and to generate additional indicators for this milestone. |
| 3. By 2005, ecosystem conditions and functions will be restored to ultimately provide adequate amounts of habitat with the necessary size, mixture, and quality to sustain native animals and plants in all regions. | Noss, R.F., E.T. La Roe, III and J.M. Scott. 1995. Biol. Report 28, *Endangered Ecosystems of the United States: A Preliminary Assessment of Loss and Degradation.* Washington, DC: U.S. Department of the Interior, NBS.<br><br>USFWS. 1994. *Recovery Program Endangered and Threatened Species, 1994 Report to Congress.* 62pp. Washington, DC: U.S. Department of the Interior, Fish and Wildlife Service. | Brad Crowder (202) 260-3528<br><br>Molly Whitworth (202) 260-7561<br><br>Office of Policy, Planning, and Evaluation | State | There is a wide variety of sources of data and information as well as different definitions and measurement standards across agencies and other groups. Coordination of efforts across agency and other jurisdictions to assemble, present and analyze data on a variety of interconnected ecosystems, species, and resources is not yet defined. |

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| MILESTONE | DATA SOURCE | CONTACT PERSON AND EPA OFFICE | INDICATOR TYPE [1] | ABOUT THE DATA |
|---|---|---|---|---|
| **SAFE DRINKING WATER**<br>**Long-Range Goal: Every American public water system will provide water that is consistently safe to drink** | | | | |
| 1. By 2005, the population served by community water systems in violation of health-based requirements will be reduced from 19 to 5 percent. | Data from Safe Drinking Water Information System (SDWIS). U.S. Environmental Protection Agency, Washington, DC. | Carl Reeverts (202) 260-7273<br>Office of Water | State | Regulations require states to report inventory and violation data to EPA. EPA has experienced problems with data completeness and quality in some states, but new Q/A procedures under SDWIS is expected to improve data quality. |
| 2. By 2005, every person served by a public water system that draws from an inadequately protected river, lake, or reservoir will receive drinking water that is adequately filtered. | Data from Safe Drinking Water Information System (SDWIS). U.S. Environmental Protection Agency, Washington, DC. | Carl Reeverts (202) 260-7273<br>Office of Water | State | EPA has a separate database to track the progress of unfiltered water systems that have been directed to filter. Steps are underway to integrate this database into SDWIS. |
| 3. By 2005, 90 percent of the nation's river and stream miles and lake and reservoir acres designated as drinking water supplies will provide water that is safe to use after conventional treatment. | USEPA. 1995. *National Water Quality Inventory, 1994 Report to Congress.* EPA 841-R-95-005. Washington, DC: U.S. Environmental Protection Agency, Office of Water.<br>Database: Waterbody System (WBS) | Carl Reeverts (202) 260-7273<br>Office of Water | State | Many problems exist in consistency and quality of 305(b) data and its limitations are well documented. For example, states have adopted different water quality criteria and standards and use differing assessment methodologies. Recent guidance for next reporting cycle began transformation of 305(b) reporting process addressing data quality, assessment coverage, locational information, and other issues. Data can not be used for trends, but represent a snapshot of water quality conditions. Direct comparisons with previous years are limited. |
| 4. By 2005, 60 percent of the population served by community water systems will receive their water from systems with source water protection programs in place. | USEPA. 1993. Wellhead Protection Program Biennial State Reports. Washington, DC.: U.S. Environmental Protection Agency, Office of Water. | Carl Reeverts (202) 260-7273<br>Office of Water | Response | Ambient and compliance monitoring information can be used to validate effectiveness of the source water protection program. States' data requirements were recently expanded to include reporting of communities relying on surface water. |

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|---|---|---|---|---|
| **SAFE FOOD**<br>**Long-Range Goal: The foods Americans consume will continue to be safe for all people to eat.** | | | | |
| 1. Through 2005, the frequency of illegal pesticide residues in food will remain at or below the current low level. | FDA. 1995. *Pesticide Program Residue Monitoring Report,; Surveillance Sample Violation Rates for Foods, 1987-1994.* Washington, DC: Division of Programs and Enforcement Policy, Office of Plant and Diary Foods and Beverages. | Allan Abramson (202) 260-6872<br><br>Office of Prevention, Pesticides, and Toxic Substances | State | Data is from well established FDA program; USDA has Pesticide Data Program which is coming on-line with pesticide residue monitoring data that can supplement FDA data (more food types and more sampling). EPA has proposed a unified pesticide residue database for housing data from USDA, FDA, EPA, and states. |
| 2. By 2005, there will be a significant reduction in the use of the food production pesticides that have the highest potential to cause cancer. | Nako, S. 1994. EPA staff estimates based on EPA/OPP cancer ratings and Doane Pesticide Usage Data Base to be included in OPP Annual Report for FY96 and later years and/or EPA Annual Pesticide Market Estimates Report. Washington, DC: U.S. Environmental Protection Agency, Office of Pesticide Programs. | Allan Abramson (202) 260-6872<br><br>Office of Prevention, Pesticides, and Toxic Substances | Pressure | Pesticide usage data is from a private source (Doane Profile).<br>OPPTS is responsible for providing cancer rating for food use chemicals. |
| 3. By 2005, all pesticide residues in food will meet the statuatory standard of "reasonable certainty of no harm." | USEPA. 1995. Data to be published in Office of Pesticide Programs Annual Report for FY96 and later years. Washington, DC: U.S. Environmental Protection Agency, Office of Pesticide Programs. | Allan Abramson (202) 260-6872<br><br>Office of Prevention, Pesticides, and Toxic Substances | Response | This milestone measures the degree to which tolerance levels are set so that anticipated exposures do not exceed allowable reference doses. It tracks changes in regulatory standards on tolerance levels and not actual residues. |

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| **SAFE HOMES, SCHOOLS, AND WORKPLACES**<br>**Long-Range Goal: All Americans will live, learn, and work in safe and healthy environments.** | | | | |
| 1. By 2005, the number of young children with high levels of lead in their blood will be reduced by more than 50 percent compared to the late 1980s. | Mahaffey, K.R., J.L. Annest, J. Roberts, and R.S. Murphy. 1982. National Estimates of Blood Lead Levels: United States, 1976-1980. JAMA 307 (10):573-579.<br><br>Brody, D.J., J.L. Pirkle, R.A. Kramer, K.M. Flegal, T.D. Matte, E.W. Gunter, and D.C. Paschal. 1994. Blood Lead Levels in the U.S. Population (NHANES III, 1988-1991). JAMA 272(4):277-283. | Doreen Cantor (202) 260-1777<br><br>Office of Prevention, Pesticides, and Toxic Substances | State | NHANES is the best data source for national blood lead level estimates. The National Center for Health Statistics anticipates that the next NHANES will begin in 1998. They plan to continue to include collection of blood lead data in the survey, however, depending on budget constraints and need for this data, collection of blood lead data may become a low priority item. |
| 2. By 2005, 27 million homes will have been voluntarily tested for radon, corrective action will have been taken in 1 million homes, and 1.5 million new homes will have been built with radon-resistant features, resulting in a 25 percent reduction from 1985 levels in the number of Americans exposed to elevated radon in their homes. | USEPA. 1994. *Radon Related Lung Cancer Deaths.* Washington, DC: U.S. Environmental Protection Agency, Office of Radiation and Indoor Air.<br><br>CRCPD. 1994. Radon Risk Communication and Results Study: Biennial Survey. Conference of Radiation Control Program Officials, Frankfort, KY.<br><br>NAHB. 1994. Annual Builders Survey. National Association of Home Builders. Washington, DC. | David Mudarri (202) 233-9053<br><br>Office of Air and Radiation | Response | National Association of Home Builders (NAHB) data are from a private source: data are not random, lack QA/QC and are from voluntary surveys with potential for bias. EPA is beginning to establish a baseline data base on indoor air quality. |
| 3. By 2005, children's exposure to environmental tobacco smoke will decrease through voluntary actions in the home. The proportion of households in which children 6 and younger are regularly exposed to smoking will be reduced to 15 percent from over 39 percent in 1986. | PHS. 1994. National Health Interview Survey, Washington, DC. Health and Human Services, Center for Disease Control. Hyattsville, MD.<br><br>USEPA. 1992. *Respiratory Health Effects of Passive Smoking: Lung Cancer and Other Disorders.* Washington, DC: U.S. Environmental Protection Agency. | David Mudarri (202) 233-9053<br><br>Office of Air and Radiation | State | Differences between PHS and CRCPD need to be addressed. |

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| 4. By 2005, the number of workers suffering adverse health effects caused by acute poisoning from pesticides will be reduced significantly from 1992 levels. | T.L. Litovitz et al. 1985-1995. Annual reports of the American Association of Poison Control Centers National Data Collection System. *American Journal of Emergency Medicine.* Volumes 4-13. | Allan Abramson (202) 260-6872<br><br>Office of Prevention, Pesticides, and Toxic Substances | State | Credible, verifiable data on the nature and cause of poisonings is difficult to obtain and report on a consistent basis over the years. A data set, national in scope, is under development. |
| 5. By 2005, the use of safe agricultural biopesticides will double from 1995 levels. | USEPA. Office of Pesticide Programs, Biological and Economic Analysis Division(OPP/BEAD) calculations.<br><br>OPP/BEAD subscribes to a proprietary agricultural crop pesticide usage data base, which provides estimates of usage in terms of active ingredient used and acreage treated each year (Doane Profile). | Allan Abramson (202) 260-6872<br><br>Office of Prevention, Pesticides, and Toxic Substances | Response | Better data are needed for non-crop use pesticides and their use. Same issue as described in Food # 2 apply. |
| 6. By 2005, the number of existing industrial high-production-volume chemicals shown to be used safely in the workplace will nearly triple. | U.S. Congress, Office of Technology Assessment. 1995. *Screening and Testing Chemicals in Commerce.*<br><br>Data retrieved from a recent report to the Assistant Administrator to OPPTS. Numbers of existing chemical are taken from the TSCA inventory. | Joseph Schechter (202) 260-1540<br><br>Office of Prevention, Pesticides, and Toxic Substances | Response | Data track the number of chemicals reviewed and not necessarily any risk reduction activity.<br>Review of existing and new chemical activity is premised on a preventing future problems. If successful, no effects will occur; however, a "no effect" does not necessarily indicate success. Thus, *quantification of success is difficult.* |
| 7. By 2005, worker protection will be promoted for as many as 10,000 new chemicals. | New chemical numbers derived from annual report statistics generated by USEPA, Office of Prevention, Pesticides, and Toxic Substances, Chemical Control Division, New Chemicals Program. | Joseph Schechter (202) 260-1540<br><br>Office of Prevention, Pesticides, and Toxic Substances | Response | OPPT does not directly determine safety/efficacy of approved new chemicals. Safety is qualitatively determined by staff monitoring of industry submissions when there is evidence of significant risk (required by TSCA §8(e)). Because submissions regarding new chemicals have been very limited, OPPT assumes safe use is high for new chemicals. |

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| **TOXIC-FREE COMMUNITIES**<br>**Long-Range Goal: By relying on pollution prevention, reuse, and recycling in the way we produce and consume materials, all Americans will live in communities free of toxic impacts.** | | | | |
| 1. By 2005, industrial facilities will reduce by 25 percent (from 1992 levels) the quantities of the toxic chemicals in waste streams that are released, disposed of, treated, or combusted for energy recovery. Half of this reduction will be achieved through pollution prevention practices. | USEPA. 1995. Toxics Release Inventory public data release. Washington, DC: U.S. Environmental Protection Agency. Washington, DC.<br><br>Database: Toxics Release Inventory | Bill Hanson (202) 260-3469<br><br>Office of Prevention, Pesticides, and Toxic Substances | Pressure | TRI database only covers reported releases and not necessarily actual releases. Thus, data quality might suffer from a possible industry reporting bias.<br>Progress will be measured annually against a baseline of 1992 Toxic Release Inventory (TRI) data. |
| 2. By 2005, more than 99 percent of new chemicals approved since 1995 will have been used safely and will not require additional controls. | | Bill Hanson (202) 260-3469<br><br>Office of Prevention, Pesticides, and Toxic Substances | Response | Tracking will include the use of data on the frequency of additional controls placed on new chemicals after the initial EPA review. The effort will be supported by industry data on identification of any previously unknown adverse effects. |
| 3. By 2005, the number of existing high-production-volume chemicals shown to be used safely will nearly triple. | EPA staff projections<br><br>U.S. Congress, Office of Technology Assessment. 1995. *Screening and Testing Chemicals in Commerce* (OTA-BP-ENV-166). Washington, DC: Office of Technology Assessment. | Bill Hanson (202) 260-3469<br><br>Office of Prevention, Pesticides, and Toxic Substances | Response | Data track the number of chemicals reviewed and not necessarily any risk reduction activity.<br>Review of existing and new chemical activity is premised on a preventing future problems. If successful, no effects will occur; however, a "no effect" does not necessarily indicate success. Thus, quantification of success is difficult. |

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| 4. By 2005, municipal solid waste will be recovered for recycling or composting at a rate of 35 percent. Municipal solid waste generation will be reduced to the 1990 level of 4.3 pounds per person per day, with the amount of waste combusted or landfilled decreasing to 2.8 pounds per person per day. | Municipal Solid Waste Characterization Data Base, 1994 data.<br><br>USEPA. 1994. *Characterization of Municipal Solid Waste in the United States, 1995 Update.* Washington, DC: U.S. Environmental Protection Agency. | Lillian Bagus (703) 308-8474<br><br>Office of Solid Waste and Emergency Response | Pressure | Data reported directly from communities on the quantity, characteristics, and fate of municipal solid waste would provide a more accurate assessment of progress. This data is not available because of the cost of uniformly generating the information and the lack of infrastructure to obtain it.<br>Depending on the availability of future studies, the data necessary to measure progress towards this milestone might not be available. |
| 5. By 2005, the presence of the most persistent, bioaccumulative, and toxic constituents in hazardous waste will be reduced by 50 percent from 1991 levels. | No database is identified, although the Toxics Release Inventory (TRI) does track a set of persistent bioaccumulative constituents.<br><br>USEPA. 1994. *The Waste Minimization National Plan.* EPA530-R-94-045. Washington, DC: U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. | Lillian Bagus (703) 308-8474<br><br>Office of Solid Waste and Emergency Response | Pressure | EPA is currently identifying future data sources and data collection instruments through the Waste Information Needs (WIN) initiative. Prototype measurement methods are under development and soon will be tested for broad applicability.<br>1991 baseline data are under development. |

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| **PREVENTING ACCIDENTAL RELEASES**<br>**Long-Range Goal: Accidental releases of substances that endanger our communities and the natural environment will be reduced to as near zero as possible. Those which do occur will cause only negligible harm to people, animals, and plants.** | | | | |
| 1. By 2005, there will be 25 percent fewer accidental releases of oil, chemicals, and radioactive substances than in 1993. | USEPA. 1994. Emergency Response Notification System (ERNS) Database. Washington, DC: U.S. Environmental Protection Agency.<br><br>USEPA. 1994. Emergency Response Notification System and Risk Management Program Final Rule (to be promulgated May 24, 1996) Washington, DC: U.S. Environmental Protection Agency. | David Nicholas (202) 260-4512<br><br>Office of Solid Waste and Emergency Response | Pressure | The ERNS database does not always give information on amount released and offsite impact. However, the Risk Management Plan (RMP) requirements for 5-year accident history will help. Chemical Energy Planning and Preparation Office also tracks large accidental releases which result in injury.<br>The RMPs will contain an accident history that begins in 1994 but will focus on large scale releases. Information on the severity of releases based on analysis of impacts to people and the environment is still needed. |
| 2. By 2005, there will be a 50 percent increase over 1993 levels in the number of industrial facilities in high-risk areas that have either eliminated hazardous substance inventories or reduced them to minimum levels. | | David Nicholas (202) 260-4512<br><br>Office of Solid Waste and Emergency Response | Response | A proposed baseline study of selected facilities that report under the RMP rule will provide data on minimum levels and high-risk areas. |

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| **SAFE WASTE MANAGEMENT**<br>**Long-Range Goal: Wastes produced by every person, business, and unit of government in America will be stored, treated, and disposed of in ways that prevent harm to people and other living things.** | | | | |
| 1. By 2005, chlorinated dioxin/furan emissions from waste-burning facilities will be reduced 98 percent from 1994 levels. | USEPA. 1996. *Proposed Rule: Revised Technical Standards for Hazardous Waste Combustion.* Washington, DC: U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response.<br><br>USEPA.1995. *Final Rule: Standards of Performance for New Stationary Sources and Emission Guidelines for Existing Sources—Municipal Waste Combustors.* Washington, DC: U.S. Environmental Protection Agency, Office of Air and Radiation. | Lillian Bagus (703) 308-8474<br><br>Office of Solid Waste and Emergency Response | Pressure | Baseline figures come from estimates generated by proposed rulemaking. New collection efforts not currently in place. |
| 2. By 2005, emissions of mercury and other harmful pollutants from waste-burning facilities will be reduced by at least 80 percent from 1994 levels. | USEPA. 1996. *Proposed Rule: Revised Technical Standards for Hazardous Waste Combustion.* Washington, DC: U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response.<br><br>USEPA.1995. *Final Rule: Standards of Performance for New Stationary Sources and Emission Guidelines for Existing Sources—Municipal Waste Combustors.* Washington, DC: U.S. Environmental Protection Agency, Office of Air and Radiation. | Lillian Bagus (703) 308-8474<br><br>Office of Solid Waste and Emergency Response | Pressure | Baseline figures come from estimates generated by proposed rulemaking. New collection efforts not currently in place. |

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| 3. By 2005, the annual number of confirmed releases from underground storage tanks will be 80 percent lower than in 1994. | USEPA. 1994. Administrator's database. Washington, DC: U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response.<br><br>Data from the UST Activity Report (sometimes referred to as STARS measures), compiled by OUST on a semi-annual basis. | David Wiley<br>(703) 603-7168<br><br>Office of Solid Waste and Emergency Response | Pressure | Variability exists in the quality and the availability of data across states due to inconsistencies in data assessment and reporting procedures.<br>Although state data vary in quality, OUST strives to improve the quality of its performance measure data by reviewing and verifying the data at the regional offices and Heaquarters. An improved data management system, UST Access, is being developed for the states. |
| 4. By 2005, wellhead protection areas and vulnerable ground waters will no longer receive industrial wastewater discharges from septic systems. | Underground Injection Control (UIC) Federal Reporting System Form 7529-2B and the Toxic Release Inventory.<br><br>USEPA. 1994. *Class V Injection Well Regulatory Impact Analysis and Regulatory Flexibility Analysis.* Final Draft. Washington, DC: U.S. Environmental Protection Agency, Office of Ground Water and Drinking Water. | Harriet Hubbard<br>(202) 260-9554<br><br>Office of Water | Pressure | |
| 5. By 2005, 10 percent of the amount of spent nuclear fuel, high-level waste, and transuranic radioactive waste currently stored across the nation will be disposed of in accordance with EPA disposal standards. | DOE. 1992. Integrated Database for 1991: United States Spent Fuel and Radioactive Waste Inventories, Projections, and Characteristics. DOE/RW-006. Washington, DC: Department of Energy. | Brian Littleton<br>(202) 233-9216<br><br>Office of Air and Radiation | Pressure | |

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| **RESTORATION OF CONTAMINATED SITES**<br>**Long-Range Goal: Places in America currently contaminated by hazardous or radioactive materials will not endanger public health and the natural environment and will be restored to uses desired by surrounding communities.** | | | | |
| 1. By 2005, long-term health threats will be eliminated and cleanup will be completed at 95 percent of the 1,212 non-federal facility contaminated sites on the 1995 Superfund National Priorities List. | Database: Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS). | David Nicholas (202) 260-4512<br><br>Office of Solid Waste and Emergency Response | Response | The CERCLIS database contains information on the location of over 30,000 hazardous waste sites, and includes NPL sites. Information provided for NPL sites includes owner/generator information, regulatory and response history, waste description, environmental impact information, water use information, and the remedial events occurring at NPL sites (including planned and actual starts and completions, prior year obligations, current year obligations, and outlays to date). |
| 2. By 2005, immediate health threats will be eliminated and long-term cleanup will be under way at 85 percent of the estimated 3,200 Superfund sites (NPL and non-NPL) expected to require cleanup. | Database: Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS). | David Nicholas (202) 260-4512<br><br>Office of Solid Waste and Emergency Response | Response | See Contaminated Sites Milestone #1 |
| 3. By 2005, at least 10 percent of contaminated federal lands currently on the National Priorities List will be cleaned up. | Database: Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS). | David Nicholas (202) 260-4512<br><br>Office of Solid Waste and Emergency Response | Response | See Contaminated Sites Milestone #1 |

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| 4. By 2005, stabilization to prevent the spread of contamination will be under way or final cleanup completed at 100 percent of operating industrial waste facilities where people have been exposed to contamination. Seventy-five percent of all facilities estimated to require cleanup will be stabilized or cleaned up. | USEPA. 1994. *Corrective Action Program Accomplishment Report.* Resource Conservation and Recovery Information System (RCRIS). Washington, DC: U.S. Environmental Protection Agency, Office of Underground Storage Tanks. | Lillian Bagus (703) 308-8474<br><br>Office of Solid Waste and Emergency Response | Response | |
| 5. By 2005, cleanups will be completed at 200,000 leaking underground storage tank sites—double the 1994 figure. | USEPA. Administrative Tracking System. U.S. Environmental Protection Agency, Office of Underground Storage Tanks, Washington, DC.<br><br>Data from the UST Activity Report (sometimes referred to as STARS measures), compiled by OUST on a semi-annual basis. | Connie Riley (703) 603-7168<br><br>Office of Solid Waste and Emergency Response | Response | Variability exists in the quality and the availability of data across states due to inconsistencies in data assessment and reporting procedures.<br>Although state data vary in quality, OUST strives to improve the quality of its performance measure data by reviewing and verifying the data at the regional offices and Heaquarters. An improved data management system, UST Access, is being developed for the states. |
| 6. By 2005, radioactivity will be cleaned up or contained at 6 percent of sites contaminated by radioactivity. | Database: Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS).<br><br>DOE. Project Tracking System, Performance Measures Databases.<br><br>NRC. Radioactive Material Licenses. | Brian Littleton (202) 233-9216<br><br>Office of Air and Radiation | Response | Tracking will require collecting and making consistent information from three sources/agencies. |
| 7. By 2005, point sources of contamination will be controlled in 10 percent of the watersheds where sediment contamination has currently been determined to be widespread. | USEPA. 1996. *The National Sediment Quality Survey: A Report to Congress on the Extent and Severity of Sediment Contamination in Surface Waters of the United States.* Washington, DC: U.S. Environmental Protection Agency, Office of Water. | Tom Armitage (202) 260-5388<br><br>Office of Water | Response | NSI data represents only 11 percent of the nation's waterbodies and river segments.<br><br>The relationship between point source discharges and sediment quality will require significant site-specific analysis. |

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| **REDUCING GLOBAL AND TRANSBOUNDARY ENVIRONMENTAL RISKS**<br>**Long-Range Goal: The United States and other nations will eliminate significant risks to human health and ecosystems arising from climate change, stratospheric ozone depletion, and other environmental problems of concern at the transboundary and global level.** | | | | |
| 1. By 2005 and beyond, U.S. greenhouse gas emissions will be reduced to levels consistent with international commitments agreed upon under the Framework Convention on Climate Change, building on initial efforts under the Climate Change Action Plan. | The White House. 1993. *The Climate Change Action Plan.* Washington, DC. | Anne Grambsch (202) 260-2782<br><br>Office of Policy, Planning, and Evaluation<br><br>Sam Napolitano (202) 233-9751<br><br>Office of Air and Radiation | Pressure | Available data on greenhouse gas emissions are model estimates and are not actual measured emissions. |
| 2. By 2005, ozone concentrations in the stratosphere will have stopped declining and will have slowly begun the process of recovery. | NASA. 1994. Conference Publication 3203: *An Assessment Model for Atmospheric Composition Data.* (94N17827) National Aeronautics and Space Administration, Goddard Space Flight Center. Greenbelt, MD. | Tom Land (202) 233-9185<br><br>Office of Air and Radiation | State | Actual measurements of stratospheric ozone will be made by NASA's Upper Atmospheric Research Satellite and the Total Ozone Mapping Spectrometer (TOMS) and also by the SBUV/2 and TOVS instruments on the NOAA POES and subsequent NPOESS. |
| 3. By 2005, atmospheric concentrations of the ozone-depleting substances CFC-11 and CFC-12 will peak at no more than 332.4 and 572.3 parts per trillion, respectively. | NASA. 1994. Conference Publication 3203: *An Assessment Model for Atmospheric Composition Data.* (94N17827) National Aeronautics and Space Administration, Goddard Space Flight Center. Greenbelt, MD. | Tom Land (202) 233-9185<br><br>Office of Air and Radiation | State | The identified data source (NASA, 1994) is a conference publication. Depending on the availability of future publications/studies, the data necessary to measure progress towards this milestone *may not be available.* |

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| MILESTONE | DATA SOURCE | CONTACT PERSON AND EPA OFFICE | INDICATOR TYPE [1] | ABOUT THE DATA |
|---|---|---|---|---|
| 4. Through 2005, with the exception of HCFCs and very limited "essential uses," there will be no U.S. production of ozone-depleting substances. | NASA. 1994. Conference Publication 3203: *An Assessment Model for Atmospheric Composition Data.* (94N17827) National Aeronautics and Space Administration, Goddard Space Flight Center. Greenbelt, MD.<br><br>USEPA. Allowance Tracking System. U.S. Environmental Protection Agency, Stratospheric Protection Division. | Tom Land<br>(202) 233-9185<br><br>Office of Air and Radiation | Pressure | The identified data source (NASA, 1994) is a conference publication. Depending on the availability of future publications/studies, the data necessary to measure progress towards this milestone may not be available. |
| 5. By 2005, cooperative efforts between the U.S. and other countries will restrict the net loss of coral ecosystems to no more than 20 percent of the world's current reef area. | Wilkinson, C.R. 1993. Global Task Team on Coral Reefs in Climate Change, United Nations Program. Nairobi, Kenya.<br><br>The International Union for the Conservation of Nature (IUCN). 1993. *Reefs at Risk.* Gland, Switzerland. | Bryan Wood-Thomas<br>(202) 260-6983<br>or<br>Ken Potts<br>(202) 260-7893<br><br>Office of International Activities | State | |
| 6. By 2005, the United States and other countries will reduce the risks to human health and the environment associated with aldrin, chlordane, dieldrin, DDT, endrin, heptachlor, toxaphene, hexachlorobenzene, mirex, PCBs, and chlorinated dioxins and furans. | | David Ogden<br>(202) 260-6633<br><br>Office of International Activities | Pressure | |
| 7. By 2005, global air emissions of mercury will be reduced, in part through a 50 percent reduction from 1990 levels in the United States. | USEPA source inventory and reduction estimates. | Alexis Cain<br>(312) 886-7018<br><br>Office of International Activities | Pressure | There are high levels of uncertainty in emissions estimates for most major categories of mercury emissions. There is a high degree of uncertainty in baseline estimates due to limited stack testing. |

[1] **Pressure:** Pressure/emissions/loadings or other stressors **State:** State/condition of the environment or human health **Response:** Response by society in the form of actions

| MILESTONE | DATA SOURCE | CONTACT PERSON AND EPA OFFICE | INDICATOR TYPE [1] | ABOUT THE DATA |
|---|---|---|---|---|
| 8. By 2005, with U.S. leadership and cooperation many nations will have phased out the use of lead in gasoline, and worldwide use of lead in gasoline will be below 1993 levels. | USEPA International Workshop on Phasing Out Lead of Gasoline: A Status Report, March 1995.<br><br>Childhood Lead Poisoning in 1994. *JAMA - Journal of the American Medical Association.* 272(4). July 27, 1994.<br><br>Centers for Disease Control and Prevention, *National Health and Nutrition Examination Survey,* 1988-1992. | Brian Muehling (202) 260-8646<br><br>Office of International Activities | Pressure | EPA assumes that OCTEL and the International Lead-Zinc Group will continue to collect and publicly release country-by-country data on lead use in gasoline. |
| 9. By 2005, all seven nonattainment areas along the United States/ Mexico border area will have met ambient air quality health standards for particulate matter, sulfur dioxide, carbon monoxide, and ozone during the preceding 4 years. | Database: Aerometric Information Retrieval System (AIRS). U.S. Environmental Protection Agency, Washington, DC (National Ambient Air Quality data) | Bryan Wood-Thomas (202) 260-6983<br><br>Office of International Affairs | State | Data is not always comparable because monitoring systems can vary between states. |
| 10. By 2005, the United States and Canada will reduce sulfur dioxide and nitrogen oxide emissions that cause acid rain. U.S. sulfur dioxide emissions will be reduced by nearly 10 million tons and nitrogen oxide emissions by more than 2 million tons from 1980 levels. | United States-Canada Air Quality Agreement. 1994 Progress Report.<br><br>1990 Clean Air Act Amendments, Title IV. | Pete Christich (202) 260-4893<br><br>Office of International Activities | Pressure | |
| 11. By 2005, existing sources of high-level radioactivity in northwest Russia with the potential for near-term release into the arctic environment will be reduced by 25 percent. | Nilsen and Bohmer. 1994. *Sources of Radioactive Contamination in Murmansk and Arkhangelsk, Bellona Report,* Volume I. Oslo, Norway.<br><br>Nilsen, Kudrick, and Nikitin. 1995. Zapadnaya Litsa Bellona Working Paper. Oslo, Norway. | Bob Dyer (202) 260-4944<br><br>Office of International Activities | Pressure | Source estimates are continuing to be developed and additional high-level sources are expected to be added to the inventory. |

[1] **Pressure:** Pressure/emissions/loadings or other stressors **State:** State/condition of the environment or human health **Response:** Response by society in the form of actions

| MILESTONE | DATA SOURCE | CONTACT PERSON AND EPA OFFICE | INDICATOR TYPE [1] | ABOUT THE DATA |
|---|---|---|---|---|
| **EMPOWERING PEOPLE WITH INFORMATION AND EDUCATION AND EXPANDING THEIR RIGHT TO KNOW** | | | | |
| **Long-Range Goal: Americans will be empowered to make informed environmental decisions and participate in setting local and national priorities.** | | | | |
| 1. By 2005, current, accurate, and easily accessible information on environmental conditions will be available for at least 75 of the largest metropolitan areas. | | Bill Hanson (202) 260-3469<br><br>Office of Prevention, Pesticides, and Toxic Substances | Response | |
| 2. By 2005, the public's right to know what materials are released in their communities will be more fully addressed by the collection and publication of more comprehensive measures of the pollution sources. | | Bill Hanson (202) 260-3469<br><br>Office of Prevention, Pesticides, and Toxic Substances | Response | |
| 3. By 2005, Americans will have improved environmental information about the products and chemicals they use, including data on toxic effects such as hormonal, reproductive, growth, and developmental risks. | | Bill Hanson (202) 260-3469<br><br>Office of Prevention, Pesticides, and Toxic Substances | Response | |
| 4. By 2005, more information on environmental programs will be publicly available, including one-stop access to and reporting of this information. EPA will make 90 percent of its databases with raw environmental data and 100 percent of its major reports, policy statements, and *Federal Register* notices available electronically. | | Bill Hanson (202) 260-3469<br><br>Office of Prevention, Pesticides, and Toxic Substances | Response | |

[1] **Pressure:** Pressure/emissions/loadings or other stressors **State:** State/condition of the environment or human health **Response:** Response by society in the form of actions

| MILESTONE | DATA SOURCE | CONTACT PERSON AND EPA OFFICE | INDICATOR TYPE [1] | ABOUT THE DATA |
|---|---|---|---|---|
| 5. By 2005, there will be substantial growth in the number and quality of environmental education programs in schools, colleges, and communities. | | Kathleen MacKinnon (202) 260-4951<br><br>Office of Communications, Education, and Public Affairs | Response | |
| 6. By 2005, nations will be better able to share information on the transport of pollutants and the movement of hazardous and toxic materials across borders. | | Bryan Wood-Thomas (202) 260-6983<br><br>Office of International Activities | Response | |

[1] **Pressure:** Pressure/emissions/loadings or other stressors **State:** State/condition of the environment or human health **Response:** Response by society in the form of actions

# APPENDIX B:

# GOALS IN THE MAJOR LAWS ADMINISTERED BY EPA

# GOALS IN THE MAJOR LAWS ADMINISTERED BY EPA

Seventeen statutes form the legal basis for the programs of the Environmental Protection Agency. Several of them contain explicit environmental goals, but for the most part EPA's work is driven by statutory and regulatory action requirements rather than by environmental results requirements. Measurable environmental targets will help provide a focus for planning and evaluating the Agency's actions. Following is a summary of the goals or goal-like language in the statutes.

1. The **Pollution Prevention Act** states that it is the policy of the United States that "pollution should be prevented or reduced at the source whenever feasible; pollution that cannot be prevented should be recycled in an environmentally safe manner whenever feasible; pollution that cannot be prevented or recycled should be treated in an environmentally safe manner whenever feasible; and disposal or other release into the environment should be employed only as a last resort and should be conducted in an environmentally safe manner." *No explicit environmental targets.*

2. The **Clean Air Act** gives states specific deadlines for meeting the air quality standard (up to 20 years (or 2010) for ozone in Los Angeles) and requires states and the federal government to make constant progress in reducing emissions. It requires technology controls on air toxics to be achieved within 10 years of enactment (2000). It requires a permanent 10 million ton reduction in sulfur dioxide emissions from 1980 levels and a 2 million ton reduction in nitrogen oxides from 1980 levels. It establishes dates for phasing out ozone-depleting substances.

3. The **Clean Water Act.** "The objective of this Act is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. In order to achieve this objective . . .

   a. It is the national goal that the discharge of pollutants into the navigable waters be eliminated by 1985;

   b. It is the national goal that wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water be achieved by July 1, 1983;

   c. It is the national policy that the discharge of toxic pollutants in toxic amounts be prohibited . . ."

   *[These national clean water goals have yet to be achieved.]*

4. The **Marine Protection, Research, and Sanctuaries Act (Ocean Dumping Act)** declares that "it is the policy of the United States to regulate the dumping of all types of materials into ocean waters and to prevent or strictly limit the dumping into ocean waters of any material which would adversely affect human health, welfare, or amenities, or the marine environment, ecological systems, or economic potentialities." *No explicit environmental targets.*

5. The **Coastal Zone Act Reauthorization Amendments of 1990** requires coastal states with approved coastal zone management programs to develop coastal nonpoint pollution control programs . . . "to restore and protect coastal waters . . ." *No explicit environmental targets.*

6. The **Safe Drinking Water Act** directs EPA to develop national drinking water regulations for public water systems, regulations for state underground injection control programs, and additional protective measures for critical aquifers. It also directs states to establish programs that protect areas around wellheads. The 1996 amendments establish a strong new emphasis on source water protection and enhanced water system management. *No explicit environmental targets.*

7. The **Resource Conservation and Recovery Act.** "The Congress hereby declares it to be the national policy of the United States that, wherever feasible, the generation of hazardous waste is to be reduced or eliminated as expeditiously as possible. Waste that is nevertheless generated should be treated, stored, or disposed of so as to minimize the present and future threat to human health and the environment." *No explicit environmental targets.*

8. The **Comprehensive Environmental Response, Compensation, and Liability Act (Superfund)** provides for liability, compensation, cleanup, and emergency response for hazardous substances released into the environment and the cleanup of inactive hazardous waste disposal sites. The 1986 amendments to the Superfund law required EPA to begin physical, on-site cleanup of at least 175 new (after 1986) sites by 1989, and of another 200 sites within the following 2 years. There are no deadlines for finishing this work. *No explicit environmental targets.*

9. The **Emergency Planning and Community Right-to-Know Act** requires local planning to cope with chemical emergencies and ensures that responsible officials are provided with information from local businesses about their activities involving hazardous chemicals. The act mandates the development of a national inventory of releases of toxic chemicals from manufacturing facilities, which is called the Toxics Release Inventory (TRI). The purpose of the TRI is to provide information to the general public about chemicals to which they may be exposed. *There are no explicit environmental targets,* although EPA uses the TRI to implement its "33/50 Program," in which industry is challenged to voluntarily reduce releases and transfers of 17 high-priority chemicals by 33 percent by 1992 and by 50 percent by 1995.

10. The **Toxic Substances Control Act** states that "authority over chemical substances and mixtures should be exercised in such a manner as not to impede unduly or create unnecessary economic barriers to technological innovation while fulfilling the primary purpose of this Act to assure that such innovation and commerce in such chemical substances and mixtures do not present an unreasonable risk of injury to health or the environment." *No explicit environmental targets.*

11. The **Federal Insecticide, Fungicide, and Rodenticide Act** directs EPA to regulate pesticides in a manner which does not pose unreasonable health or environmental risks. This act was amended by the Food Quality Protection Act of 1996 which directs EPA to promote the registration of safer pesticides and provides continued funding for pesticide re-registrations. *No explicit environmental targets.*

12. The **Federal Food, Drug, and Cosmetic Act** establishes the standard to be used for setting pesticide residue levels in foods. This act was amended by the Food Quality Protection Act of 1996 which establishes a uniform, health-based standard for pesticide residues in raw and processed foods. *No explicit environmental targets.*

13. The **Environmental Research, Development, and Demonstration Authorization Act** authorizes all EPA's research and development programs. *No explicit environmental targets.*

14. The **National Environmental Education Act.** The stated policy is "to establish and support a program of education on the environment . . . through activities in schools, institutions of higher education and related educational activities, and to encourage postsecondary students to pursue careers related to the environment." *No explicit environmental targets.*

15. The **Atomic Energy Act** was enacted to administer research and development on both peaceful and military applications of nuclear energy. It transferred to EPA the functions of establishing generally applicable environmental standards [for radiation protection] and the authority to provide guidance to federal agencies. *No explicit environmental targets.*

16. The purpose of the **Pollution Prosecution Act** is "to provide the Environmental Protection Agency with resources needed to enforce our environmental laws and to ensure that those involved in enforcement receive consistent and excellent training." *No explicit environmental targets.*

17. The **National Environmental Policy Act.** The purposes are "To declare a national policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the Nation; and to establish a Council on Environmental Quality . . . It is the continuing responsibility of the Federal Government . . . to improve and coordinate Federal plans, functions, programs, and resources to the end that the Nation may --

    a. Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;

    b. Assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings;

    c. Attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences;

    d. Preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity, and variety of individual choice;

    e. Achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities; and,

    f. Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources."

# APPENDIX C:

# GOALS OF THE PRESIDENT'S COUNCIL ON SUSTAINABLE DEVELOPMENT

# GOALS OF THE PRESIDENT'S COUNCIL ON SUSTAINABLE DEVELOPMENT

In the course of developing the proposed environmental goals contained in this report, EPA examined health and environmental goals already set by federal agencies, states, and other countries. As a member of the President's Council on Sustainable Development (PCSD), the EPA Administrator took part in developing the recently published national goals for sustainable development. The PCSD's goals for sustainable development and EPA's proposed goals for the environment complement each other.

The set of goals contained in this appendix emerged from the PCSD's vision. These goals express in concrete terms the elements of sustainability. The goals express the shared aspirations of the President's Council on Sustainable Development. They are truly interdependent and flow from the Council's understanding that it is essential to seek economic prosperity, environmental protection, and social equity together. The achievement of any one goal is not enough to ensure that future generations will have at least the same opportunities to live and prosper that this generation enjoys: all are needed.

Accompanying the goals are indicators of progress, yardsticks to measure progress toward each goal. These indicators of progress suggest what information to look at to determine the progress that the country is making toward achieving the goals. They are not intended to be mandates for specific actions or policies, and they may change over time as the country moves toward these goals and learns more about the science and policy options underlying them. In some cases, the suggested indicators are concepts that are not now easily measured and will require more work before they can be used as true yardsticks.

## GOAL 1 - HEALTH AND THE ENVIRONMENT

***Ensure that every person enjoys the benefits of clean air, clean water, and a healthy environment at home, at work, and at play.***

### INDICATORS OF PROGRESS

Clean air, clean water, and reduced exposure to toxics are basic indicators. Beyond that, other environmental exposures (such as to lead and tobacco smoke) can also contribute directly and indirectly to health problems. Where causal links can be identified, additional indicators should be used.

**Clean Air**
Decreased number of people living in areas that fail to meet air quality standards.

**Drinking Water**
Decreased number of people whose drinking water fails to meet national safe drinking water standards.

**Toxic Exposures**
Reduced releases that contribute to human exposure to toxic materials.

**Diseases and Mortality**
Decrease in diseases and deaths from environmental exposures, including occupationally related illnesses.

## GOAL 2 - ECONOMIC PROSPERITY

***Sustain a healthy U.S. economy that grows sufficiently to create meaningful jobs, reduce poverty, and provide the opportunity for a high quality of life for all in an increasingly competitive world.***

### INDICATORS OF PROGRESS

The traditional measures of economic activity include gross domestic product (GDP), net domestic product (NDP), and the unemployment rate. These measures, however, do not take into account negative environmental impacts of production and consumption or gauge the incidence of poverty. The Council agreed that additional yardsticks are needed for adequately gauging economic progress in the broadest sense.

**Economic Performance**
Increases in per capita GDP and NDP.

**Employment**
Increases in the number, wage level, and quality of jobs (as measured, for example, by the percentage of jobs at or below minimum wage).

**Poverty**
Decreased number of people living below the poverty line.

**Savings and Investment Rates**
Higher per capita savings and investment rates.

**Natural Resources and Environmental Accounting**
Development and use of new economic measures or satellite accounts that reflect resource depletion and environmental costs.

**Productivity**
Increased per capita production per hour worked.

## GOAL 3 - EQUITY

***Ensure that all Americans are afforded justice and have the opportunity to achieve economic, environmental, and social well-being.***

### INDICATORS OF PROGRESS

The Council believes that equity is such an important goal that it has worked to weave this priority into each element of this report. However, measuring fairness and equality of opportunity throughout a population is complex. It requires measuring differences between rich and poor in a number of ways

and involves yardsticks not yet available. Such measures should be developed to show whether the nation is progressing toward greater equity by reducing disparities in risks and access to benefits.

**Income Trends**
Increase in the average income of the bottom 20 percent compared with that of the top 20 percent of the U.S. population.

**Environmental Equity**
Development of measures of any disproportionate environmental burdens (such as exposure to air, water, and toxic pollution) borne by different economic and social groups.

**Social Equity**
Development of measures of access to critical services (such as education, health care, and community services), and opportunities to participate in decision making by different economic and social groups, such as the percentage of these populations attending college.

## GOAL 4 - CONSERVATION OF NATURE

***Use, conserve, protect, and restore natural resources -- land, air, water, and biodiversity -- in ways that help ensure long-term social, economic, and environmental benefits for ourselves and future generations.***

### INDICATORS OF PROGRESS

Measuring the health and extent of natural systems is difficult because they are complex; vary over time and space; and have effects that can be local, regional, and/or global. Most of the following indicators focus on local and regional systems, reflecting the Council's work on watersheds and communities. Additional indicators are needed to reflect how well the nation is contributing to the protection of natural systems worldwide.

**Ecosystems**
Increase in the health of ecosystems, including forests, grasslands, wetlands, surface waters, and coastal lands:

- Decreased soil loss and associated productivity loss due to erosion and chemical or biological changes in natural systems and other lands such as agricultural lands.
- Increased number of acres of healthy wetlands.
- Increased percentage of forests managed to reach full maturity and diversity.
- Development of indicators to measure water bodies with healthy biological communities.
- Increased number of acres of healthy native grasslands.

**Habitat Loss**
Development of measures of threats to habitat loss and the extent of habitat conversion, such as the rate of wetlands loss.

**Threatened and Endangered Species**
Decreased number of threatened and endangered species.

**Nutrients and Toxics**
Decreased releases that contribute to the exposure of natural systems to toxics and excess nutrients.

**Exotic Species**
Reduced ecological impacts caused by the introduction and spread of exotic species.

**Global Environmental Change**
Reduced emissions of greenhouse gases and of compounds that damage the ozone layer.

## GOAL 5 - STEWARDSHIP

***Create a widely held ethic of stewardship that strongly encourages individuals, institutions, and corporations to take full responsibility for the economic, environmental, and social consequences of their actions.***

### INDICATORS OF PROGRESS

Stewardship is an ethic or value; quantitative measures of it are difficult and need further work. What can be readily measured is the use of natural resources within the United States -- efficient use and wise management are key to ensuring that such resources will be available for future generations.

**Materials Consumption**
Increased efficiency of materials use, such as materials intensity measured per capita or per unit of output.

**Waste Reduction**
Increased source reduction, reuse, recovery, and recycling.

**Energy Efficiency**
Reduced energy intensity (energy per unit output).

**Renewable Resource Use**
Decreased rate of harvest or use compared to rate of regeneration in fisheries, forests, soil, and groundwater.

## GOAL 6 - SUSTAINABLE COMMUNITIES

***Encourage people to work together to create healthy communities where natural and historic resources are preserved, jobs are available, sprawl is contained, neighborhoods are secure, education is lifelong, transportation and health care are accessible, and all citizens have opportunities to improve the quality of their lives.***

### INDICATORS OF PROGRESS

Local values and priorities shape the characteristics that contribute to strong and stable communities. However, thriving communities across the nation share many common traits as do threatened communities. Indicators need to allow for diversity among communities while recognizing national priorities.

**Community Economic Viability**
Increased local per capita income and employment in urban, suburban, and rural communities.

**Safe Neighborhoods**
Decrease in violent crime rates.

**Public Parks**
Increase in urban green space, park space, and recreational areas.

**Investment in Future Generations**
Increase in the amount of public and private resources dedicated to children, including health care, maternal care, childhood development, and education and training.

**Transportation Patterns**
Decrease in measures of traffic congestion; increase in the use of public and alternative transportation systems.

**Community Access to Information**
Increase in library use and the percentage of schools and libraries with access to the Internet and National Information Infrastructure.

**Shelter**
Decreased number of homeless people by community.

**Metropolitan Income Patterns**
Reduced disparity in per capita income between urban areas and their suburbs.

**Infant Mortality**
Decrease in infant mortality rates by economic and social group.

## GOAL 7 - CIVIC ENGAGEMENT

***Create full opportunity for citizens, businesses, and communities to participate in and influence the natural resource, environmental, and economic decisions that affect them.***

### INDICATORS OF PROGRESS

Democratic societies rely on an engaged population of diverse individuals and institutions. Additional measures are needed to track participation and gauge the effectiveness of policies that strengthen cooperative decision making while still allowing for individual leadership and creativity. Effective yardsticks may come from studying successful efforts to build community values, public trust, and government responsiveness.

**Public Participation**
Increase in the percentage of eligible voters who cast ballots in national, state, and local elections.

New indicators must be developed to measure:

**Social Capital**
Increase in citizen engagement and public trust, such as the willingness of people in a community to cooperate for their mutual benefit.

**Citizen Participation**
Increase in community participation in such civic activities as professional and service organizations, parent-teacher associations, sporting leagues, and volunteer work.

**Collaborations**
Increased use of successful civic collaborations such as public-private partnerships, community-based planning and goal-setting projects, and consensus-building efforts.

## GOAL 8 - POPULATION

***Move toward stabilization of U.S. population.***

### INDICATORS OF PROGRESS

Together with the more traditional population measurements, such as estimates of growth, trends and measures of the social and economic status of women within society are also important. Evidence has shown that as the health and status of women improve, population pressures become more manageable.

**Population Growth**
Reduced rate of population growth in the United States and the world.

**Status of Women**
Increased educational opportunity for women; increased income equality for equivalent work.

**Unintended Pregnancies**
Decreased number of unintended pregnancies in the United States.

**Teen Pregnancies**
Decreased number of teenage pregnancies in the United States.

**Immigration**
Decreased number of illegal immigrants.

## GOAL 9 - INTERNATIONAL RESPONSIBILITY

***Take a leadership role in the development and implementation of global sustainable development policies, standards of conduct, and trade and foreign policies, that further the achievement of sustainability.***

### INDICATORS OF PROGRESS

The actions taken by the United States have a significant effect on the world's environment, economy, and cultures. This nation has a tradition of global leadership and responsibility. It is important to continue this tradition. While indicators of global leadership apply to all sectors, the following ones focus on the role of the federal government.

**International Assistance**
Increased level of U.S. international assistance for sustainable development, including official development assistance (federal money dedicated to international aid for developing nations).

**Environmental Assistance**
Increase in the U.S. contribution to the Global Environmental Facility and other environmentally targeted development aid.

**Assessment of Progress**
Development and use of new measures for assessing progress toward sustainable development in countries receiving U.S. assistance.

**Environmental Technology Exports**
Increased U.S. exports or transfers of cost-effective and environmentally sound technologies to developing countries.

**Research Leadership**
Increased levels of U.S. research on global environmental problems.

## GOAL 10 - EDUCATION

***Ensure that all Americans have equal access to education and lifelong learning opportunities that will prepare them for meaningful work, a high quality of life, and an understanding of the concepts involved in sustainable development.***

**Indicators of Progress**
Education for sustainable development should be lifelong through integration into formal and nonformal education settings, including teacher education, continuing education, curriculum development, and worker training.

**Information Access**
Increased number of communities with infrastructure in place that allows easy access to government information, public and private research, and community right-to-know documents.

**Curriculum Development**
Increased number of curricula, materials, and training opportunities that teach the principles of sustainable development.

**National Standards**
Increased number of school systems that have adopted K-12 voluntary standards for learning about sustainable development similar to the standards developed under the National Goals 2000 initiative.

**Community Participation**
Increased number of school systems and communities with programs for lifelong learning through both formal and nonformal learning institutions.

**National Achievement**
Improved skill performance of U.S. students as measured by standardized achievement tests.

**Graduation Rates**
Increased high school graduation rates and number of students going on to college or vocational training.

# APPENDIX D:

# SOME FEDERAL AGENCY COMMENTS FROM A PRELIMINARY REVIEW

## SOME FEDERAL AGENCY COMMENTS FROM A PRELIMINARY REVIEW

This report was given a limited federal review during the summer of 1996. As a result of that review, EPA corrected inaccuracies and made other revisions. Because EPA did not want to delay getting comments from its other government partners, it has moved ahead with the present draft without responding fully to all of the federal comments. EPA is currently working to resolve these issues. Similar comments have been combined in the interest of brevity. EPA agrees with some of these comments and does not agree with others. EPA offers these comments in order to stimulate a full discussion with the reviewers.

### GENERAL

1. Additional milestones should be added for federal facilities. The aggregate impact of all federal facilities is significant.

2. The draft includes a goal for terrestrial ecosystems, but comparatively little attention is devoted to coastal and marine ecosystems. Among the milestones that could be included are the disposal of harbor and dredged materials and industrial and municipal discharges. We recommend adding a separate goal and milestones for healthy estuarine, coastal, and marine ecosystems.

3. The document emphasizes "standards" and does not adequately acknowledge source and exposure information. The relationship between the sources of emissions and resulting levels of exposures should be clear.

4. There may be insufficient funds available to meet all expectations. Should there be an attempt to rank the milestones, if not individually, at least by groups?

5. It would be difficult and costly to develop and field the necessary data collection systems in a timely manner to monitor progress.

6. The report would be improved if it included more information that indicates the type and magnitude of real world problem that each milestone addresses, the specific kinds of actions which might have to be taken, the likely kinds and levels of costs, the probable types and levels of benefits, and the availability of alternatives that might produce equal benefits at lower costs.

7. These are some generic problems in several of the milestones: the statistical measures used in the milestones need to be restated in terms of the desirable outcome or condition sought, outcome measures should be stated in absolute terms rather than percentages change, justification/explanation for the selection of the specific baseline years and targets is needed, and milestones that would merely establish more regulations should be revised to reflect outcome performance rather than [outputs].

8. The differences between the EPA milestones and the Healthy People 2000 objectives could be confusing to state and local governments and the public.

9. Should the relationships between the milestones and research needs be called out in the report? The milestones should provide the strong policy direction needed to set federal monitoring and research and development priorities for the environment.

10. The draft report is unusually ambitious: (1) the likely costs and benefits of attaining the goals are often unclear and in some instances unknown; (2) some goals and milestones are difficult to commit to without risking premature judgements (i.e., they commit EPA to regulatory decisions that have not been proposed or are currently subject to public comment), while others merely reflect the expected results of actions already completed; (3) in some instances, the basis for the factual claims and the resulting implications of those claims are undocumented; and (4) in general, the report could be taken to imply a need for massive federal effort.

11. Some reviewers thought the report overly long and the language too vague for its apparent purpose. "Milestones" were considered particularly weak where they rely on language such as "substantial improvement" and "substantial growth." Quantifications were preferred by these reviewers. Other reviewers preferred nonquantitative measures or omitting the milestone when the baselines could not be well established.

12. Many goals are presented as specific numerical targets; in many cases they appear arbitrary.

13. The various milestones specify percentage reductions from 1990, 1993, 1994, 1995 levels, etc. Where possible, use of a consistent base year of 1990 would be preferable.

14. While applauding EPA's effort to establish environmental quality goals, the draft needs to be more inclusive of other agencies in tone and in aims, or it should limit its scope to the EPA's domain.

15. The successes of conservation programs are based on the voluntary efforts of private landowners. The involvement of these groups early in the process of identifying goals and setting priorities will be very important.

16. The milestones should be shown on maps to help readers understand where the problems are located. Many of the indicators used as milestones are mappable.

## CLEAN AIR

### *General*

1. There should be some milestones for reducing toxic air pollutants besides VOCs.

2. We suggest that EPA add a 7th milestone for Clean Air—that the levels of soil and water nitrification will improve 10 percent because of the improvements in control strategies and market approaches to reducing NOx that is a precursor to ozone.

### *Milestone 1*

3. Milestone 1 commits to reducing to 6 the number of cities that do not meet all National Ambient Air Quality Standards. This will be very difficult to do, particularly if EPA tightens its ozone and particulate matter standards.

4. This milestone would be more meaningful if it were based on direct measures of air quality, rather than on attainment of current national standards.

5. The Healthy People 2000 Objective 11.05 and this EPA milestone are very similar, with the EPA goal being very aggressive. While the EPA goal is for cities and the Healthy People 2000 for people, limitation in the measurement system precludes an exact measure of those individuals experiencing poorer air quality. The wording of the EPA milestone implies that for those areas where the air quality may improve but fail to meet the EPA's standards, their air will not be safer to breathe. If the air quality improves, even if it does not achieve EPA standards, the air is safer to breathe. The standards are in a sense arbitrary and can be changed in the future.
Recommendation: Revise the EPA target to reflect the concerns cited above and consider adding a target that tracks U.S. population living in areas that have not exceeded any EPA standard for air quality.

*Milestone 2*

6. Spell out the characteristics of the "typical vehicle" used to track automobile emission improvements. Is this truly representative of the fleet?

7. We are concerned that the emphasis is on cars and not on motor vehicles. The milestone should also treat off-road vehicles, heavy-duty trucks, etc. We also suggest that reference to the past be changed to 1970. Since 1970, there has been a 95 percent decrease in per car VOC emissions.

*Milestone 3*

8. Milestone 3 discusses "economic incentives, education, and incentives for smart land use'" as the means by which to get people to drive their cars less to, among other things, reduce greenhouse gas emissions. This issue is sufficiently contentious that the year-long "Car Talk" advisory committee could not reach consensus on ways to achieve such reductions.

9. This milestone sets a vague target. How would we measure success? In the context of attainment, etc., it specifies a partial "means" to an outcome. Given these problems, the milestone should not be included.

10. This milestone should be carefully considered. Since EPA cannot change the tax code or lobby for such a change, the most direct methods to change driving are out of scope. If clean air is the goal, is this milestone on a method necessary?

*Milestone 4*

11. As milestone 4 does not bear any relation to health or environmental outcomes, it should not be included.

12. Change milestone to read: "By 2005 all ~~174~~ categories of major industrial facilities will meet toxic air emission standards, reducing toxic air emissions by XXX tons per year."

*Milestone 6*

13. The achievement and quantification of visibility could be difficult.

*Strategy*

14. To reduce emissions from motor vehicles, a strategy worth considering is the removal of the 10 percent highest emitters (these may account for almost 50 percent of the toxic vehicle emissions).

15. The strategy of making "flexible inspection and maintenance programs more effective" should be described more fully.

## CLEAN WATERS

*General*

1. Extrapolated water quality trends based on anticipated pollution controls is problematical for determining targets. Suggest adding qualifying text to the effect that complete achievement of the projected levels of control may not be possible, and that therefore the quantified milestones may be optimistic.

2. Milestones 2, 3, and 4 rely on data sources that are not comparable over time and space. Moreover, they are all arbitrary. As stated in the milestones, statistically valid national-level trend data do not exist on waters safe for aquatic life or for recreation, and on fish and shellfish harvest areas that are closed. Thus we do not know whether such data, when it is collected, would indicate that the milestone is attainable, unattainable, or perhaps is already being met.

*Milestone 1*

3. Questioned ability to set target due to inadequate baseline data on wetland loss trends.

4. Need to clarify the basis of the figure of 100,000 acres of net annual increase in wetlands in 2005 and yearly thereafter.

5. Would a more realistic target be zero net loss by 2005?

6. What is meant by increasing wetland acreage? Does improving the quality of an existing wetland count toward the milestone or must a wetland be newly created from non-wetland terrain?

*Milestone 2*

7. 305(b) studies only look at designated use attainment. This could be inconsistent with the waterbody's ability to support a healthy aquatic community. (i.e. it could support a different community than what it "should" support). Need to define what constitutes a healthy aquatic community and what monitoring methods would be used.

8. Advanced monitoring might lead to apparent declines in conditions due to improved detection of impacts.

9. Since the milestone itself indicates that there is not a common measure of healthy aquatic

communities, the baseline percentages given in figure M2 could be subject to doubt and the target of 80 percent could be considered conjecture at best.

*Milestone 3*

10. While this milestone may be achievable, the remaining percentages will be difficult to clean up because toxics, emitted as air pollution over the last 50-100 year, have caused a build-up of these chemicals in sediments. The air toxics milestone needs to be more specific about which toxics build up, and should also address as a minimum which of the unhealthful rivers, lakes, etc. can repair themselves and over what time frame.

11. Milestone 3 is more ambitious than the HP 2000 target. The reason for the more ambitious target should be discussed. If the target was broken down by type of waterbody, EPA would track the same data and match the methods used by HP 2000.

*Milestone 4*

12. The target for Milestone 4 is more ambitious than the HP 2000 target. A discussion should be included that explains the reason for the more ambitious target. If the target was broken down by type of waterbody, EPA would track the same data and match the methods used by HP 2000. In addition, if secondary contact recreation was eliminated or broken down into primary and secondary activities, the EPA and DHHS targets would be more closely aligned.

*Milestone 5*

13. Difficulties in interpreting results of past ground water studies preclude the ability to propose a specific target for this milestone. Suggest specifying the target as a percentage based on SDWIS data as it becomes available—annual reduction in the number of people served by wells containing high levels of nitrate.

*Milestone 7*

14. Due to differences in environmental effects, it does not make sense to lump pounds of TSS with pounds of mercury when estimating total loads. EPA's effluent guidelines program uses a multiplier (toxic weighting factor) to account for the differing impacts. Suggest using pound equivalents.

## HEALTHY TERRESTRIAL ECOSYSTEMS

*General*

1. Based on the milestones, a goal of conserving biological diversity would be more appropriate. No milestones relate to ecosystem processes; instead they are targeted at population and species and habitat size.

2. While the 3 milestones may cover certain aspects of ecosystem health, the extent of that coverage is unclear. Similarly unclear is the national data, available or expected to be available, that will allow tracking of the goals at a known level of accuracy or precision.

3. The distinction between the ability of ecosystems to recover from natural versus human-induced stresses is not so clear-cut, particularly if humans are considered part of ecosystems.

4. These milestones—to eliminate the loss of endangered or threatened ecosystem types and to restore ecosystem conditions and functions—are laudable, but achieving them by the year 2005 is unrealistic.

*Milestone 1*

5. Data for tracking progress must be obtained through a deliberate, premeditated, and systematic process if they are to provide meaningful information.

6. Progress toward this milestone will be measured in part using data from the NBS's Gap Analysis Program. Funding for this NBS program has been in question. Does EPA have an alternative funding source?

7. Based upon total losses of biological systems since the earliest settlements, a relative ranking of endangerment was calculated by EPA. Missing from this analysis is the amount of those remaining fragments that are currently protected by law directly by inclusion in parks, preserves, or as designated wilderness at the federal, state, and local level.

*Milestone 2*

8. Change in population densities of listed species may indicate little about ecosystem health. Is there a statistical relationship between the number of species listed and the actual number of species endangered or threatened? The indicator may be more indicative of the success of recovery programs.

9. The tracking of results in this goal should use objective measurements of resource abundance and quality rather than enrollment in conservation programs.

10. Missing from this milestone is a description of work being done now to address condition of the land.

11. The call for protection of representative types of ecosystems.."[that] once dominated the landscape..." indicates that there is a notion behind this milestone that it is possible to protect ecosystems from change and to also restore them to some pre-Columbian condition. Ecosystems change through time in response to biotic and abiotic factors. This milestone should be reevaluated in light of this. We suggest that more flexible goals that would allow the system to function within its normal parameters be established.

## SAFE DRINKING WATER

*Milestone 1*

1. Current milestone only includes Community Water Systems (CWS) that report maximum contaminant level (MCL) violations and, as a result, underestimates the population receiving water

that is in violation of SDWA regulations. It is also important to include CWS that fail to monitor/report. EPA target should address all persons served by public water supplies. EPA should use 186 million, not 243 million, as figure for the population receiving water from CWS for which they have information on violations.

2. This milestone only concerns the population served by CWS that are in violation of standards and has little relationship to risk reduction.

3. All water systems that exceeded a single MCL at least once during a year are treated the same, irrespective of the magnitude of an exceedance or its number or duration.

4. Achievement of the milestone will be complicated by difficulties associated with costly forthcoming EPA rules on groundwater disinfection, disinfection by products, enhanced surface water treatment, radionuclides, and arsenic.

5. Recommend that the milestone be expressed in terms of measurable improvements in public health (e.g., outbreaks of waterborne disease). Change the milestone statement to read "By 2005, the population affected by water-borne disease outbreaks among community water systems will be reduced by XX percent"

*Milestone 2*

6. The criteria for defining inadequately protected surface sources of drinking water is not clear. It could be better to adequately protect the supply than to rely upon filtration to treat the condition.

*Milestone 4*

7. Many Public Water Systems (PWSs) have already invested heavily in filtration and disinfection and are meeting requirements and will be reluctant to invest additional resources in source water protection. The 60 percent target might be difficult to achieve without a statutory or regulatory mandate.

8. This milestone is arbitrary in that source water protection programs (SWPPs) correlate poorly with risk reduction. Specifically, many CWS are in full compliance with existing requirements without SWPPs. Thus, SWPPs at CWS would neither improve public health nor reduce costs. 60 percent target has no basis. Given these problems, the milestone should not be included.

## SAFE FOOD

*General*

1. The disjuncture between the listed milestones and actual attainment of the goal is striking. There are many contaminants more important than pesticide residues that cause food-related illness.

*Milestone 1*

2. The goal for pesticide residues in imported food could be equal to that of domestic food. A clear

strategy for maintaining or reducing the frequency of illegal pesticide residues in imported food is not presented.

3. The goal for the frequency of unauthorized chemical pesticide residues in food should be zero.

*Milestone 2*

4. What is the expected impact of EPA's new cancer guidelines on reducing the use of cancer causing pesticides?

5. The milestone does not accurately indicate the difference between potential to cause cancer and the risk posed by a particular use. The milestone should be, "....a significant reduction in the highest cancer risks posed by the use of pesticides in food production."

*Milestone 3*

6. The baseline appears to be unclear. As of 1995, how many of the 453 active ingredients have been evaluated?

7. The narrative clearly describes, in a way that the milestone does not, the process of completing the analysis and actions to eliminate reference dose (RfD) exceeders by the year 2005, which is in accordance with the completion of re-registration.

## SAFE HOMES, SCHOOLS, AND WORKPLACES

*General*

1. This chapter actually says almost nothing about schools.

*Milestone 1*

2. The extrapolations for the year 2005, in most instances, were based upon published data from 1984, and more recently, upon NHANES III data. However, it should be noted that for the year 1984, there were no published data on children 1 through 5 years of age in the U.S. population with blood lead levels greater than or equal to 10 ug/dl. Further, there were no HHS objectives for the year 2000 for children 1 through 5 years of age in the U.S. population with blood lead levels greater than or equal to 10 ug/dl. It appears that EPA milestones for the Year 2005 were based on a goal of a 43 percent reduction of the prevalence reported by NHANES III.

3. For children with blood lead levels of greater than or equal to 15 ug/dl, the milestone for children 1 through 5 years of age in the U.S. population was based on a 50 percent reduction of the prevalence reported by NHANES III, and for inner-city, low-income, African-American children 1 through 5 years of age, the milestone was based on a 47 reduction. No reason could be discerned for the differences in the percent factors used for the projections.

4. The HHS year 2000 objective states that no children 1 through 5 years of age in the U.S. population will have blood lead levels greater than or equal to 25 ug/dl. EPA should report the same milestone for the year 2005.

*Milestone 2*

5. The target for Healthy People 2000 Objective 11.06 was chosen during the late 1980s, before monitoring had begun. Recent data show that achievement of the target of 40 percent reduction is unlikely. The EPA target for this milestone is more realistic.

*Milestone 3*

6. EPA also may want to consider addressing ETS exposure of children in child care centers and schools. Healthy People 2000 objectives cover both of these areas.

*Milestone 5*

7. This milestone stipulating a doubling of use of"safe" biopesticides is unrelated to risk. As doubling will in fact increase risk if there is any environmental risk from the use of such pesticides, this milestone should not be included.

8. Consider replacing this milestone with monitoring data on concentrations of synthetic pesticides in surface water or in fish. Fish tissue concentrations were well-characterized in EPA's National Study on Chemical Residue in Fish tissue.

*Milestone 6*

9. The review of high-production volume chemicals and product stewardship programs of the chemical industry *promote* protection of workers exposed to chemicals but they do not *assure* it. Reviews are limited by current science and implementation of preventive measures is neither universal nor perfect. The milestone text could be revised as follows: "By 2005, the number of existing industrial high-production-volume chemicals evaluated for safe use in the workplace will nearly triple."

10. Milestone is redundant with Toxic-Free milestone 3.

*Milestone 7*

11. This appears to be a "design-type" milestone. As it is not clear how this milestone is related to health/environment end-points, it should not be included.

*Strategy*

12. The Strategy says, "By 2005, 3000 or more schools or commercial buildings will have indoor air quality management plans that are in keeping with..." This is a tiny percentage considering the numbers of schools and commercial buildings.

13. Regarding the strategy for understanding indoor air quality, couldn't this include a proportion of schools consistent with population occupancy norms for all buildings?

## TOXIC-FREE COMMUNITIES

### *General*

1. The title, "Toxic-Free Communities" is misleading.

2. Many milestones are presented as specific numerical targets. The discussion could be improved if EPA included the rationale for selecting these milestones; in many cases they appear arbitrary.

### *Milestone 1*

3. It is not clear why a 25 percent reduction in release of toxic chemicals was selected.

4. The paragraph on past trends notes that quantities of toxic chemicals in production related wastes are projected to decrease; however, graph M.1 shows no decline or a slight increase between 1994 and 1995. Why was there no decrease in 1995? Is the projection for 2005 realistic?

5. EPA's targeted reductions apply to all substances tracked in the Toxic Release Inventory. The Healthy People 2000's target attempts to isolate those substances most hazardous to public health. By doing so, it tends to eliminate some of the substances less hazardous to humans which may skew the data, especially if the substances are heavier by weight (more dense) or more widely used. Subsets should be created in the EPA milestone which isolate and replicate the two Healthy People lists as targets.

### *Milestone 2*

6. In this milestone, the phrase "will have been used safely" is determined by whether a new chemical will later require additional controls on its production or use. In milestone 3, the term "used safely" is more appropriately determined by the adequacy of available toxicity information to estimate health and environmental impacts. The inconsistency between these milestones in defining "safety" is awkward. Milestone 2 does not provide a true assurance of safety for chemicals in production or use that lack sufficient toxicity information. What are EPA's criteria for predicting that the estimated 10,000 additional new chemicals will be safe for their intended uses?

7. Breakdown or byproducts should also be addressed in judgments of safety.

### *Milestone 4*

8. This milesone should not be included unless EPA can provide estimates or a description of improvements to human health and/or the environment.

## PREVENTING ACCIDENTAL RELEASES

*General*

1. Not clear why this isn't part of the Toxic-Free Communities chapter.

2. A milestone should be added to Chapter 8: "By 2005, there will be a 50 percent increase in training and educational materials made available to emergency responders and health care providers."

*Milestone 1*

3. This milestone is aimed at reducing the number of accidental releases of oil. We believe that preferred measures are reductions in the amount of chemicals spilled, and in the number of spills over a certain size (e.g. over 10,000 gallons).

*Milestone 2*

4. A 50 percent increase over 1993 levels in the number of industrial facilities in high-risk areas appears to be arbitrary. The discussion indicates that there is no data on past trends. Apparently, there also is no data on current baseline. The discussion proposes a baseline study that would presumably be used to identify a baseline and allow tracking of the goal. But the current goal of a 50 percent increase appears to have been chosen in the absence of such information.

5. The existence of hazardous substance inventories is two steps removed from risk. Inventories must lead to accidental releases. Releases must be of a sufficient duration, frequency and magnitude to pose risk. A milestone based on the existence of an inventory in an undefined high-risk area is an exceptionally poor proxy for risk. Even fully-recycled systems with no release and no emissions would be covered. Again, the measure of interest is a reduction in accidental releases (milestone 1); this milestone is a "design-type" milestone and should not be included.

## SAFE WASTE MANAGEMENT

*General*

1. Since direct impacts of RCRA on emissions are not tracked, most indicators of progress in this section will be indirect and merely track government efforts to improve waste management.

2. This chapter should include a concern for the effects on human health of incineration and smelting of materials. Operating smelters have been shown to be sources of particulate releases that cause respiratory health problems, particularly in young children. Older municipal incinerators have unknown human health implications, but merit attention. Therefore, a milestone should be added to Chapter 9: "By 2005 at least 25 percent of the nation's operating incinerators and smelters will have been characterized as to human health risk."

*Milestone 1*

3. Many goals/milestones appear arbitrary. Some have no documented supporting analysis. Others lack measurability. Example: Milestone 1 commits to a 98 percent reduction in dioxin/furan emissions from 1994 levels. This is the "combustion MACT" NPRM currently out for public comment.

*Milestone 2*

4. Assumptions about mercury emissions are similar to those in the Hg reports; little consideration is given to potential recycling of Hg through sedimentation or erosion (possibly more of a problem) or the tracking of other metals, such as arsenic, which could pose additional health risks.

5. Milestone statement is not consistent with description below. Change milestone statement to read: "By 2005, emissions of heavy metals from waste-burning facilities will be reduced from 1994 levels:"

6. One reviewer commented that this milestone should not be included.

*Milestone 5*

7. Milestone is misleading. There is no waste now disposed of that is out of compliance with EPA disposal standards. DOE measures progress by (increasing) the amount disposed of.

8. The overall goal that by 2005, 10 percent of the spent nuclear fuel, high-level waste, and transuranic radioactive waste currently stored across the nation, shall be disposed of in accordance with EPA disposal standards, is not achievable for spent nuclear fuel or high-level waste. 2005 would be the earliest date for DOE's receiving a construction permit for a high-level waste repository. Thus zero percent of the spent fuel and high-level waste will be disposed of by that date. If the goal is only for transuranic waste, then only transuranic waste should be mentioned.

9. It is incorrectly stated that development of regulations or guidance for "other" waste types will facilitate disposal. All waste types currently have adequate regulatory requirements except for NORM/NARM.

10. One reviewer commented that this milestone should not be included.

*Strategy*

11. First paragraph under Radioactive Wastes Strategy, last sentence. This sentence should be deleted. There have been no "recent improvements" in methods for evaluation exposure from disposal of radioactive wastes.

12. Last paragraph under Strategy. The statement that by 2005 a regulatory framework for all three major waste types will be in place is meaningless and misleading. A complete regulatory framework exists now.

## RESTORATION OF CONTAMINATED SITES

*Challenge*

1. This section makes assumptions about progress based on the current number of sites on the list, "program trends and administrative reforms", and reauthorization of CERCLA—none of which can be assured.

2. Targets seem very ambitious and rather selective.

3. This chapter contains mention of ATSDR and some of its health findings in communities around Superfund sites. Unfortunately, it focuses only on cleanup of hazardous waste sites, to the extent that the effects on human health are lost. In particular, this chapter needs to have more of a public health perspective, given the health findings reported on Superfund sites. Therefore, a milestone should be added to Chapter 10: "By 2005 all communities meeting medical monitoring criteria established by ATSDR will be incorporated into an appropriate program of medical monitoring and surveillance.

4. Milestones 1 - 3 aimed at hazardous waste site remediation appear to conflict with Chapter 3 milestones 1, 2, and especially 3 related to ecosystem maintenance and enhancement.

*Milestone 1*

5. Milestones 1 and 2 under "Restoration of Contaminated Sites" references HHS Healthy People 2000 goals to "eliminate significant health risks" at hazardous waste sites. The EPA milestones do not limit the cleanup objective to "significant" health risks at sites that have been assessed for such risks, but state that cleanups will be achieved without regard to whether a health risk is present. We recommend that the HHS distinction between significant and other types of risks should be preserved since most of these sites are believed to present no consequential health risk of any kind.

6. It is not clear what outcome would represent a successful achievement of this milestone. Is the "[95] percent" target intended to apply to both "elimination of health threats" and "cleanup completed" or to either/or? The assumption for the HP 2000 Objective is that we are trying to eliminate 100 percent of the immediate and significant health threats. In addition, a definition of what EPA considers to be long-term health threats and a description of how they plan to measure the elimination of these long-term health hazards is not included. Recommendation: Further clarification is needed concerning how the target will be derived.

*Milestone 5*

7. Clean-up of radioactivity-contaminated areas can be contentious since the radioactivity can be bound to soil matrices and be relatively benign until disturbed. Each situation must be evaluated based on the specific circumstances.

*Milestone 7*

8. Requirement for point source control in 10 percent of watersheds appears to be arbitrarily set. The current baseline is not established. The NSI data base covers only eleven percent of the nation's waterbodies and rivers. An evaluation of this database identified 96 watersheds with likely widespread contamination. It was considered reasonable that each region would complete the task in one high priority watershed. However, with expansion of NSI there could be many more watersheds with sediment problems and doing ten watersheds would achieve control on only [a small] percent of the watersheds. The measure here is also tenuously linked to environmental improvement. Given these problems, this milestone should not be included.

*Strategy*

9. In the box titled "Radiation Cleanup Rule", the date of 1997 is overly optimistic.

## REDUCING GLOBAL AND TRANSBOUNDARY ENVIRONMENTAL RISKS

*Milestone 5*

1. A very large fraction of the world's coral reefs lie outside of the U.S. and its protectorates. Therefore, we will have little direct control of these unique ecosystems and their protection.

2. One reviewer commented that this milestone should not be included.

*Milestone 7*

3. EPA's Utility and Mercury reports have been delayed because of data problems. It is not appropriate to base goals on studies which have not been approved for release.

4. Milestone 7 indicates that a 50 percent reduction of mercury emissions in the United States will reduce global air emissions of this element. However, if U.S. anthropogenic emissions of mercury account for only 5 percent of global anthropogenic emissions, wouldn't a 50 percent reduction in the U.S. produce only a 2.5 percent global reduction? China and India might well be targeted for special attention here, as their increased future emissions could swamp any U.S. reductions.

5. One reviewer commented that this milestone should not be included.

*Milestone 9*

6. One reviewer commented that this milestone should not be included.

*Milestone 11*

7. Milestone to reduce the potential for radioactive release into the arctic from sources in Northwest Russia by 25 percent should be dropped. This milestone seems to be outside of EPA's jurisdiction.

## EMPOWERING PEOPLE WITH INFORMATION AND EDUCATION AND EXPANDING THEIR RIGHT TO KNOW

*General*

1. Several of the milestones are not specific and should be consolidated or not included, unless specifics are added.

*Milestone 4*

2. The narrative does not sufficiently discuss the need for federal agencies to work together. Further, it goes beyond providing multi-agency data to "one-stop" submission of data for regulated entities, a concept likely to be plagued with problems.

# APPENDIX E:

# ACRONYMS AND ABBREVIATIONS

## ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| ACP | Agricultural Conservation Program |
| AEA | Atomic Energy Act |
| AIRS | Aerometric Information Retrieval System |
| AMWA | Association of Metropolitan Water Agencies |
| ATSDR | Agency for Toxic Substances and Disease Registry |
| AWWA | American Water Works Association |
| BASE | Building Assessment Survey |
| BLM | Bureau of Land Management |
| BMPs | Best Management Practices |
| BOD | Biochemical Oxygen Demand |
| CAA | Clean Air Act |
| CAAA | Clean Air Act Amendments of 1990 |
| CABO | Council of American Building Officials |
| CCAP | Climate Change Action Plan |
| CDC | *Centers for Disease Control and Prevention* |
| CERCLA | Comprehensive Environmental Response, Compensation and Liability Act |
| CERCLIS | Comprehensive Environmental Response, Compensation and Liability Information System |
| CERFA | Community Environmental Response Facilitation Act |
| CFCs | Chlorofluorocarbons |
| CFR | Code of Federal Regulations |
| CITES | Convention on International Trade in Endangered Species of Wild Fauna and Flora |
| CMA | Chemical Manufacturers Association |
| CT | Chronic Toxicity |
| CPSC | Consumer Product Safety Commission |
| CRCPD | *Conference of Radiation Control Program Directors* |
| CSO | Combined Sewer Overflow |
| CWA | Clean Water Act |
| DDT | Dichloro-diphenyl-trichloro-ethane |
| DEC | Department of Environmental Conservation |
| DfE | Design for the Environment |
| DHHS | Department of Health and Human Services |
| DOD | Department of Defense |
| DOE | Department of Energy |
| DOI | Department of Interior |
| DOS | Department of State |
| DOT | Department of Transportation |
| DRES | Dietary Risk Evaluation System |
| EMAP | Environmental Monitoring and Assessment Program |
| EPA | Environmental Protection Agency |
| EPCRA | Emergency Planning and Community Right-to-Know Act |
| ETS | Environmental Tobacco Smoke |
| EU | European Union |

| | |
|---|---|
| FCCC | Framework Convention on Climate Change |
| FDA | Food and Drug Administration |
| FEMAT | Forest Ecosystem Management Assessment Team |
| FFCA | Federal Facility Compliance Act |
| FFDCA | Federal Food, Drug and Cosmetic Act |
| FIFRA | Federal Insecticide, Fungicide, and Rodenticide Act |
| FIP | Forestry Incentives Program |
| FREDS | Findings and Required Elements Data System |
| FUSRAP | Formerly Utilized Sites Remedial Action Program |
| FWS | Fish and Wildlife Service (DOI) |
| GEMS | Global Environmental Monitoring System |
| GHGs | Greenhouse gases |
| GIS | Geographic Information System |
| GNP | Gross National Product |
| GPRA | Government Performance and Results Act of 1993 |
| GRID | Global Resource Information Database |
| HCFCs | Hydrochlorofluorocarbons |
| HFCs | Hydrofluorocarbons |
| HPV | High-Production Volume |
| HSWA | Hazardous and Solid Waste Amendments of RCRA |
| IAG | Interagency Agreement |
| ICOLP | International Cooperative for Ozone Layer Protection |
| ICRI | International Coral Reef Initiative |
| IMPROVE | Interagency Monitoring of Protected Visual Environments |
| IPCC | Intergovernmental Panel on Climate Change |
| IPM | Integrated Pest Management |
| ISO | International Standardization Organization |
| ITFM | Intergovernmental Task Force on Monitoring Water Quality |
| IUCN | International Union for Conservation of Nature and Natural Resources |
| LEPC | Local Emergency Planning Committees |
| MACT | Maximum Achievable Control Technologies |
| MCLs | Maximum Contaminant Levels |
| MMTCE | Million Metric Tons of Carbon Equivalent |
| MSHA | Mine Safety and Health Administration |
| MSW | Municipal Solid Waste |
| NAFTA | North American Free Trade Agreement |
| NASA | National Aeronautics and Space Administration |
| NBS | National Biological Service |
| NEPA | National Environmental Policy Act |
| NHANES | National Health and Nutrition Examination Survey |
| NIOSH | National Institute of Occupational Safety and Healthy |
| NMVOC | Nonmethane Volatile Organic Compounds |
| NOAA | National Oceanic and Atmospheric Administration |
| NPDES | National Pollutant Discharge Elimination System |
| NPL | National Priorities List |
| NRC | Nuclear Regulatory Commission |
| NRCS | Natural Resources Conservation Service |

| | |
|---|---|
| NRI | National Resources Inventory |
| NSI | National Sediment Inventory |
| ODP | Ozone-Depleting Potential |
| OECD | Organization for Economic Cooperation and Development |
| OSHA | Occupational Safety and Health Administration |
| OSWER | Office of Solid Waste and Emergence Response (EPA) |
| PAHs | Polycyclic Aromatic Hydrocarbons |
| PCBs | Polychlorinated Biphenyls |
| PCS | Permit Compliance System |
| PCSD | President's Council on Sustainable Development |
| PESP | Pesticide Environmental Stewardship Program |
| PFCs | Perfluorocarbons |
| PHS | Public Health Service |
| POPs | Persistent Organic Pollutants |
| PPA | Pollution Prevention Act |
| PRTRs | Pollution Release and Transfer Registries |
| RCRA | Resource Conservation and Recovery Act |
| RCRIS | Resource Conservation and Recovery Information System |
| RfD | Reference Dose |
| RMP | Risk Management Plan |
| ROD | Record of Decision |
| SACM | Superfund Accelerated Cleanup Model |
| SARA | Superfund Amendments and Reauthorization Act |
| SDWA | Safe Drinking Water Act |
| SDWIS | Safe Drinking Water Information System |
| SIC | Standard Industrial Categories |
| SIDS | Screening Information Data Set |
| SIP | Stewardship Incentives Program |
| SNAP | Significant New Alternatives Policy |
| SNPRM | Supplemental Notice of Proposed Rulemaking |
| SSOs | Sanitary Sewer Overflows |
| STORET | Storage and Retrieval of Water Quality Information Data Base |
| SWTR | Surface Water Treatment Rule |
| TEQ | Toxic Equivalency Factor |
| TMDLs | Total Maximum Daily Loads |
| TOMS | Total Ozone Mapping Spectrometer |
| TRI | Toxics Release Inventory |
| TRU | Transuranic Waste |
| TSCA | Toxic Substance Control Act |
| TSR | Total Reduced Sulfur |
| UIC | Underground Injection Control |
| UNEP | United Nations Environment Programme |
| USCG | U.S. Coast Guard |
| USDA | United States Department of Agriculture |
| USEPA | United States Environmental Protection Agency |
| USFWS | U.S. Fish and Wildlife Service |
| USTs | Underground Storage Tanks |

| | |
|---|---|
| UV-b | Ultraviolet Radiation |
| VOCs | Volatile Organic Compounds |
| WIN | Waste Information Needs |
| WIPP | Waste Isolation Pilot Plant |
| WMO | World Meteorological Organization |
| WPA | Watershed Protection Approach |
| WRDA | Water Resources Development Act |
| WPS | Worker Protection Standard |
| XL | Project XL - eXcellence and Leadership |

# CONTRIBUTORS

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