



September 1998

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* Mr. DiSanto did not agree with some of the recommendations in the land use chapter and therefore did not sign the report.

September 15, 1998

Dear Governor Ridge:

Since July 1, 1997, when you launched an effort to determine Pennsylvania's 21st century environmental priorities, we have worked diligently with a remarkable and diverse group of Pennsylvanians — the 40 commissioners representing businesses, environmental organizations, academics, philanthropy and local and state government. You challenged all of us to take the long view, to think broadly, and to start with a clean slate — no preconceived notions.

We believe that the Commission met your challenge, and then some. It has drawn a blueprint for a future of the Commonwealth — one that is filled with prosperity and a healthy environment for all Pennsylvanians, a future that corrects the problems of the past and prevents them from happening in the future.

You challenged us to involve the citizens of the Commonwealth. When we asked the people of Pennsylvania to help us, they did so in remarkable numbers. Thousands of people across the Commonwealth have been engaged in discussions about Pennsylvania in the 21st century.

We identified priority issues that are most pressing for Pennsylvania in the coming years. The Commissioners feel strongly that we need to improve the way we use our land and our natural resources. We have recognized the value that the natural environment provides to our well-being as well as our economy, and we have charted a course to enhance both.

The many recommendations outlined in this report are based on the Commission's vision and shared principles. Underlying each of them are three common elements — education, effectiveness and equity. Above all, we stand for educating our citizens to make environmentally sound decisions and improving the effectiveness of both government and the private sector in making fair and equitable decisions about our natural resources.

We used a consensus process to formulate goals, objectives and action steps. However, because of the complexity of the issues, it was not possible to reach total agreement on every word or sentence. Not every commissioner agrees absolutely with every statement, objective or action step in the report. Nevertheless, this report represents the group conscience of the Commission on the direction that Pennsylvania needs to move in the 21st century.

This report is not a final blueprint but rather the beginning of an important debate. It is meant to identify key challenges and solutions concerning the future environment of Pennsylvania. It is a flexible blueprint meant to elevate public awareness and understanding of the critical environmental issues Pennsylvania will soon be facing. New information and discoveries are being made every day. The issues we addressed are complex, interrelated, and dynamic. We ask that you use this report as a foundation for further deliberation and action on these vital issues.

Neither the Commission nor the Governor alone can bring about the changes necessary in the Commonwealth. Change cannot just come from Harrisburg, although strong leadership is required of state government. The hard work of the Commission will only make a difference for Pennsylvania if it ignites debates, builds consensus, inspires local and individual action, and encourages businesses, governments and communities to see the environment, the economy and community in new ways.

Our service on this Commission has been an honor. We thank the talented and dedicated staff for their patient and energetic service. We thank the many Pennsylvanians who advised us so wisely, and we thank you for the opportunity to serve our Commonwealth.

Sincerely,



James M. Seif,
Co-Chairperson,

21st Century Environment Commission



Caren E. Glotfelty,
Co-Chairperson,

21st Century Environment Commission



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Executive Summary

The surest way to predict the future, including the future of Pennsylvania's environment, is to invent it. And many great inventions originate in very simple ideas. As we, the members of Pennsylvania's 21st Century Environment Commission, examined the condition of our state's people and their land, air, woods, water and well-being, and developed a vision for what 21st century Pennsylvania should be, we came to a very simple conclusion:

A healthy environment, a dynamic economy and the well being of our communities are directly linked. To make progress in one area, Pennsylvania must strive for simultaneous excellence in all.

From that basic premise we developed broad goals, detailed guidelines and more than 240 specific recommendations for

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inventing a future that will make our state an example of excellence to the United States and beyond. We have also devised a measuring stick for progress: an index of achievement rather than a listing of shortcomings and penalties. This ambitious report — the product of

extensive outreach to the public and intensive research and discussion among ourselves — draws a multilevel blueprint for attaining high standards of environmental quality that flow from and add strength to vigorous economic performance.

Advances in one area foster progress in the other. Obviously, without a dynamic, prospering economic base, our state cannot sustain essential investments in protecting natural resources and community health. Yet without clean air and water and productive land and forests, economic growth will falter and health care costs will rise.

Where conflict has too often pitted economic goals against environmental goals, we envision a future of collaborative, conscientious, educated stewardship. We do not expect that discord will automatically disappear. Old habits die hard. But recognition of the positive interaction of community, economic and environmental interests will mean contending parties will find it easier in the next century to protect both private rights and the public good.

No environmental issue is more controversial than land use. Besides land use, this report recommends action in four other areas — conservation and sustainable use of natural resources, bettering human health and environmental quality, improving the way industry, government and citizens achieve environmental results, advancing environmental stewardship — as well as recommendations for implementing change and measuring progress. Among all these urgent matters, however, we give top priority to the challenge of promoting responsible land use. Promoting environmental stewardship may be the most important issue, but correcting our land use patterns is the most pressing.

Promoting Responsible Land Use

Sprawl threatens our environmental and economic health and our sense of community. Sprawl is the reckless, almost random growth of housing developments, strip malls, business parks, and the roads connecting them, and of the numbers of vehicles using those roads. Sprawl wastes open land, damages habitat and natural diversity, and destroys historic sites. It strains public funds to build the roads and sewers and schools that must spread to serve a spreading population. That diffusion, however, has long characterized the Commonwealth's growth. In the three decades since 1960, the population of our ten largest metropolitan areas grew by 13 percent, but their developed land area grew by 80 percent.

Sprawl also swells business budgets, imposing higher corporate and personal transportation costs than more compact development would exact for the



same level of services. It endangers farming and the processing, distribution and marketing jobs linked to agriculture. Sprawl converts crop and pasture land to intensive development that depletes ground water supplies and raises the risk of water pollution and flooding. Sprawl feeds air pollution by forcing more and more Pennsylvanians into their cars for longer and longer periods.

Many forces contribute to our sprawl pattern of growth. It is a complex and long standing problem — a difficult one to solve. It involves problems in our core communities, especially the quality of our schools, concern for personal safety and rising tax rates. Fragmentation of decision making across agencies and through multiple levels of government is also a major cause of the problem.

Can sprawl be stopped? Slowed? Reversed? We can begin by calling attention to the problem and educating decision-makers and the public about the consequences of sprawl. It is essential to begin a steady effort to make the best possible future use of our land.

The success of that effort depends primarily on county and local government. Our communities must originate the voluntary solutions that will ensure growth and ensure that such growth is smart, not sloppy. It is at the county and local level that partnerships for sound land use can start to turn the tide by defining areas appropriate for development, setting aside other land as rural resource areas and guiding the manner of new development. Such teamwork should involve not just the citizens, officials and developers of single municipalities but neighboring counties, cities, towns and villages as well.

The state must spur this new kind of grass-roots cooperation with various actions. At the top of the list is the Municipalities Planning Code (MPC). A series of amendments to the MPC and related legislation should give local officials the flexibility to work with one another on a regional basis, promote consistent actions and speed decisions in their own jurisdic-

tions on behalf of development they have determined to be sound. To back them up with practical technical assistance, the Governor's Center for Local Government Services in the Department of Community and Economic Development (DCED) should create a clearinghouse of information on model land use practices and ways to implement them, monitor trends in Pennsylvania and ensure that citizens and their local officials and solicitors learn the concepts and the details of sound development. The most effective incentive will be dollars tied to the participation of communities in regional efforts.

The Commonwealth must also look to its own land-use practices — where its office buildings are sited, how its current funding rules may encourage new school construction instead of renovation, where it underwrites new infrastructure such as roads and sewers, whether its disaster relief and flood insurance programs allow development that has high future costs. And since transportation policy and infrastructure particularly reinforce sprawl, the state has a significant role to play in promoting more compact communities served by accessible, reliable, affordable mass transit. To change our land use patterns, we must make our older core communities competitive with suburban developments. Combined with imaginative incentives to bring new life, growth and appeal to older communities, Pennsylvanians can set about minimizing suburban sprawl and — in the future we foresee — can pattern vigorous development in harmony with careful use of nature's resources.

Conserving Natural Resources for Sustainable Use

Pennsylvania boasts remarkable diversity in our natural systems. More than half our land is forested. Farms occupy just over a quarter of our land. Six major river basins give us 83,000 miles of waterways. And even with two of the top 20 metropolitan areas in the country, Pennsylvania has the largest rural population of any state.

That is the varied face of the present, one that includes 116 state parks, so many that no Pennsylvanian is more than 25 miles away from such recreational resources. The face of the past was darker — colored by the smoke and waste of early industry that first drew on our forests for charcoal, our mines for coal and iron ore, our quarries for limestone and, later, our oil and gas for energy. The outlook for the future is full of promise, built on a healthy mix of farming and forestry, of mining and manufacturing, of service industries and high technology.

Redevelopment. Part of that prospect is dependent on our determination and ingenuity in preserving and stretching our natural resources — crop land, minerals, park land, forests and streams — to give us their wealth for the longest possible time, in some cases, forever. And part depends on the investment we make in repairing past environmental damage. Not only do we need to clean up old abandoned mine sites, but we should improve extraction, processing and use technologies to make them more efficient and environmentally sound.

Thanks to new incentives from Pennsylvania's Land Recycling Act, many Pennsylvania municipalities have recycled their land and buildings. The idea works. It needs to be applied even more widely. And we must do more to encourage the return of those sites to productive uses. By bringing new life to many abandoned industrial and mining sites around the state, we can convert old wounds on our cityscapes and landscape into new seedbeds of growth.

Sustaining farming and forestry. As prudently as we try to handle our health or our household budgets, we need to manage two collective assets — agricultural land and forests — with an eye to their long-term well-being and our own. Development threatens much of the farm and pasture land in the urbanizing southeastern, southcentral and southwestern areas of the state. The loss of the richest and best-drained soils means more than an aesthetic setback. It reduces groundwater recharge capability and

destroys wildlife habitat. These lands are also critical to our tourism industry. But as suburbs grow and land values rise, farmers and the private citizens who own 71 percent of the state's forests understandably find it hard to remain profitable.

Should they be helped? We believe they should, especially if they will enlist in new efforts to manage their holdings for sustained, sustainable returns. Conservation easements and conservation subdivisions as well as financial incentives should be combined with vigorous efforts by County Conservation Districts to assist farmers and land owners in combating soil erosion and pesticide- and fertilizer-laden runoff. The state's Farmland Preservation Program deserves higher levels of support and more creative approaches. So does the work of many private conservation, sportsmen's and agriculture and forestry organizations in keeping plowed and forested land from the bulldozer.

Preserving natural diversity. As important to our welfare as the visible landscape is the less noticed life within it, the wide range of species that are the planet's biological heritage and, in all likelihood, a crucial part of our scientific and technological future. As valuable as they are and may be, more than one tenth of Pennsylvania's native species of plants and animals are endangered or threatened. Many have already disappeared, uncared for in our common wealth. And the toll is mounting.

One reason that diversity is neglected is that no single private or public entity has the responsibility for developing and carrying out a comprehensive conservation strategy. The Department of Conservation and Natural Resources (DCNR) should be directed to bring all interested partners together to create that strategy, involving other state agencies, interested citizens groups, academics, business representatives and, not least, private landowners. The most urgent job to be tackled is the definition of criteria and priorities for conserving natural diversity. Longer term we need a mechanism — a Natural Diversity Index — that can



help to give perspective to natural diversity in the context of other environmental quality and human health indicators. In addition, we must develop new management strategies for public lands and encourage their use on private lands to ensure the conscientious stewardship of the living wealth they hold.

Setting the Example on Public Lands. The four million acres of publicly owned land in the Commonwealth are an immense asset — from a recreational, ecological and economic standpoint. Visits to State Parks alone generate over \$600 million a year, and the timber harvest on State Forest and State Game Lands contributes to a multi-billion dollar industry. Yet maintenance of these preserves has slipped. More than \$200 million worth of repair and upgrading work is needed on roads, bridges, dams, campgrounds, sewer and water facilities.

Overcoming this backlog must be a top priority. At the same time, we need to clean up the sites where long-ago activities — mining and mine drainage, oil and gas production — and current illegal dumping have left environmental degradation behind. These efforts should be part of a broader vanguard program that approaches public lands not as static spaces simply to conserve, but as the green infrastructure of outward-looking, conservation- and recreation-oriented ecosystems.

The challenges of promoting responsible land use and conserving natural resources are awesome ones. The way we meet them in the 21st century will help determine the future of our economy, the richness of our natural environment and — as the next section discusses — the health of our people.

Making A Healthy Environment for Healthy People

It is clear that clean air and clean water nurture human health and that healthy citizens are productive workers. Beyond that truism, however, lies incomplete knowledge about which environmental pollutants, in what quantities, do how much harm to

our health and at what cost to our economy. We need to know much more about the causes and the prevention of lead, chemical and pesticide poisoning, for instance, and about controlling the factors that produce and spread respiratory ailments. A new system to track the incidence of environmentally related diseases should be the first step in a comprehensive effort to link environmental and other factors to human health, and bring academic, state and federal and even international researchers onto a scientific team that can analyze the information and disseminate it to the public.

On the basis of that new knowledge and on the basis of what we already know, we should bring the state's decision-makers from different areas — air, land and water use and health, environmental and economic policy — so that we better integrate our environmental, economic and health programs. Our goal is to reduce, toward the ultimate goal of eliminating, the exposure of people and other organisms to harmful levels of environmental contaminants, and our focus should be not just on separate hazards but on the way they and the ecosystems they affect are interrelated. Sound science — that is, our best available scientific understanding — must be at the base of decision making. In the face of uncertainty, and where harm can be serious and irreversible, other factors, such as community needs, must be considered in the decision making process.

Water. The quality and the quantity of Pennsylvania's water require sustained attention. Both need to be better managed under comprehensive watershed-wide strategies that will ensure not only the safety of the groundwater that provides us with about half of what we drink but also the cleanliness of the rivers and streams that support boating and fishing activities worth more than \$2.5 billion a year. With only a little more than 15 percent of those waterways assessed so far, we know that a quarter of their combined length is impaired — roughly one-third by agricultural runoff and two-thirds by acid mine drainage.

Those are two key threats we must address with new approaches. We can help farmers, for instance, by educating and assisting them (through cost-sharing and low-interest loans) to control the pollutants they use and the runoff that carries sediment and other pollutants into our waterways. We can do the same in our cities, suburbs and towns to improve the management of stormwater and reduce the use of nitrogen fertilizers on lawns and road salt in winter. As for acid mine drainage, we must begin by making sure that no new mining activities are permitted if they carry the risk of generating such discharges. To handle the seemingly insurmountable problems left by past mineral extraction practices, we must commit ourselves to restoring all of the state's mine-drainage impacted streams by 2025. We must set clean-up priorities, tap into Federal funding for help and open the way for re-mining of abandoned lands.

We must better understand the amount of water available to us. Industrial facilities and residential subdivisions are being approved in many areas without adequate knowledge of water availability. We propose the development of a state-wide water resources plan built around the six major water basins and the institution of a process that will allow us to manage these resources so that future growth does not drain them or raise the risks of flooding.

Our broad goal for the next century is to see comprehensive, community-based watershed management strategies as the driver of water quality, quantity and habitat decisions. To do this the state needs to provide technical and financial assistance to local watershed partnerships. We also recommend the realignment of DEP regional offices by watershed and reorganization of the staff by multi-media teams.

Air. During the last quarter century Pennsylvania has achieved major successes in cutting dangerous levels of sulfur dioxide and particulate matter from its air and sharply reducing carbon monoxide levels in Philadelphia. Ground-level ozone, our most persistent air pollutant, has also been forced into retreat, though

not everywhere nor all the time. Much of our problem comes from western states upwind, but we can be a problem for our neighbors, too.

The most effective approach to the broad issue of air quality, therefore, lies in pursuing regional strategies and in developing new, market-based incentives that will encourage the owners of small industrial operations such as print shops, gas stations and dry cleaners as well as commuters and other drivers to lower their emissions by saving energy and switching to technologies that pollute less or not at all. Our goal is to ensure that Pennsylvania's air is clean and its citizens are fully protected from harmful airborne contamination. We have made great progress already. We must do still more.

Waste. Imagine a future where waste products nearly or completely disappear. We envision a 21st century Pennsylvania where manufacturers recycle their products and the packaging as customers return them. A carpeting firm in Georgia already does just that. We foresee waste being reused in the industrial process, converted to energy and to raw materials for other industries. Pennsylvania should be the leader in the development of eco-industrial parks where clusters of industry are encouraged which can benefit from each other's excess products, waste and energy streams. This is already done in Denmark. And as an example in our own Beaver County, calcium sulfate from a coal-fired power plant will soon be processed into wallboard. We must reuse, recycle and reduce waste now as though our future depended on it.

Energy Efficiency. Our ability to stop wasting energy, to conserve far more of it and — above all — to use it efficiently is a key link between a vibrant economy and protection of the environment. From stimulating research into clean energy processes on one hand and purchasing vehicles powered by new energy sources on the other, the state can encourage efficiency through its own practices and programs. Among them should be greater support for and improvement of mass transit and energy conserva-



tion measures. Pennsylvania can lead in developing non-polluting power and in conserving the power we now use. What counts — as the following section explains — is the way we visualize the tight connection between the environment and the economy and the ways we embrace innovative practices to turn that linkage to our future benefit.

Developing A New Foundation for Teamwork

Obviously, it is not enough to declare goals or recommend long-term implementing actions. Fundamentally, we need to make profound changes in our attitudes, behaviors and our patterns of organization to incorporate an intelligent, measured environmental concern into every action we take as private citizens, business people and public officials. Nothing that the state or individual municipalities can do to promote environmental goals will have the maximum effect unless the effort rests on informed public support and active private sector engagement. We need a new way of looking at what we do and the way we do it, requiring and fostering teamwork in place of confrontation and dispute.

To generate that involvement, we should establish a cutting-edge system to manage environmental performance with a flexible and cooperative approach to the needs of different communities and different businesses. To reduce our dependence on current command and control approaches to environmental management, we recommend a solid, new collaboration that will assist government in coordinating its policies and their implementation and help business to become more efficient and competitive. The development of a new resource accounting system, a system of tradable credits that works across media (air, water and soil) and can tie natural resource assets to pollution credits and a covenant system that brings community and industry together to identify and solve environmental issues are suggested programs to help that cause.

Business and government alike need to look toward environmental performance management systems. We must measure environmental and health costs and benefits as well as economic and social progress. Instead of only counting fines levied or infractions penalized, the process should establish positive measurements of compliance and use them to encourage a climb toward even higher standards. The system should be bolstered by incentives that reward such progress in the business community. It should be complemented by strenuous efforts to help our existing businesses, bring more environmentally clean businesses into the state and through state funding support research and development of clean, advanced technologies.

All of this means changing old attitudes and ingrained adversarial instincts. Such change is a function of education — education at many levels but most of all education of the public at large. As the next section spells out, environmental education has to be a continuing activity, a priority for our future.

Promoting Environmental Education, Training and Stewardship

Already a national leader in educating its citizens to respect the vitality and the fragility of the natural environment, Pennsylvania must invest steadily and with renewed commitment in improving public understanding of environmental risks, remedies and benefits and to assist its citizens in their role as stewards. Many examples of beneficial endeavors deserve wide publicity. An ambitious, long-running state-wide awareness campaign in traditional media and on a coordinated network of expert websites can showcase the achievements of business,

Pennsylvania must invest steadily and with renewed commitment to improve public understanding of environmental risks, remedies and benefits and to assist its citizens in their role as stewards.



volunteer groups and government in introducing effective new technologies and advancing the goals our commission has laid out.

We expect school builders to incorporate regenerative environmental principles in their construction, and teachers to be fully prepared and continually refreshed in the interdisciplinary nature of environmental education. Learners — from kindergarten through adulthood — must be steadily exposed to balanced and stimulating environmental curricula and information. Similarly, we should be helping businesses to expand their profits by expanding their activities into environmentally sound processing and production. Voluntary audits of their progress would reward their successes with public recognition and widen understanding of the possibilities for win-win change. In addition to building closer working partnerships with the many capable, grassroots voluntary organizations concerned with environmental stewardship, state government must ensure that its officials are environmentally literate problem solvers with the information to lead wisely and the habits — bred of daily practice — to set the example for others.

Making and Measuring the Next Steps

As a practical beginning we urge state government to determine clear lines of responsibility for managing and implementing the recommendations in this report. Better management, though, is just a starting point for government. It must also become a strategic, innovation-oriented actor, and a communicative catalyst for a change of culture. Government must be entrepreneurial. It must prevent environmental harm, not just remediate damage. It must stimulate top-flight performance by connecting funding to results and making appropriate incentives available to the private sector. It must work with market forces, even to the point of helping create marketplaces in which environmental benefits can be valued and traded.

First-class environmental stewardship can be very expensive. Meeting the goals we have outlined could require billions of dollars in capital outlays, far more than the Commonwealth can realistically commit to the effort. By evaluating each implementation recommendation in terms of its urgency, duration, total and yearly costs, however, we can weigh both our will and our wallet and apply the two to productive solutions rather than sterile contention. It is not beyond the capacity of government to make money through the services it provides or to profit from development it facilitates. It is certainly possible to save money through more efficient practices. Above all, it is essential to find the funds from savings and from earnings to support a forward-looking environmental action agenda.

We must, however, have assurances that those funds are being effectively invested in creating a healthier and economically more productive environment. One tool that could help is a new yardstick of achievement. Tallying the numbers of fines, violations, spills and accidents tells us what has gone wrong. Additionally, we need to know what is going right and how much money it is costing, how much time it is taking, how many organizations and individuals are involved in making constructive changes.

We propose defining a new set of economic, social and environmental indicators which, taken in combination, can gauge our speed and direction. To measure progress in responsible land use, for example, we would seek to learn both the quantity of land use plans adopted to conserve farm land and historic and natural resources and the average acreage per person of new development, the number of vehicle miles traveled daily and the miles of available greenways and trails. Similarly, to evaluate conservation and sustainable use, we should be counting our progress in restoring streams damaged by acid mine drainage, in protecting wetlands, and in spurring recycling activities. We should comprehensively survey the contribution our natural environment and resources make to



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Gross State Product and the success of our businesses in meeting and going beyond environmental standards and employing pollution-prevention and quality-management strategies. We need to know what our kids know about the environment and how competent their teachers are to impart that knowledge.

And we need to put all that information together in a useful fashion that will guide us to address trouble spots, reinforce promising experiments and spur greater public and private involvement in the effort to make the next century a time of environmental health and economic advances. The challenge could not be more important. The future is at stake. It is ours to build with information, with wisdom and with new appreciation for the interconnectedness of the dynamics of the economy, the health of the environment and the well being of our communities.



Prologue

Our appreciation of the basic accord of our long-term environmental, economic and community aims grew steadily during the time we worked together and with great numbers of our concerned fellow citizens. Appointed by Governor Tom Ridge under his July 1, 1997 Executive Order 1997-4, Commissioners have had the help of thousands of Pennsylvanians. They came to our 16 regional roundtables last fall and winter and to 11 open houses this summer. They wrote us almost 800 letters, some of them e-mail responses to the documents on our Internet web page. They telephoned our toll free number, and in forums with local government officials, business representatives, the agricultural community and environmentalists, they gave us expert views and guidance. Commission work products, meeting agendas and minutes and the 3,000-plus individual comments have been preserved in a database at our web site — <http://www.21stcentury.state.pa.us>.

Ultimately, though, the responsibility for meeting the Governor's charge to "...recommend methods and policies to improve the environmental qualities of the Commonwealth and measure the results, while allowing for enhanced economic and social progress" was ours. We achieved remarkable consensus on goals and actions, but not unanimity on every word or sentence of this report. We were able to craft a common framework of beliefs into a set of goal statements, objectives and action steps presented in order of priority. We have fashioned an agenda for enduring change but not for sudden upheaval. The goals are purposefully challenging and long term, and in several places, we propose ideals that might be impractical as current government policy.

Our report will be a success if it touches off a sustained debate and a steady transition to a new environmental/economic/community equilibrium. It is meant to prompt wider public discussion on the critical, complex, interrelated environmental issues that Pennsylvania faces in the next century. With new information available and fresh discoveries being made every day, we look on our work as the early design for a model future.

The answers we offer begin with a vision of the Commonwealth's future. It is a vision that stretches our sense of the possible, that recognizes barriers, but also allows for the inevitability of change and the promise of new approaches. We used it as a beacon and a compass in setting priorities and setting down plans of action. We hope our fellow citizens will use it in a similar fashion to frame their questions and consideration of our shared economic, environmental and social future.



Our Vision of 21st Century Pennsylvania

We see a life-sustaining Pennsylvania, committed to environmental and cultural values, strong communities, and a stewardship ethic among all citizens. In our vision, a robust economy provides both the chance for satisfying work and a high quality of life for current and future generations. Working as partners, we protect our environment, its natural resources and the viability of natural systems upon which all life depends.

In the Pennsylvania of the day after tomorrow,

- We are well educated stewards of the environment. We understand and — in all our actions — respond to the interconnection of economic, personal, community and environmental health.
- Strong and effective collaboration links us as individual citizens and as government, business and academic groups in working partnerships on economic, social and environmental issues.
- Both our declared policies and our actual practices effectively support the simultaneous goals of environmental quality, personal and community well being and economic prosperity — goals that are not in conflict but, we recognize, mutually dependent.
- Having corrected the undesirable legacies of past actions, we protect our natural resources and systems, husbanding them as assets to be used in a sustainable manner that lets our children and grandchildren enjoy the same rewarding quality of life that we desire.
- Pennsylvania stands as an example to the nation and to the world for the excellence it has simultaneously achieved in economic and ecological health and in the quality of life of its citizens. That signal success brings the Commonwealth wide recognition as a desirable place to visit, live, work and raise families.



We Believe...

To make this vision a reality, we will need more than a broad inspiring purpose. We need operating guidelines as well, rules of the road for the road to the future. Out of our discussions among ourselves and with our fellow citizens, our consultations with noted environmental leaders and thinkers, and our research into efforts in other states and countries, we have formed 15 key principles to frame our recommendations and point the way to their implementation.

Pennsylvania's 21st Century Environment Commission believes:

1. Public involvement is critical to sound environmental decision making.
2. A prosperous economy, a healthy citizenry and a better environment are directly linked to each other. To make progress in any one area, Pennsylvania must strive for simultaneous excellence in all.
3. Educated and informed Pennsylvanians will be good stewards of the environment.
4. Although no new layers of government are necessary to meet the challenges of the next century, we do need to examine carefully and with open minds the level of government at which certain decisions should best be made.
5. Environmental performance should be measured by results and outcomes.
6. Partnerships among the government, the private sector and the public will improve the future environment more than traditional adversarial relationships.
7. We should continue to enforce and build upon our existing foundation of environmental laws and regulations, while providing incentives and tools to encourage Pennsylvanians to move beyond compliance.
8. Government should continue to set and enforce environmental standards, but allow flexibility in how to meet them.
9. Environmental decisions must be made holistically to eliminate fragmentation.
10. Environmental policy and resource allocation must be based on our best available scientific understanding.
11. The most effective way to eliminate pollution is to prevent it from ever occurring.
12. The constitutional rights of individuals, including private property rights, must be respected.
13. At the same time, individual behavior and the quality of life of others are inextricably linked. We must foster a goal of assuring the best quality of life for all Pennsylvanians.
14. Government at all levels should lead by example.
15. Systems should be flexible and agile to accommodate innovations, including technological ones.

This very minute, 12 million Pennsylvanians are doing ...something. An hour from now, we'll be doing something else. These tens of millions of individual acts either help the environment, or they hurt it. Do we know the impact of our actions? No person, no agency, no commission can possibly comprehend the scope and effect of all of our acts and behaviors, but we do know that the environment keeps perfect score.

Our actions — and inactions — have caused problems in our urban and rural areas. The careless siting of incompatible industries in densely populated areas has fragmented neighborhoods and possibly endangered human health. While our water resources are a major asset, a fourth of our assessed streams are polluted, we've lost over half of our wetlands, and we don't have a secure system for managing our ground and surface water supply. We are blessed with some of the finest farmland and most productive forests in



the nation, yet since 1985 enough farm land, forest and open space has been transformed into suburbs to connect Pittsburgh and Philadelphia with a corridor roughly five miles wide.¹ Roads have carried people and commerce and life away from the downtown centers of many cities.

Most of those changes occurred without anyone thinking twice about the impact of progress on the state's environment. There were exceptions — Joseph Rothrock, J. Horace McFarland, Gifford Pinchot, Mira Dock and, more recently, Maurice K. Goddard. The ethic of conservation that is their tangible legacy in our rural state parks and urban parklands is also part of the history that clarifies our future. Especially in the last 25 years, Pennsylvania has made significant strides in improving our environment and protecting our natural areas. However, more work is required in order to live up to the environmental obligations stated in our Constitution and to realize the vision of the future the Commission has formulated.

That vision does not require additional layers of regulation. It requires instead that we reassess our approach to environmental, economic and social issues and the way they overlap and the way we address and resolve them on a day-to-day basis. **Progress — economic, social and environmental — now depends on our ability to redefine progress itself.**

In the early years of environmental regulation there were fires to put out — literally, rivers were burning. While environmental regulations focused on controlling the immediate problems — point sources of pollution (smoke stacks and wastewater discharges), it was difficult to see the bigger picture — the actual health of our natural resources, our biological systems, our communities. We did not emphasize the need for open space and healthy communities as we struggled — one discharge at a time — to clean up polluted water and air.

"The people have a right to clean air, pure water, and to the preservation of the natural, scenic, historic and esthetic values of the environment. Pennsylvania's public natural resources are the common property of all the people, including generations yet to come. As trustees of these resources, the Commonwealth shall conserve and maintain them for the benefit of all the people."
 — Article 1, Section 27 of the Pennsylvania Constitution

¹ Based on 1) the 1992 Census of Agriculture which states that 1,108,172 acres of farmland were lost between 1982–1992; 2) the National Agricultural Statistics Service and the PA Dept. of Agriculture's 1995–1996 Statistical Summary which states that 1,000,000 acres of farmland were lost between 1985–1995. [While some farmland has been abandoned, the majority of acres lost has been due to development (new residential, commercial and industrial projects and highways)]; 3) The USDA Forest Service's *Conserving the Forests of the Chesapeake: The Status, Trends, and Importance of Forests of the Bay's Sustainable Future* which states that while there was only a 85,000 acre decline in forest cover in the PA portion of the Chesapeake Bay Basin (1985–1995), there are large differences between the northern and southern sections. The forest lands in the northern tier grew due to farmland abandonment and state reforestation efforts. But, "the urban sprawl associated with Harrisburg, in Cumberland, Dauphin, and York counties caused forest losses of over 1,100 acres per year — nearly 1.5 % between 1985 and 1995. Differences also occur in the traditional agricultural region of the state, including Adams, Lancaster, and York counties of the Lower Susquehanna River. Forests in these counties declined almost 5% from 1985 to 1995 (2,000 acres/yr.)". The Delaware Valley Regional Planning Commission (DVRPC) also cites that in the 5 county southeast PA region 134,000 acres of land was converted from wooded, agricultural or recreational uses to residential or non-residential development in the period 1970 to 1990.



Now we need to think more holistically, remembering how the health of our environment, our economy and our society are linked and how we demand excellence in all three. We must change the common thinking that a growing economy and a healthy environment cannot coexist. In fact, they must prosper together. We need to be clear that some things should be encouraged to grow — children, trees, the economy, mass transit, community cohesiveness. Others should be discouraged — toxic emissions, traffic delays and infrastructure costs. The Commonwealth needs to continue to grow and prosper ...we just need to do it smarter.

The good news is it's not too late. We have been entrusted with the care of a remarkable estate, the 44,000 square miles of Penn's Woods. Our state's constitution recognizes our right to enjoy the beauty and bounty of this estate, and obliges us to preserve these assets for the health and enjoyment of succeeding generations. We are all stewards, charged with the care of something that belongs to someone else. To be good stewards, we must begin now, with purpose and urgency, to build on the foundations we have, to leverage the trends we can identify and to think anew.

We realize that environmental protection, framed as a public good, can find itself in conflict with private property rights. Pennsylvania cannot thrive if we constantly sacrifice one of these fundamental principles to the other. Environmental policy in the 21st century must find ways to promote alliances rather than antagonisms between property ownership and environmental stewardship. The search for common ground will require informed debate, experimentation, patience, restraint and public and private cooperation. But the quest will pay off in long-term prosperity.

Governor Ridge asked us to prioritize the state's environmental concerns and to recommend approaches and solutions. We met, reached out to others, discussed and, yes, argued for many months.

In the end we picked the following five major environmental needs as crucial to our future:

- Promoting Responsible Land Use
- Conserving Natural Resources for Sustainable Use
- Making a Healthy Environment for Healthy People
- Developing A New Foundation for Teamwork
- Promoting Environmental Education, Training and Stewardship

Each of these five concerns is critical. But current land use patterns — the increasing rate of land consumption (compared to minimal growth in population) and the deterioration of older communities — demands the most urgent attention. Of all our more than 240 recommendations, we prioritized that the state must support effective planning at the county and municipal government levels. A clear framework must be created for addressing and resolving land use issues; to reduce sprawl and to encourage growth where appropriate; to accommodate mixed land uses and to revitalize existing infrastructure in urban, suburban and rural communities.

Along with its wealth of natural resources, Pennsylvania also has scars. Within our recommendations for "Conserving Natural Resources for Sustainable Use" we call for healing that will eliminate these injuries and prevention that will ensure against their recurrence. We recognize that the best way to maintain our productive base of forest and farmland is to help our resource-based industries (agriculture, forestry, recreation and tourism) thrive and conserve our special natural assets (natural diversity and public lands) for the future.

Our third area of concern is the impact of environmental contaminants on human health. Recognizing our need for better scientific data to connect environmental problems with health effects and better



ways to predict the cumulative impact of multiple pollution sources, we spelled out a variety of actions to protect water and air quality, to minimize solid waste and to conserve energy while developing new and renewable energy sources. Our key goal is an ambitious one: to ultimately eliminate exposure of people and other organisms to harmful levels of environmental contaminants. It is a distant goal but one that we believe is attainable.

Our last two environmental concerns — “Developing A New Foundation for Teamwork” and “Promoting Environmental Education, Training and Stewardship” — deal with changing the way we all think about and act on environmental issues. They have the high importance of an idea whose time has come. Regulation and enforcement, though they must continue, cannot protect human and environmental health without a transformation in public, business and government attitudes. Genuine environmental progress in the 21st century will require, in addition, voluntary individual actions, community initiatives and public/private partnerships. The Commission recognizes that environmental education and training - not just in school, but throughout one’s lifetime - leads to acts of stewardship and is the key to guaranteeing a 21st century of environmental excellence, economic prosperity and a high quality of life.

We have spelled out these recommendations in the five central chapters that follow. But since part of Governor Ridge’s directive called for ideas about measuring the effect of our work, we conclude our report with specific suggestions for follow-up actions to be taken throughout the Commonwealth and an innovative index of environmental progress that will gauge the positive accomplishments of the Pennsylvanians who redefine progress and bring our 21st century vision to life.

What will Pennsylvania look like in the next century? Will more of us move from cities and towns to the suburbs and beyond, or will we be moving back to the cities and towns? How much farmland and open space will we have? Will over half of the state be covered by forest, as it is now? Will the environmental scars of our past be gone? Will our air and water quality continue to improve? When we strive for “the good life”, how will concerns of environmental quality, natural diversity, sound economic growth and healthy communities affect our decisions?

What is our vision of Pennsylvania for the 21st century? Do we have the necessary public and private programs in place to realize that vision? What is the role of government? Do we recognize the value of our state resources to Pennsylvania, the nation and the world? Can we strengthen our economy and protect these resources at the same time? What actions are we as individual citizens willing to take to preserve and enhance Pennsylvania’s environment? Will we Pennsylvanians understand the collective implications of our individual actions as they relate to the environment? Will we as government employees, business representatives and citizens of the Commonwealth be asking similar questions of each other? Will we try and find the answers together, in partnership?

As we approach the 21st century, we must ask ourselves some key questions about how we approach environmental, economic and community issues. How we frame these questions and how we go about answering them, may well determine our success in the next century.

Recommendations

I. Promoting Responsible Land Use

After its people, Pennsylvania's most precious resource is its land. Even though Penn's Woods have undergone repeated transformations in the 317 years since King Charles established the colony, Pennsylvanians have long recognized the link between their land and their economic and social well-being. That tie will not weaken in the next century. Whether supporting a coal mine in Somerset, a farm in Leola or a factory in Marcus Hook, the land has been and always will be the backbone of the Commonwealth. We have not, however, always shown it the necessary respect.

To correct for past neglect and insure a sound, future course of action, the Commission recommends that the state and others:

- Recognize and acknowledge the problems created by our current land use patterns.
- Educate Pennsylvanians on land use issues.
- Provide local governments better tools to project, plan and implement local and regional land use initiatives.
- Lead by example.
- Address the interrelationship between land use decisions and infrastructure.
- Revitalize our older communities.

Background: Challenges from the Past, for the Future

Once a patchwork of cities and boroughs surrounded by rural, usually agricultural, townships, Pennsylvania has transformed itself as its people have altered their attitudes toward the land and its use. Not only occupying more land than ever before, we have been moving away from densely populated cities, boroughs and villages and into residential subdivisions on land that was once farmed or left as open space.

These new homes, commercial establishments and industrial centers show that Pennsylvania's population and economy are growing. And that is good. Our problem is the pattern of growth. It has been reckless and inefficient. The usual term is "sprawl," what the Chester County Planning Commission defined as "a spreading, low-density, automobile-dependent development pattern of housing, shopping centers and business parks that wastes land needlessly." It is the cumulative, unintended result of decisions by individuals, municipalities and businesses, and it is a pattern widespread in our state. David Rusk, an author and policy analyst on sprawl who has studied the Commonwealth, reminded the Commission that whereas the population in the state's ten largest metropolitan regions grew by only 13 percent between 1960 and 1990, the amount of land we live on grew by 80 percent.

Causes. Many factors have shaped our land use patterns. High among them are increased affluence; the proliferation of automobiles; social problems — crime and drug abuse as well as unemployment and inadequate schools; local government dependence on and competition for real estate taxes; even the spirit of individualism in American culture. State and Federal policies also play a part. Spending on water and sewer infrastructure and on roads — "the engines of growth" — and federal mortgage requirements that favor new housing over older housing in existing communities contribute significantly to sprawl.

Because of our agricultural/industrial heritage, Pennsylvania is dotted with cities, boroughs and villages with unique cultural and architectural histories that would seem to be just the type of small, close-knit communities American families say they desire. Nonetheless, many of these smaller, livable centers are in decline. A number of our fellow citizens described the phenomenon at our regional roundtables in the fall and pointed to its causes.



Recommendations

Promoting Responsible Land Use

When malls and “big box” stores locate in the suburbs, they draw retail business away from downtown areas. People who move to the suburbs frequently explain that the concerns motivating them are 1) quality of schools, 2) personal safety and 3) increasing taxes. Not just big city plagues, these ailments strike in mid-size cities such as Reading, Lancaster, York and Erie as well and in numerous boroughs. While schools, taxes and crime are not “environmental” issues, they are problems that must be addressed if we want our core communities to be competitive with suburban and rural areas.

Although few of these problems are unique to Pennsylvania, the Commission believes that the fragmentation of Pennsylvania’s decision-making process with regard to land use and related tax, economic development, transportation, water and sewer facilities and school policies makes our situation worse. Current development patterns combined with Pennsylvania’s land use laws, the number (2,571) of municipalities with land use authority and insufficient inter-municipal coordination on land use issues work to foster sprawl, not deter it. Court-made rules, reacting to this fragmentation, exacerbate the situation by requiring that every municipality that chooses to plan and zone must provide for every use — all kinds of housing, commercial and industrial uses.

Municipalities choose not to plan and zone for many reasons, including concern over 1) the impact on private property rights, 2) the cost of expanding local government to administer planning and zoning regulations and 3) the fear that plans would force the transformation of rural places into built-up, urban space. Their anxiety is understandable. The Municipalities Planning Code (MPC) authorizes planning and zoning for development; it does not envision the conservation of rural communities where agriculture, mining, quarrying, timbering, recreation and tourism may be preferred. The MPC also fails to provide adequate protection for the conservation of natural areas like stream corridors and contiguous forest areas to sustain groundwater recharge and natural

diversity. These are objectives that many municipalities and counties know how to pursue through sound land use planning and zoning. Others, however, are not so familiar with the latest tools and techniques and told us they need such information.

Planning is far from unknown in Pennsylvania. But it is not enough for municipalities to have prepared comprehensive plans or adopt a statement of community objectives to justify their zoning ordinances when those plans — where they exist — are often out of date and in conflict with their ordinances. Moreover, even if comprehensive municipal plans are in good shape, nothing guarantees that state and other governmental agencies, particularly water and sewer authorities and economic development agencies, will match their activity to county or municipal plans.

Against this background, the Commission agreed that the need to change our patterns of land use was the most immediate issue to address. Consider the costs of inaction.

Environmental Consequences

Sprawl is expensive. Although some do not consider land use an environmental problem, the pattern of negligent growth creates both direct environmental impacts and higher public costs. This inefficient use of public capital also results in secondary environmental impacts. Chertow and Esty state the issue well in their recent book, *Thinking Ecologically* (1997):

“Environmental progress in the next generation will increasingly depend on stemming the environmental costs of current land use patterns. Perhaps because land use is such a vague term, policymakers have difficulty grasping the linkages between the use of land and the economic, environmental, and social health of their communities. Environmental issues are traditionally debated in state and federal legislatures. Local governments and planning commissions consider land use. The next generation of environmental policymaking will require a more holistic approach — one that considers the impact of devel-



opment on natural systems and integrates decision making across political boundaries. It must build on the fundamental recognition that land use decisions and environmental progress are two sides of the same coin. So long as the cumulative effects of land use decisions are ignored, environmental policy will be only marginally successful in achieving its goals.”

By ignoring what is happening around us, we damage ourselves and those who come after us in the 21st century in a variety of ways. For instance,

- **Loss of Open Space and the Natural Environment.** People, in their flight for safety, good schools and “elbow room” are increasingly leaving densely developed areas for the suburbs. People now command, and in many cases zoning ordinances dictate, much larger plots of land per house than previously. As a result, many of Pennsylvania’s most scenic open space areas are being fragmented to the detriment of the natural environment and cultural landscape.
- **Loss of Farmland.** As population shifts away from urban areas, Pennsylvania’s prime farm lands are transformed into residential subdivisions. While a total of 115,000 acres of farmland have been preserved through state and local programs, just in the ten years from 1982 to 1992, Pennsylvania lost over one million acres of cropland and pastureland. Despite recent laws and efforts to protect prime and statewide important soils, farmland conversion continues at an alarming pace. *(See details in Chapter II’s discussion of agriculture, forestry and tourism.)*
- **Loss of Habitat.** As people buy larger and larger residential lots, and industry and commercial interests move out of our older developed areas, habitat is lost or degraded, resulting in loss of natural diversity. *(See details in Chapter II’s section on natural diversity.)*
- **Loss of Aquifers (Future Water Shortages).** Aquifers are the geologic layers that hold our groundwater resources and, during periods of lit-

tle rain, determine the water flow in streams and rivers. The water they store is critical to maintaining a habitat for fish and a host of stream life during hot, dry summer periods. Public water sources can also be affected. The impervious surfaces associated with urban development can dramatically reduce the amount and purity of water percolating down to the groundwater.

- **Stormwater Runoff.** Sprawl has increased the amount of impervious surfaces that increase stormwater runoff. Not only does the water run faster, but the first flush of auto contaminants from malls and other large parking areas contributes significantly to the non-point source loading of pollutants entering streams. Some municipalities require stormwater controls to reduce the rate of runoff, but only a few municipalities regulate its quality as well.
- **Flooding.** Impervious surfaces from development generate rainfall runoff. The acceleration of that water discharged through efficient storm sewer pipes has led to frequent flooding of many areas downstream of dense development. Furthermore, increased development on floodplains has put many people and properties at risk.
- **Conflicts of Sprawl with Rural Land Uses.** Conflicts develop when new residential developments are built adjacent to active farms or forestry operations. New homeowners rarely appreciate the odors, dust and noise associated with normal farming and forestry practices.
- **Conflict of Sprawl with Mineral Extraction.** When sprawling development moves into rural areas, conflicts often develop between surface owners and mineral estate owners over mining operation issues such as subsidence, water loss, noise, traffic and other nuisance-type conditions. Often, mining companies have underground mineral rights and can be extracting coal underneath housing subdivisions, possibly resulting in subsidence. Our mineral and energy resources are only found in certain areas; they cannot relocate.



Recommendations

Promoting Responsible Land Use

- **Air Pollution.** Pennsylvanians are spending more time in their cars. Farther apart and farther from work, shops, schools, health care and entertainment facilities, people depend more and more on automobiles for their basic needs. Total vehicle miles traveled (VMT) in Pennsylvania increased from about 263 million miles per day to 294 million miles per day over the six year period of 1990 to 1996. This is a 12 percent increase or an annual average of 2%. Many of our rural counties exhibited even higher annual rate of increase; e.g., Bedford (5%), Clinton (6.6%) and Pike (5%).

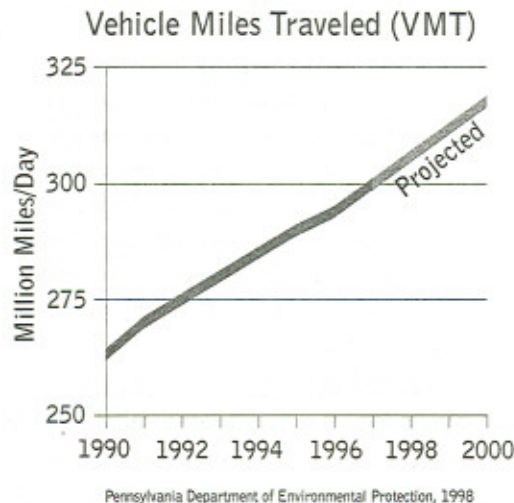
Economic Consequences

Sprawl's effects reach beyond the environment to raise consumption of natural resources, public outlays and the taxes that cover them and even many kinds of personal and household costs. Combined, those consequences can harm a state's economic prospects, its competitiveness, its future. Studies over the last twenty five years done for New Jersey, Michigan, Maryland and other states or regions have demonstrated that sprawl patterns of development compared with more compact forms of growth in traditional cities and towns increase the overall economic cost of development to citizens. Headless growth duplicates infrastructure and schools, requires increased municipal services and taxes, affects air and water quality, swallows rural resource lands and hastens the decline of municipalities that must use shrinking revenues to maintain facilities and services for residents who stay behind.²

- **Public Development.** Sprawl in Pennsylvania continues to absorb large amounts of public capital. Public facilities (roads, sewers, water supply and wastewater treatment systems, schools) to serve this development must cover larger, less dense areas. The inevitable higher costs bring higher taxes. Sprawling development is likely to

increase the total public capital cost burden to local government for open space, roads, schools and utilities.

- **Infrastructure.** Unplanned development leads to the higher infrastructure service costs of "leap-frogging" when roads and utilities between major developments cross open spaces with few residents and few taxpayers. *The Cost of Sprawl* study (The Real Estate Corporation, 1974) suggests that the cost difference for sprawl is particularly significant for that proportion of total costs likely to be borne by local governments for roads, water and sewers.
- **Cultural Heritage Costs.** The Keystone State has been the cornerstone of our nation from colonial times, but our great legacy of historical resources is suffering from short-sighted land use patterns. Historic preservation, for instance, is often so poorly coordinated with municipal policies that property tax statutes often undermine the goals of preservation programs. Redevelopment, in turn, often encourages the



² See, e.g., Burchell and Listokin, *Land, Infrastructure, Housing Costs, and Fiscal Impacts associated with Growth: The Literature on the Impacts of Traditional versus Managed Growth*, (1995).

demolition of significant architectural and cultural resources. Their loss or neglect is a loss to our scenic and cultural values and to the promise of tourism.

- **Existing Infrastructure Deterioration.** As demographics change, older infrastructure suffers. Operating costs per dwelling unit for roadways, schools, sewage disposal and water supply are likely to be lower for denser urban developments. As people leave these dense areas (for which the utilities were sized), operating costs rise for those who stay. At some point, the revenue cannot satisfy the maintenance required and the system deteriorates.

Societal Consequences

The flight of middle- and upper-income citizens to exurban areas further and further from core areas also impacts the social viability of urban centers and suburban communities. An unintended social stratification in Pennsylvania concentrates poor and minority populations in urban areas with limited access to jobs or schools that provide quality education.

costs high and where social burdens are comparatively heavy — children in the free school lunch program, single-parent headed households, low median property values and higher crime levels. The affluent may (and do) depart — literally, for greener pastures — but the problems remain (or worsen) and the resources available to meet those problems shrink.

Tom Hylton in his book, *Save Our Land, Save Our Towns*, (1995) points to the loss of a sense of community occurring in Pennsylvania. When small boroughs and cities were the focal point of society, community pride and sense of ownership flourished. Although difficult to quantify, Hylton maintains that the “spreading out” of Pennsylvanians has caused a loss of civic virtue and sense of community that once enriched us.

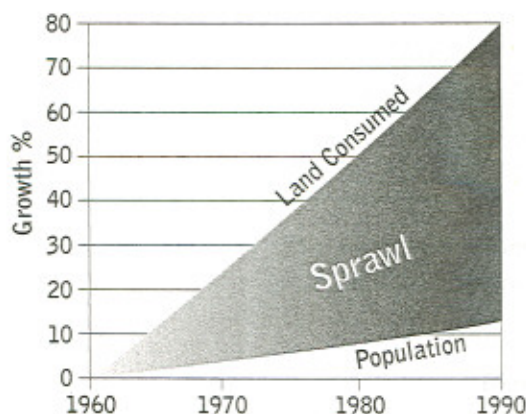
We cannot live in the past. In building the future, however, we have to find a more sensible and sustainable pattern of growth and land use. That is the goal of the recommendations the Commission formulated. They follow.

Commission Recommendations

Our land use patterns create wide-ranging problems which no single, easy formula can remedy in a state as diverse as Pennsylvania. Many, different, determined steps, however, can put us on the right track.

- Respecting Pennsylvania’s tradition of local government, the Commission urges strengthening the ability and authority of community officials and agencies to plan their growth in cooperation with their county and neighboring municipalities.
- While the state has a role in the development of better land use patterns, state mandates will not effectively solve the problem. Solutions must be voluntary, but legally supported and effective, and driven by local initiative. The state should provide a framework, financial incentives and technical assistance.

Growth of Developed Land vs. Population



Study of the 10 largest metropolitan areas in Pennsylvania, David Rusk, Washington D.C., 1997

Representative Myron Orfield of Minnesota, author of *Metropolitics* (1997), has developed a graphic mapping methodology that uses various indicators of social and fiscal health to analyze the fiscal and social disparities among municipalities in metropolitan regions, Philadelphia and Pittsburgh, among them. His maps graphically demonstrate the danger that the majority of these

regions’ urban populations live or soon will be living in municipalities where tax bases are low and service



Recommendations

Promoting Responsible Land Use

There are many exciting land use planning initiatives occurring across the state that have included extensive involvement of municipal officials and the public. Two notable examples are the recent planning efforts by Lancaster and Chester Counties.

Lancaster County began revising its growth management strategy in the late 1980s as a result of the increased negative impacts that sprawl and unmanaged development were having on the landscape. Realizing that county governments in Pennsylvania are primarily advisory bodies, the county devised a comprehensive planning process that emphasizes 1) extensive public involvement, 2) increased inter-governmental cooperation, and 3) implementation and action. Based on a strong consensus in the community, urban growth boundaries (UGBs) were promoted as the key growth management tool in the plan. The boundaries have provided the framework for working with municipalities on a regional basis to direct growth to appropriate places where the infrastructure and services exist or are planned for in the future. This strategy also ensures that growth and development are directed away from the region's important agricultural soils and important conservation areas. Due to this cooperative approach to managing growth, 19 of the 26 municipalities that are expected to adopt growth boundaries have already done so. This effort proves that the management of growth and change can be successful if it is based on a cooperative approach which involves both the county and its municipalities.

In 1996, Chester County adopted a new County Comprehensive Plan, *Landscapes: Managing Change in Chester County*. *Landscapes* promotes the creation of livable landscapes as an alternative to sprawl and sets forth plans of action to improve quality of life in ten major areas: land use, resource protection, economic development, transportation, housing, utilities, community facilities, human services, public health, and planning and coordination. The county also prepared a *Community Planning Handbook: A Toolbox for Managing Growth in Chester County* to introduce municipalities to a wide range of planning techniques that can be used to achieve managed growth both locally and regionally. Municipalities have been given planning grants to revise their comprehensive plans and ordinances to align with the county plan. As of August, 1998, 67 of 73 municipalities (representing 98 percent of the population) are cooperating in the plan.

- It is possible to plan and create better land use patterns without infringing on private property rights. We need to work in partnership and respect local community ideas.
- The Commission is pro growth. We need economic growth to provide a high quality of life. **But we must grow smartly** so that we build and maintain sustainable communities and reduce the high public cost associated with inefficient development patterns.

Within this context, the Commission proposes a 21st century course for Pennsylvania that will help put an end to sprawl:

Recognizing the Problem

Growing communities are good, but our sprawling patterns of growth are not. It is important that Pennsylvanians acknowledge the difference and recognize that we are using land inefficiently and unsustainably. The rate at which land is developed in

Pennsylvania far outpaces the growth of its population. Sprawl harms the environment, increases the cost of infrastructure and exacerbates the abandonment of existing communities. The Governor and other elected leaders, who have the benefit of a broader perspective, need to articulate this problem to Pennsylvanians.

By Executive Order or other action, the Governor should send a clear message that the administration finds current land use patterns to be a problem. The executive order should declare that farmland, open space and natural areas are valuable, threatened resources in Pennsylvania, and that our core communities need to be sustained and revitalized. The order should define the scope and consequences of the problem and encourage Pennsylvanians to take action.

In the private sector, community and business leaders must also accept that sprawl is not healthy. In higher costs to taxpayers and diminished community spirit, it affects us all for the worse. Our leaders must be prepared to spread the word of its consequences.

Educating Pennsylvanians

Since sprawl is the cumulative result of individual and business decisions and government spending and policies, it will only be solved by the decisions of these same individuals, businesses and governing bodies. Education at all levels is critical to the process of developing the enlightened policies at every level of government that can undo the errors of the past. In the 21st century, Pennsylvanians must realize the interrelationship of land use patterns, transportation and other infrastructure and environmental quality.

When we consider the aspects of environmental and ecological issues that should be covered in our school curricula, land use topics are not often on the list. To

foster an educated citizenry, Pennsylvania should ensure that land use issues are included in the school curricula. In addition separate programs should be available for government officials, businesses, developers and the general public on the importance of land use issues to our quality of life. (*See Chapter V for more details on education proposals*).

We also encourage the development of land use planning programs in colleges and universities for the initial and continuing education of planning professionals.

Better Tools for Local Government

Amending the Municipalities Planning Code (MPC): Members of the Commission believe that Pennsylvania's legislative framework for land use decisions is inadequate and contributes significantly to the cause of many of our land use problems. Before Pennsylvania can correct course, the legislative authorization for sound local government action must be in place. With the appropriate tools, county and local governing bodies can craft solutions that are tailored to the challenges and needs of their communities.

During the 1999–2000 legislative session, the General Assembly should approve reauthorization of the Municipalities Planning Code³ to authorize and facilitate:

- County/multi-municipal cooperation to develop regional plans through the use of intergovernmental cooperative agreements, including mechanisms for achieving consistent action at all levels of government,
- Use of targeted growth areas as a potential tool to manage growth and direct infrastructure development in municipalities and areas covered by multi-municipal or regional plans,

³ May also require amendments to other legislation such as the Local Tax Enabling Act and the Intergovernmental Cooperation Law.



Recommendations

Promoting Responsible Land Use

- Designation of multi-municipal growth areas and rural resource areas so that not all municipalities have to become urbanized if they choose to plan and zone,
- Required "uses" being provided within multi-municipal areas or regions instead of in every municipality,
- Transfer of Development Rights (TDRs) across municipal boundaries,
- Intergovernmental cost and revenue sharing,
- Enhanced infrastructure (transportation, energy, water) corridor preservation for existing and future infrastructure rights-of-way,
- Zoning that conserves identified natural, historic and cultural resources,
- Traditional, mixed-use neighborhood development and Planned Unit Development (PUDs),
- In designated growth areas, provision for streamlined development decisions and regulatory incentives to encourage growth,
- Zoning that recognizes that agricultural land is a viable land use.

Many members of the public urged the Commission to go further in pressing for new legislation, and the Commission also discussed at length such concepts as concurrency (making development approvals contingent on provision of infrastructure), a state plan and mandatory compliance with county planning. Although some of us believe that these approaches could help address the sprawl problem, we concluded that voluntary mechanisms with legal effect are in the present best interest of Pennsylvania.

Financial Incentives and Assistance: Several state programs already encourage community and economic development in existing communities and protect and preserve important agricultural lands. The Project for Community Building, the Land Recycling Program and the proposed Keystone Opportunity Zones are

some state initiatives that support the rejuvenation of distressed areas. Such programs offer significant, productive incentives targeted at solving land use problems. We must ensure their continued support and expansion into the 21st century.

The Commonwealth should do more to support municipal and multi-municipal planning and consistent implementation, providing financial assistance for planning and implementation to qualifying communities. While there was a greater than 100% increase in the State Planning Assistance Grants line item in the FY 1998-1999 budget, appropriate funding needs to follow to assist those municipalities that are willing to enter into county and multi-municipal plans. These Commonwealth dollars could also be tied directly to the success of efforts to regionalize.

Technical assistance: Planning is not easy. It requires significant technical expertise, the added know-how that many local government officials told us they needed to complete what they view as an effective land use plan. Many who expressed a desire to do "something" did not know what that "something" was.

To help address this problem, the Governor, by executive order, should designate the Governor's Center for Local Government Services (The Center), with an advisory committee, and in cooperation with the Department of Community and Economic Development (DCED), as the principal state level entity responsible for land use assistance and monitoring. Specifically, the Governor should charge the Center to:

- Work in partnership with the public and private sector to establish a clearinghouse of sound land use practices (SLUPs), such as cluster and conservation zoning, visioning processes, use of natural resource inventories in developing comprehensive plans and site plan reviews, purchase and/or transfer of development rights, property tax credits, etc.

- Assist local governments interested in implementing sound land use practices and spread information about existing programs and initiatives such as the state's Growing Greener Program (conservation by design) or *Landscapes*, Chester County's comprehensive planning program which included voluntary cooperation by municipalities.
- Help local governments with planning and zoning to provide a clear process for the siting of industrial and commercial facilities.
- Facilitate the efforts of counties and municipalities to enter into multi-municipal cooperative agreements.
- The Center and the advisory committee will evaluate the need to coordinate planning across disciplines.
- Monitor current trends of land use in Pennsylvania and issue a biennial report to the public describing Pennsylvania's land use patterns.
- Utilize a statewide Geographic Information Systems (GIS)⁴ to assist all county and local governments.
- Work with the Department of Education to develop programs for land use education.

Encouraging Sustainable Communities: To develop strong, sustainable communities, local stakeholders must be involved in a process that looks at long-term options. Pennsylvania should take advantage of the growing national and international sustainability movement, often backed by national funding, that supports community efforts to develop local sustainable programs. The International Council for Local Environmental Initiatives (ICLEI) has identified over 1800 communities in 33 countries that are developing local sustainable development programs. (See *Appendix 4 for information on existing municipalities with sustainable community programs and potential*

funding sources.) The County Commissioners Association of Pennsylvania adopted in August, 1998 a Sustainable Community Task Force Report *Working Together to Build Sustainable Communities*.

The essential idea of such programs is to galvanize a grass roots, multi-stakeholder process which develops an economic, social, and environmental vision for the future of the community. Communities are encouraged to plan for a future that provides for a good economy while protecting the environment and considering issues of social equity. Many different quality of life issues are typically considered in developing a local sustainable development program and usually in establishing indicators that measure progress in achieving locally formulated sustainable development goals. If the State indicators that we recommend at the close of our report are eventually to be of value, they should somehow relate to measurements used at the community level.

Leading by Example

If Pennsylvania is to be a 21st century example to America of environmental and economic health, its state government must lead by example at home. As the employer of approximately 85,000 workers, owner of 2,810 buildings greater than 5,000 square feet in size and lessor of an additional 1,200 buildings, the state has an obligation to promote and live by sound land use practices. Whenever possible, state agencies should be located on brownfields or in areas that are already developed, where employees can walk, bike or take mass transit to work.

The Governor's Green Government Council, created by Executive Order 1998-1, should coordinate with the Governor's Center for Local Government Services to ensure that Commonwealth agencies are acting consistently with sound land use practices. For its part, the Center should provide Commonwealth agencies supportive technical assistance.

⁴ It is recommended that the state designate one agency to lead in the development of a statewide GIS system and facilitate compatibility with currently existing public and private systems.



Recommendations

Promoting Responsible Land Use

Through the direction of the Governor's Green Government Council and the Center, state agencies should identify existing programs, regulations and policies that are inconsistent with sound land use practices. For instance, the Department of Education has a reimbursement policy for local school districts which encourages the building of new schools rather than the renovation of existing schools, an incentive which affects development patterns. The impact of Act 537, the Sewage Facilities Planning Act, on development patterns and consistency with the directions of the MPC should be reviewed. Bad land use decisions are often supported by disaster relief

funds and flood insurance programs that the state should reevaluate.

While the recommended changes to the MPC will facilitate better multi-municipal/regional planning, a more vigorous commitment is needed. Governments should be proactive in this endeavor, working with developers and economic development organizations through public/private partnerships to build (or rebuild) the types of mixed-use communities and eco-industrial centers the Commission proposes (*see the Waste section of Chapter III for a discussion of eco-industrial parks*).

There are positive mixed-use and reuse development projects occurring throughout Pennsylvania. These include the mixed-use development at Washington Landing, an old brownfields site in Pittsburgh where the Southwest Regional Office of DEP is located, developed by Murray Rust. Cited as an exemplary urban infill project by HUD Secretary Henry Cisneros is the Crawford Square development in Pittsburgh's Hill District neighborhood designed by Urban Design Associates for the Urban Redevelopment Authority of Pittsburgh and McCormack Baron Associates. The development has a total of 500 units of mixed income housing, with over 50 percent of the units subsidized, yet there is no apparent distinction in either architecture or the character of the neighborhood. The urban design creates a series of streets and public spaces that serve not only the development itself, but also provide new linkages from the rest of the Hill neighborhood to the city.

Following in the footsteps of Chesterbrook, one of the first planned unit developments in the nation, is Eagleview, a new mixed-use planned development of over 800 acres in Exton, Chester County. Eagleview, designed and built by the Hankin Group, is an example of a community that provides for growth in the future without destroying the Chester County setting. It represents a new form of development that encourages the placement of homes, shopping, recreation and business together in a holistic way. Sidewalks, jogging paths and greenways connect and integrate the home, the market and the workplace, unified by a town square.

Building Smart Infrastructure

Land use decisions are not made in a vacuum. Infrastructure often plays a key role in steering development in undesirable directions. Addressing this important linkage, Pennsylvania must maintain and, where appropriate, expand an infrastructure that promotes and enhances the efficient use of land and simultaneously attracts new businesses. Infrastructure (transportation, water/wastewater, schools, etc.) projects should support sound land use by giving preference to development and redevelopment in existing communities and growth areas defined in multi-municipal/regional plans.

We recommend taking some specific steps:

- Develop transportation and infrastructure plans on a regional basis, facilitated by counties, with the participation of state agencies, municipalities, developers, businesses and citizens.
- Encourage transit-oriented development — that is, walkable, livable, mixed-use communities built around transit stops in feasible locations in both urban and suburban areas. For example, the proposed Schuylkill Valley Metro from Philadelphia to Reading would link city and suburban locations, including King of Prussia mall, and serve several sites where transit-oriented developments could be built to provide residents access to work, schools, shops, and entertainment without the need to use automobiles for every trip.
- Ensure that mass-transit is accessible, safe, reliable and affordable.
- Encourage the use of rail freight to relieve traffic congestion, known to be an economic drain on commerce. The use of railroads for commuter and freight, activities which fit well with Pennsylvania's geography, also brings documented benefits in improved air quality and reduced energy usage.

- Periodically update and implement a Statewide Long Range Transportation Plan that recognizes and enhances the relationship between land use and the transportation infrastructure and is consistent with Metropolitan Planning Organization and Local Development District long range plans.
- Continually update and implement water, wastewater treatment and solid waste infrastructure plans and projects so that they support sound land use practices and are consistent with county and multi-municipal comprehensive plans.

Revitalizing Our Existing Communities

More than 5.5 million Pennsylvanians — out of 12 million — live in our 56 cities and 964 boroughs. Others make their homes in core communities or village centers in some townships. Keeping these places of denser population economically and environmentally healthy and desirable places to live is critically important to assuring that all Pennsylvania's citizens enjoy a high quality of life.

Urban life, of course, is not everyone's choice, and free choice in such matters is a sacred American right. We cannot compel but, for those individuals and families who do choose to live in the more urban areas, we can and should ensure that Pennsylvania offers quality locations to call home. By making our urban areas and small towns more attractive places in which to live, we can slow down the rush to new housing developments in the suburbs and rural areas and assure continued use of infrastructure already in place. The challenge is to make our urban municipalities and core communities competitive with suburban and rural areas. A number of different approaches can take us to the same goal.

Following are several recommendations for improving the environment of our more developed areas and enticing employers to locate in them:



Recommendations

Promoting Responsible Land Use

- Encourage mixed land use development patterns in existing communities to create or improve neighborhoods.
- Encourage local governments to reduce code and regulatory barriers to the rehabilitation of older buildings.
- Develop parks and connected bikeways, walkways and greenways throughout existing communities.
- Retrofit and improve existing schools (greening of schools); build new ones only as a last resort.
- Enhance the availability of quality of life, infrastructure, work force and financial advantages to draw businesses wishing to locate in developed areas through programs such as:
 - state incentive programs for residential, commercial and industrial (community-appropriate) development in developed areas. An example is the Governor's proposed Keystone Opportunity Zone (KOZ) initiative which is designed to revive economically distressed urban and rural communities using tax abatement.
 - financial incentives for reuse of old buildings and tax/lien forgiveness to "recycle" buildings and preserve historic sites.

Although Pennsylvania is a leader among the 50 states in its aggressive approach to remediation and reuse of old industrial sites (brownfields), it can do more. We would like to see all contaminated "brownfield" and hazardous waste sites identified, remediated and closed. If possible, all contaminated sites should be put to productive use. (See Chapter II on correcting past errors for more details).

We recognize that our recommendations address only some of the issues that must be tackled if our existing communities are to become more desirable places to live and work and if Pennsylvania is going to solve its problems of sprawl. Among the factors

that are beyond the Commission's scope are the need to make quality education available in all areas of the state so that better schools in outlying areas are not magnets for urban families. Public safety is also crucial. To slow the flow out of cities and towns, our citizens of all income levels must feel themselves secure in their homes and on their streets.

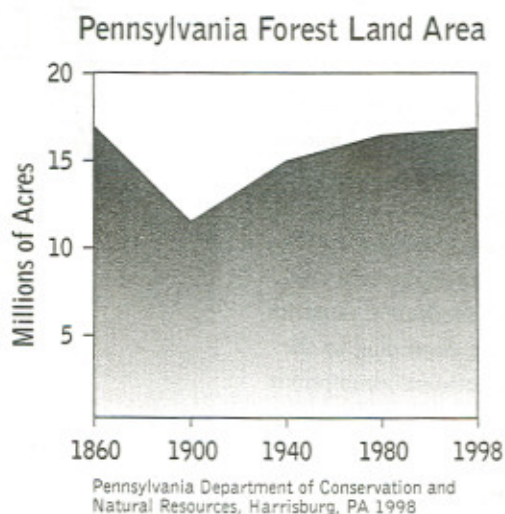
The mix of approaches we have offered to the problem of sprawl and the hope of redressing it in the 21st century reflects not just the variety of views within the Commission but the wealth of opportunities for new departures. To take up those opportunities, however, we must recognize the value of the natural resources on which our future and our welfare depend. In the following chapter, we look at ways to conserve that base yet still use it in a sensitive fashion.

II. Conserving Natural Resources for Sustainable Use

The "faire countrye" of ancient forests, rich soil and abundant water that William and Hannah Penn first surveyed is still our extraordinary estate. Along with its "keystone" location — connected to the Great Lakes, the Atlantic Ocean and the Gulf of Mexico — its natural resources have fed the growth of industries built on limestone, iron ore, and eventually coal, oil, and gas and other minerals. Charcoal from its vast stands of pine and hemlock and wood from its cherry, oak, maple and chestnut trees supplied raw material for many successful commercial enterprises. Its rich soil and dedicated farmers also made the Commonwealth an agricultural power.

Nor does this economic history speak only of a distant legacy. Our natural resources today still support the state's strong sectors of agriculture, forestry and recreation/tourism and give it,

according to Regional Financial Associates, an economic consulting firm, one of the most diverse economies in the nation. Our mix of manufacturing, services, agriculture, forestry and mining mirrors the national pattern better than nearly any other state, sparing us from relying primarily on just one or two industries for economic health and well-being.



The Commonwealth is entering the 21st century as an emerging center of high technology, especially in the areas of information technology, biotechnology, environmental engineering and technology, agribusiness and advanced materials. That progress and promise flow from Pennsylvania's world-class educational facilities, its highly skilled workforce, and a vigorous network of suppliers and distributors.

Manufacturing continues to play an important role in Pennsylvania's economy, accounting for 17 percent of Commonwealth jobs. As is true of the U.S. as a whole, service industries, including health, education, computer and engineering services, have become increasingly important, employing almost one out of every three workers. Pennsylvania's agriculture, forestry and tourism industries are also important sources of jobs and economic activity, but perhaps their most valuable contribution is the boost they give to Pennsylvania's overall quality of life. While the Commonwealth has the fifth and 19th largest metropolitan areas in the nation (Philadelphia and Pittsburgh, respectively), as well as eight cities and five townships with populations over 50,000, it also has the largest rural population of any state.

Located in the densely populated Mid-Atlantic/Great Lakes megalopolis, we nonetheless own a unique storehouse of renewable and non-renewable natural resources that fuel our economy and enhance our quality of life. Of Pennsylvania's 28.6 million acres, 7.7 million acres are farmland, of which 5.6 million acres are cropland. The southcentral and southeastern portions of the state boast some of the best agricultural soils in the world.

Over half of Pennsylvania's land is forested, and those forests contribute significantly to our economy through tourism, recreation and the forest products industry. Our 2.1 million acre state forest system is one of the largest publicly-owned forests in the eastern United States, and we have the largest hardwood inventory in the nation. Pennsylvania Game Lands cover an additional 1.4 million acres.

Pennsylvania is the fourth leading coal producing state. In addition to coal, Pennsylvania has active oil, gas and industrial mineral industries. Pennsylvania lies at the northeastern end of the Appalachian Coal Basin. Bituminous coal underlies more than 13,000 square miles across the western and central portions of the state, and almost all of the nation's anthracite or "hard coal" is found in northeastern Pennsylvania.



Recommendations

Conserving Natural Resources for Sustainable Use

Another important aspect of Pennsylvania's uniqueness is the diversity of our natural systems. Pennsylvania contains multiple distinct landform types (mapped as physiographic provinces and sections), each with its own geology, and mix of natural resources which produces distinct topography and habitat. That variety supports a multi-billion dollar outdoor recreation economy. Growing numbers of visitors attracted by natural and historic sites and activities — ecotourists — can enjoy over 80,000 miles of rivers and streams in six major river basins. Our waters invite fishing, swimming and boating, improve the quality of our lives and provide an invaluable resource for economic development.

Thanks to a conservation legacy fostered by Joseph Rothrock, J. Horace McFarland, Gifford Pinchot, Mira Dock and more recently, Maurice K. Goddard, Pennsylvanians and their (paying) guests have access to almost 4.5 million acres of public lands, natural wonders to explore. No Pennsylvanian need go more than 25 miles from home to find a state park. Today 116 of them provide hiking, camping, swimming, boating and picnicking in natural outdoor settings. In our cities, answering the need for open space, we have protected unique corridors such as the Fairmont Park system in the City of Philadelphia and Schenley and Frick parks in Pittsburgh. Our smallest state park is Pittsburgh's urban centerpiece — Point State Park.

"It's a gift," says the Shaker hymn, "to come down where you want to be." The gifts we have from nature and from foresighted endeavor have put us in an enviable position, but to hold that high and pleasant ground and ensure a thriving economy and rewarding quality of life into the 21st century, we must make a commitment. We must embrace the ethic of sustainable growth and development. That undertaking means adopting a long-term view of our natural resources so that we use them in ways that ensure their availability for future generations as well. We live and work in the present, but we are required to think and look ahead and, doing so, to maximize

conservation of our natural resources and minimize the impacts of extraction, development and use.

Our recommendations for conservation and sustainable use of natural resources address four main areas of opportunity:

- Correcting the problems of the past — restoring areas degraded by past coal, oil, gas, and mineral extraction and manufacturing, and putting those areas back into productive use.
- Helping our resource-based industries continue to thrive for the long term — assuring that agriculture, forestry and mining, along with recreation and tourism, continue as fundamental sectors in Pennsylvania's economy, employing sustainable management practices.
- Conserving and enhancing the natural diversity of Pennsylvania.
- Improving the resources of our public lands.

Correcting the Problems of the Past

Background: Pennsylvania is blessed with a wealth of extractable energy (coal, oil and gas) and mineral resources. On top of potential holdings of 22 billion tons of bituminous coal, or just over six percent of the U.S. total (D. Hoskins, State Geologist, 1998), state reserves contain an additional potential seven billion tons of anthracite coal. Production estimates of coal, oil and gas vary greatly, depending on the use of economic factors, technological assumptions and extraction criteria.

This rich store of energy and the millions of hard working people who tapped it not only fueled the emergence of the iron and steel industries in the 18th and 19th centuries and the industrial revolution at the turn of the 20th century but were also instrumental in winning two world wars. Coal, steel and railroads put Pennsylvania on the map as a world-class industrial powerhouse. A source of deserved pride, this heritage also carries costs. Because coal

mining and processing looked primarily to fuel production and rarely, if at all, to environmental consequences, we now need to spend \$15 billion to correct environmental problems those practices left behind. In addition to 2,200 miles of impacted streams and acid contaminated water supplies (*additional details in Chapter III*), the state is home to 250,000 acres of abandoned surface mines, over 7,000 orphaned and abandoned oil and gas wells, widespread subsidence problems, numerous hazardous mine openings, mine fires, drainage problems and abandoned structures.

Abandoned industrial works, commonly called "brownfield sites," have also left scars. Because of environmental liability associated with their use, developers and entrepreneurs left them behind, searching instead for "greenfields" that had no prior industrial use. Doing so meant giving up valuable resources in developed areas where infrastructure and a labor pool already existed. The Land Recycling and Environmental Remediation Standards Act (Act 2) enacted in 1995 initiated the benchmark Land Recycling Program for the remediation of brownfield sites that has enabled DEP and DCED to work with site developers, local governments, economic development agencies and citizens to clean up abandoned industrial sites and put them back into use. DEP administers the cleanup component while DCED (through the Industrial Sites Reuse Program) provides grants and low-interest loans to perform environmental site assessment and remediation work. Between 1995 and 1997, more than 100 such former industrial sites were remediated. Work is under way at over 200 other sites. Already the most effective general purpose cleanup program in Pennsylvania's history, this initiative and its implementation have created further opportunities for corrective progress. Below we recommend ways to build on that success and broaden it.

Mining

Existing mining legislation and regulations were written to ensure protection of environmental and human health, but more can be done. We recommend the following additional measures:

- Providing clear guidance and incentives, through legislation, to restore and productively utilize abandoned mine lands.
- Developing new extraction, processing and use technologies that improve protection of the environment and human health and increase the efficiency of the extraction process.
- Establishing a public/private partnership to work with non-renewable resource-based industry to choose the mechanisms that can most effectively foster the development of appropriate extraction, processing and use technologies that enhance performance and minimize adverse impact. In the range of options are
 - Federal funding (e.g. Department of Energy grants),
 - Research & development tax incentives,
 - State funding (e.g. bond referendum, tax incentives, private/public matching funds),
 - Financial and/or legislative inducements that provide for an emissions trading and credit program and encourage environmental performance beyond compliance.
- Maximizing the beneficial use of waste products associated with the extraction, processing and use of nonrenewable resources. (*The water resources section of Chapter III contains recommendations to restore water quality degraded by historic coal mining practices.*)



Recommendations

Conserving Natural Resources for Sustainable Use

Brownfields

Abandoned industrial sites are being redeveloped throughout Pennsylvania. Projects such as the Crawford County Industrial Park in Meadville, Washington's Landing at Herr's Island in Pittsburgh, the creation of a community park in West Chester and a hotel/office complex in Altoona exemplify the variety of urban redevelopment spurred by the Land Recycling Program. One recent investment used an old foundry in Downingtown for housing. A small project in Mercersburg, Franklin County cleaned up an old tannery for business expansion in the area. These ventures create jobs, revitalizing urban areas while diminishing environmental impacts. The Land Recycling Program is precisely the type of program that the Commission encourages and supports. We recommend additional actions to improve this program and increase the reuse of brownfield sites:

- ❑ Develop a prioritized list, weighted according to human and ecological health risk, of all brownfields and hazardous waste sites.
- ❑ Develop a financial/risk-based strategy for site clean ups.
- ❑ Interview industrial representatives and other potential users of brownfield sites to determine what incentives might help/encourage them to undertake responsible site development.
- ❑ Maintain and increase financial incentive programs. Continue to provide grants and low interest loans for site clean-ups that will lead to reuse.
- ❑ Coordinate other resources such as site assessments, job training programs and planning assistance to strengthen clean up efforts.

Prosperity for agricultural, forestry and recreation/tourism industries

Background on Agriculture: With more than a quarter of its total land devoted to farming and nearly three-fourths of that dedicated to crops, Pennsylvania

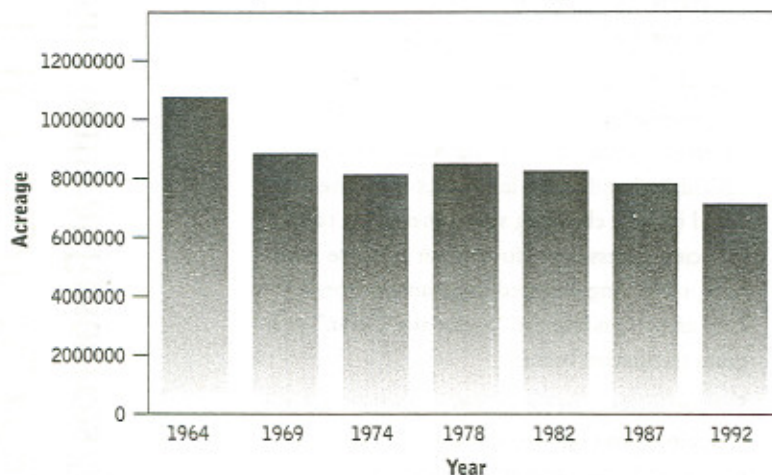
is committed to agriculture as a major industry. But Pennsylvania's growers, processors, distributors and marketers face stiff competitive pressures in today's market. If we agree that farming is a land use to be maintained, we need to support the farmer and keep land value — a major consideration in the economics of agriculture — competitive with other land uses.

Agricultural production, by its nature, has both positive and negative impacts on the environment. In addition to providing food and fiber, the open areas associated with farming and forestry practices also provide significant aquifer recharge areas where rainwater and snow melt can percolate down through the soil and renew stores of groundwater. Private agricultural and forest lands also support the majority of wildlife habitat in Pennsylvania. Finally, Pennsylvania's expansive farm fields and forests provide an aesthetic benefit that adds to our tourism appeal and lifts our spirits and our quality of life.

The other side of the coin is the fact that certain agricultural production practices harm surface and groundwater supplies. Groundwater contaminated by agricultural chemicals and fertilizers can be harmful to humans and aquatic and terrestrial life. If good land management methods are not practiced, storm runoff erodes valuable soils and flushes fertilizer and pesticide-bearing sediment into streams. As feedlots grow in popularity and concentrate greater numbers of animals on smaller acreage, they change the nature of Pennsylvania farming and create new environmental problems we must address.

Well drained, flat or moderately sloped, our best agricultural soils are also best suited for subdivision development. As population migrates out from urban areas, Pennsylvania's prime farmland is often the first to be developed. So many farmers stop farming, sell up and move out that according to the Agricultural Census we lost over one million acres of farmland in the decade after 1982. Pennsylvania is ranked as number 12 in a ranking of states by

Pennsylvania Farmland Acreage 1964-1992



1992 Census of Agriculture

acreage of prime or unique farmland converted to urban land, having lost 141,000 acres between 1982 and 1992 (Sorensen, Greene and Russ, 1997). The loss of these prime lands has economic and sustainability impacts on the agricultural industry.

The American Farmland Trust has ranked southcentral and southeastern Pennsylvania (Adams, York, Lancaster, Chester, Delaware, Montgomery and Bucks counties) as the nation's second most threatened agricultural area.

If we are going to maintain and increase farm production as a way of life in Pennsylvania, we need to find ways to make it economically viable and internationally competitive.

Many farmers find that as development pressure

pushes values up, it is not economically feasible to keep the land in agriculture. Land use conflicts erupt when new residents regard the normal odors, noise and dust of farming as nuisances. If we are going to maintain and increase farm production as a way of

life in Pennsylvania, we need to find ways to make it economically viable and internationally competitive. We also need to make sure our land use laws allow rural communities to remain rural. They should be able to plan and zone free of the present requirement to provide for all industrial, commercial and residential uses within the boundary of one municipality.

Background on Forestry: One of our greatest natural resources, Pennsylvania's 17 million acres of forest, 58% of the state's land area, give it the largest hardwood inventory in the nation, an enormous environmental and economic asset. In addition to their contribution to timber, recreation and tourism earnings, forests provide diverse habitat, protective cover, filters for air contaminants, systems of groundwater recharge and filtration, protection for surface water quality and barriers against soil erosion.

The regeneration of our forest resources, however, is threatened by an overabundance of white-tailed deer, unsustainable forest management practices, poor air quality (including ground level ozone and acid rain) and the sprawl of new development. Also, while 71% of the state's forest land is privately owned, only 3% of these private owners have a written forest management plan. A recent assessment of 85 timbering sites revealed that only half of the forest appeared to be managed sustainably.⁵

Poor forest and wildlife management will lead to economic and environmental deterioration, hindering productive regeneration and diminishing assets for the logging and tourism industries. A poorly managed forest will negatively affect water quality and the aquatic community in nearby streams. Soil characteristics and types of trees and understory plants will change, adversely affecting the numbers and types of organisms able to live within the forest.

⁵ Sustainable Forestry — We are basing our definition on the recommendations of the Brundtland Commission on Sustainable Development adopted by the International Earth Summit held in Rio de Janeiro in 1992: "To meet the needs of the present without compromising the ability of future generations to meet their own needs." In forestry this is accomplished by practicing a land stewardship ethic which integrates the reforestation, managing, growing, nurturing and harvesting of trees or useful products with the conservation of soil, air and water quality, wildlife and fish habitat, and aesthetics.



Recommendations

Conserving Natural Resources for Sustainable Use

Recommendations

Pennsylvania can ensure a supply of agricultural and forest products throughout the 21st century and maintain the value of these industries to the Commonwealth if decision-making about renewable resources is approached with a holistic understanding of the impacts of water quantity on water quality, of forests on water, of wildlife management on forest resources, etc. To ensure that farms and forests remain among preferred land uses in the next century and that the farming and forestry practices are sustainable, profitable and environmentally sound, we propose the following actions:

- Implement innovative land use practices such as conservation easements, land acquisition, transfer of development rights (TDRs), targeted growth areas, conservation subdivisions and tax incentives to achieve the best mix across the landscape of forests, rural communities and cities that sustain natural systems.
- Spur County Conservation Districts to lead an effort, in conjunction with representatives of the agricultural and academic communities, to promote environmentally and economically sustainable practices and management techniques in agriculture and other land uses through a comprehensive program of education, technical assistance, planning and financial assistance.
- Make the Bureau of Forestry in DCNR the lead agency, in conjunction with representatives of the forestry and academic communities, for sustainable practices and management techniques on forest lands.
- Support public/private research efforts and partnerships directed toward sustainable agriculture and forestry, including the adequate funding of County Conservation Districts, the Sustainable Agriculture Development Board in the Pennsylvania Department of Agriculture, forest industry research and Penn State Cooperative Extension.
- Create innovative market-based mechanisms and programs to support the natural resource base of the forest and agriculture economy.
- Provide tax incentives connected to agriculture and forestry to encourage creation of environmentally sound practices and preservation of agricultural and forest lands. Tax incentives could include changing state inheritance tax law, reducing assessments for certain land use practices, instituting deferred tax plans for forest land and extending the "Clean and Green" program to riparian buffers.
- Support private sector efforts to sustain forestry, agriculture and other renewable natural resources. Some examples include the Sustainable Forestry Initiative, land conservancies, private conservation and agricultural organizations and sportsmen's organizations.
- Encourage strong public/private partnership to promote the primary and secondary processing of Pennsylvania agricultural and forest products within Pennsylvania and to develop and maintain domestic and international markets for these products through, for example, "green certification."
- Develop a new system of resource trading credit units that might include the potential trading of water non-point/point source for TMDL (total maximum daily load), NO_x, and carbon sequestering by trees. (See Chapter IV for more details.)
- Enhance value-added processing by creating local markets and local opportunities for processing commodities.
- Facilitate preservation of farms through increased funding of the State's Farmland Preservation Program and development of a system that makes it easier for landowners to preserve property.
- Provide incentives for farmers who compost organic food waste from restaurants and yard waste from residential neighborhoods and utilize the finished compost for soil enrichment.

The Commission also supports actions to maximize efficiency and minimize waste in the growing, harvesting, processing and use of renewable resources. (See Chapter III's section on waste for more details.)

Preserving Natural Diversity

Background: Plants, animals, fungi and microorganisms — the diversity of life in nature — in combination weave the web that holds together the vital ecological services and products that sustain all life on Earth. The quality and strength of the web is dependent on the quality of our natural support systems — water, land and air, discussed at length in the following chapter. Ecological services include

photosynthesis, climate regulation, water purification and cycling, flood control and air filtering. Nature's multitude of products and resources include food, fiber, shelter, fuel and medicine, indispensable goods that make our economy as Stanford's Paul Ehrlich has observed, "a wholly owned subsidiary" of our environment.

Additionally, the diversity of living things transmits a flood of information useful in genetic engineering, applied biology and other fields

yet to be discovered. Natural ecosystems provide the "green infrastructure" that supports outdoor recreation and tourism, and, in small ways and large ones, diversity also gives spiritual, psychological and aesthetic nourishment to people who see nature as sacred, renewing and beautiful.

The diversity of life is a key measure of the health of our environment now and of its future reliability as a source of products and services for humans. Scientists

estimate that the current rate of extinction of plant and animal species around the world is as much as 10,000 times the rate caused by natural climate variability and natural disasters.

Since the industrial revolution natural ecosystems have been significantly altered as land was cleared for timber and agriculture, for mineral extraction, for housing, commerce and roads. Of Pennsylvania's 3,500 or more documented native species of vascular plants and animals, 156 are known to have disappeared from the state since the arrival of European settlers, and another 351 are endangered or threatened. We lack information on how many species of invertebrate animals, fungi, non-vascular plants and microorganisms have been lost.

Urbanization and fragmentation of landscapes, the introduction of exotic species and air and water pollution all degrade natural habitat and pose the greatest threats to Pennsylvania's remaining natural diversity. Future population growth and development will inevitably continue such pressures on the state's natural diversity and thus on its environmental health. Without a concerted effort to maintain and enhance natural diversity, populations of many native species will continue to decline and several will face extinction.

Despite this mounting hazard, Pennsylvania lacks a comprehensive policy or strategy for the conservation of natural diversity. Responsibility for conservation of particular individual species or groups is fragmented among several state agencies. On the positive side, state and federal landowners in Pennsylvania are beginning to identify opportunities to conserve and enhance natural diversity on existing public lands. For their part, private landowners are concerned that land use restrictions may accompany attempts to conserve native species and their ecosystems.

Recommendations

Our natural diversity must be conserved and enhanced. The specific objectives and actions that

The diversity of life is a key measure of the health of our environment now and of its future reliability as a source of products and services for humans. Scientists estimate that the current rate of extinction of plant and animal species around the world is as much as 10,000 times the rate caused by natural climate variability and natural disasters.



Recommendations

Conserving Natural Resources for Sustainable Use

the Commission recommends below reflect both the urgency of the need for conservation and the concerns of citizens about the social and economic impacts such conservation could have. The Commission believes that broad-based discussion among the many concerned stakeholders is a necessary prerequisite for developing an effective and acceptable policy and strategy.

On our publicly owned land we are under obligation to use all opportunities for thorough-going, energetic action. With private landowners, government should take the role of coach or advisor. The Commission recommends mandating the use of best ecological practices on public lands with the aim of carrying out demonstration projects to be used as educational tools for private landowners. Additionally, we recommend:

- Developing a common set of criteria and a process for conserving and managing natural diversity on state lands.
- Developing and beginning to implement a set of "best stewardship practices for natural diversity conservation" on public lands.

To overcome the uncertainty and inaction that divided responsibility breeds, the Commission recommends designating the Department of Conservation and Natural Resources (DCNR) as the coordinating agency for natural diversity conservation in Pennsylvania. As follow-on, the Governor should direct DCNR to structure a broad public/private partnership to promote natural diversity conservation. Among state agencies, the Joint Legislative Air and Water Pollution Control and Conservation Committee, the Game Commission, the Fish and Boat Commission, the Wild Resource Conservation Fund, DEP and DCED should take part. Their partners should include universities, cooperative extension agencies, private landowners, industry, conservation interests, and scientists from Pennsylvania and from neighboring states that share Pennsylvania's major river basins and/or physiographic provinces.

In the Commission's view, this reorganized and reanimated private/public drive to advance conservation and enhance natural diversity should pursue the following objectives:

- Define and set conservation priorities for species, habitats and biological communities.
Implementation: develop a common set of criteria for identifying the elements deserving attention.
- Establish comprehensive long-term programs to inventory, assess, research, monitor and manage data and information on natural diversity.
Implementation: coordinate existing information management and exchange activities among agencies and others with substantial lands or databases; also establish a permanent source of funding for the data base program with support from the Wild Resource Conservation Fund (WRCF) and the Pennsylvania Natural Diversity Inventory (PNDI), among others.
- Develop and implement a comprehensive and dynamic natural diversity management policy and strategy for public (mandated) and private (voluntary) lands that take economic, environmental and social needs into account. The strategy should be flexible enough to alter as new information arises and understanding of the challenge deepens. **Implementation:** coordinate with county and municipal governments to identify natural diversity issues at the community level and provide funding for the completion of county natural heritage inventories. Encourage as well the formation of municipal Environmental Advisory Committees (EACs) and the development of local Environmental Resource Inventories (ERIs).

Other significant, related goals and activities for the DCNR-led partnership to advance include:

- Encouraging the use of "best management practices for natural diversity conservation" on private lands.

- Producing and distributing information to the public on the benefits of natural diversity conservation. Information for private landowners and businesses should focus on ways to incorporate natural diversity conservation during land use and management activities, including using “best stewardship practices.”
- Develop a method of measuring and monitoring the acreage of public and private land using “best stewardship practices for natural diversity conservation.”
- Develop a Natural Diversity Index that will be useful in measuring, monitoring and reporting the status of natural diversity in Pennsylvania and its relationship to environmental and human health and quality of life.
- Promote the use of native plants in private and public landscapes. Require that all public lands be managed with native species and develop strategies for eliminating aggressive, non-native species that have already become established. Provide educational literature to homeowners and facility managers to encourage them to plant native species.

The work of developing and implementing a long-term policy and strategy for conservation and enhancement of Pennsylvania’s natural diversity will not be quick or easy. It will, however, meet what the 21st Century Environment Commission sees as our ethical responsibility to future generations to maintain the ecological services and products upon which all life depends. That responsibility begins — but does not end — with the lands that the state itself holds in trust for us and our future. There we require ideal levels of conduct.

Exemplary Stewardship of Public Lands

Pennsylvania’s constitution specifically establishes a duty for the Commonwealth to act as a trustee in the management of State-owned lands and to conserve

and maintain these assets for the benefit of current and future generations. Our State Parks, State Forest lands, Game lands, and other Commonwealth holdings of recreational or historic value are magnificent treasures. They should be managed to meet our constitutional responsibilities. And that management should embody exemplary stewardship practices for others to follow.

The Commission’s goals for that high level of public stewardship are:

- Address the backlog of facility repairs and upgrades necessary to ensure visitor health and safety, enhance visitor experiences and improve environmental quality on public lands.
- Clean up historic environmental problems and prevent new harm from activities on or adjacent to public lands.
- Provide leadership in demonstrating ecologically sensitive approaches for protecting the long-term health and productivity of these public assets for future generations.

Background: The conservation legacy Pennsylvanians inherited from such visionaries as Rothrock, Pinchot, and Goddard has inspired their successors and helped, for instance, to ensure bipartisan support in the legislature in the last three decades for successful public referendums on three separate public lands conservation bond proposals. One result of such a commitment to conscientious stewardship is the expanse — approximately four million acres — of state-owned lands available to the public. Huge stretches of wilderness, trails, rivers, streams, lakes and mountains are open for hunting, fishing, camping, hiking, biking, boating, birding and more.

These outdoor amenities are of growing importance to our travel and tourism industry. For example, annual visitation to State Parks generates over \$600 million (PSU, School of Forest Resources, 1990). One hundred sixteen State Parks provide recreation opportunities within 25 miles of every Pennsylvania citizen.



Recommendations

Conserving Natural Resources for Sustainable Use

Approximately 2.1 million acres are managed as State Forest Lands; State Game Lands take in another 1.4 million acres. The Pennsylvania Fish and Boat Commission (PFBC) manages 62 accessible lakes and nearly 250 public boating access areas. The Pennsylvania Historical and Museum Commission (PHMC) supervises over 60 historic sites open to the public. In addition, much of the four million acres helps maintain public water supplies, produces minerals and supports a multi-billion dollar timber industry.

While these public lands provide some of the most spectacular scenery in the state, many areas still suffer from historic environmental problems that pre-date today's tougher standards. Unreclaimed mine lands, acid mine drainage and abandoned oil and gas wells continue to cause environmental degradation. Recently, illegal trash and waste dumping is becoming more of a problem on less-traveled public lands.

Other public lands and facilities experience problems related to land use on their own or adjacent holdings. Traffic, noise, land encroachments and development that can change the character of entire watersheds may lead to accelerated stream runoff, flooding and increased sedimentation — different factors all of which can degrade natural resources and diminish the pleasure of outdoor activities on many of these lands. Their growing popularity for outdoor recreation can also lead to competing demands and conflicts among various users. Managers confront the strain created by too many users putting too heavy a demand on the resource. In some public lands, as well, browsing by deer has prevented regeneration of forest vegetation.

Our public lands also provide a wealth of specialized habitats which are important elements of the state's natural diversity discussed immediately above. Partly because different agencies pursue differing objectives

and partly because each natural setting presents a unique set of management problems and opportunities, we lack a common approach that can identify what we want most to protect on public lands.

Through their separately determined management practices, resource agencies can impose unhealthy stresses on nature — water quality changes, timbering, habitat fragmentation, encroaching development, invasion of exotic species and other environmental modifications. Different areas of public lands, moreover, handle such strains differently.

Finally, one of the most significant problems on our public lands are the many facilities which need repairs and upgrades. The cost of meeting the backlog of identified infrastructure improvements runs over \$200 million. About half of these improvements are needed in State Parks for sewer and water facilities, roads, bridges, dams, campgrounds, comfort stations and buildings. Just to improve and upgrade effluent treatment at PFBC hatcheries will take over \$15 million. The PFBC also needs almost \$20 million for dam safety repairs. State Forest lands and Game lands require funds for roads, bridges, and buildings. PHMC estimates over \$35 million is needed to address repair needs at 60 historic sites.

Recommendations

The essential principle of stewardship, around which we have organized our recommendations, is the careful and responsible management of something entrusted to one's care. The basic goals established by the Commission are

- fix deteriorated facilities,
- clean up environmental problems,
- prevent new problems, and
- take a broader view of natural systems in managing our public lands.

Traffic, noise, land encroachments and development can change the character of entire watersheds...



Infrastructure Capital Development Program:

Deferred maintenance needs and postponed improvements have created a public lands infrastructure backlog exceeding \$200 million. While ongoing maintenance repairs are most appropriately funded from annual operating budgets, the infrastructure backlog will require a major capital development program similar to the conservation bond referendums (the Keystone Program being the most recent) approved over the last three decades. Future backlogs should be prevented by using current operating funds and increased user fees as needed.

Remediation of Environmental Problems: The land management agencies should inventory and assess existing pollution problems from abandoned mine lands, acid mine drainage and oil and gas wells. Joint work groups should be established with DEP to address these problems through existing regulatory and reclamation programs. The Commission recommends support of pending legislation to address the problem of trash dumping on State Forest lands.

Cooperative Partnerships for Conserving Public Lands: Management activities on private lands adjacent to public lands may create problems for the neighboring area or help prevent them. The Commission recommends that the Natural Resources Work Group (DCNR, PFBC, PGC and Governor's Sportsmen's Advisor) develop an adjacent lands strategy for several pilot areas to help flag emerging problems and describe options available to address them. Although acquisition of adjacent lands is sometimes necessary to resolve conflicts, the Commission recommends that agencies encourage the use of other options. Conservation easements, for instance, can preserve certain land features while keeping the property in private ownership. To help promote the use of these easements, the Commission recommends consideration of uniform conservation easement legislation, adopted by most other states, to help clarify the legal status of such easements.

Municipalities near state lands can also take advantage of existing recreation and open space municipal grant programs to help solve or prevent problems from adversely affecting these public lands. The Commission recommends the appropriate targeting of Keystone grants where state public lands will also benefit from municipal recreation and open space grant projects.

State agencies should continue to explore partnerships with business, conservation organizations, sportsmen, local governments and others that can develop innovative approaches to enhance existing programs, maintain resources and facilities, offer new services and provide a wider, fuller, two-way flow of information.

Leveraging Federal Funds

Several federal funding programs currently help support the management of Pennsylvania's public lands. While the funds are often limited to such specific concerns as historic preservation, fish and wildlife restoration, boating and forestry, our agencies should seize opportunities, including any that the growing federal budget surplus may offer, to continue using existing state funds to leverage additional federal funding where possible. The Commission recognizes that the Federal Land and Water Conservation Fund at one time provided approximately \$10-12 million annually to Pennsylvania for public land investments by state agencies and local governments. The fund can be broadly used for most conservation purposes although no monies have been appropriated to the states for the last three years. Since the Fund receives \$900 million annually from the several billion dollars in annual off-shore oil lease receipts, the Commission recommends that the Governor and General Assembly urge the Congress to return a portion of these funds to the states as the law originally intended. Given the potential for high return to the state, a determined push in Washington is worth the effort.



Recommendations

Conserving Natural Resources for Sustainable Use

Leadership in Ecosystem Management

Wherever appropriate, the state should ensure that its policies and their execution serve as models for all elements of the private sector. The advisory committee that DCNR has established to help define and apply ecosystem management principles to the current review of state forest plans is an example of such an approach. Its goal is to instill a more holistic view of forest management activities into the work of protecting the long-term health and productivity of Pennsylvania's State Forest lands. This initiative should be broadened, and, the Commission recommends, the Natural Resources Work Group should provide the leadership to coordinate this effort with the major public lands management interests in Pennsylvania.

The Commission also supports the ongoing assessment of State Forest lands for certification as environmentally sustainable. DCNR should encourage similar efforts by managers of both public and private lands.

We have stressed the value of our natural resources to our present and future prosperity and well-being. Often what we cannot see — microscopic life forms or farm land buried under a strip mall — can have a heavy impact on our lives, our health, our ability to work to our highest potential. Air and water pollution can be such imperfectly visible forces. Having examined the treasures we must better conserve, we turn in the next chapter to environmental, economic and health threats we must more effectively combat.

III. Making a Healthy Environment for Healthy People

Environmental factors affect human health, sometimes in ways that are easy to measure, sometimes in a manner that science has yet to define perfectly. Knowing that environmental quality does matter to our citizens' well-being, the Commission explored what is known about the impact of environmental pollutants upon health, how priorities are set and how results are measured. Based on that inquiry, we set goals that are broad and far-reaching and that encompass all media: air, water, waste and energy.

We base that ambitious decision on our stated fundamental principle and belief that the traditional pattern built on trade-offs among the economy, the environment and health must give way to a design for action that drives us to optimize environmental health, economic health and human health simultaneously. We believe we cannot achieve any of these essentials of well being over the long term, unless we achieve the others as well. Nowhere in this report is that belief more relevant than in our consideration of ways to better the health of Pennsylvanians.

Human Health

Improving human and environmental health requires an understanding of how environmental conditions advance or assault our fitness. For some symptoms there are clear cause-and-effect relationships, while for others scientific evidence can only point to likely connections. Recognizing what we know and what we do not yet know, the Commission looks forward to a day when all...

...Pennsylvanians enjoy long and productive lives that are not negatively affected by man-made environmental factors.

We will move more quickly toward this goal if:

- All Pennsylvanians are working from a shared vision and agree upon the priority problems. We employ credible methods of determining the results of our efforts.
- We make decisions, individually and institutionally, based on a better understanding of the relationship of human, economic and environmental health; of the consequences of personal choices, of real and perceived risk and the limits of our knowledge; and of our resources and our ability to solve our problems.
- Based on that same improved understanding, we focus our priorities and limited resources where they can have the greatest positive impact.
- We more effectively involve individuals in the process by which we determine and solve priority problems.
- We expand our focus beyond individual pollutants and beyond specific media (air, water, and soil) so that we begin to concentrate on the watersheds and "airsheds" that transcend political boundaries.

Background Premises: The tie-in between environmental pollutants and human health is a subject that as a nation and a Commonwealth we must continue to investigate. As our understanding increases, we can expect pollution prevention and environmental protection priorities to change accordingly. We must therefore be sure that the management systems we employ to handle these emerging issues are designed to be flexible and allow for rapid response. In the near term we must base our decisions and actions on the best available scientific understanding. At the same time we recognize that a reasoned analysis of threat may also make it appropriate to act in the absence of clear proof. Additionally, we agree that no individual or community should carry a disproportionately large share of the environmental or health burden. The Commonwealth must ensure that our laws, policies and procedures are fair and equitable.



Recommendations

Making a Healthy Environment for Healthy People

Recommendations

The Commission recommends the following objectives and actions:

- Vigorously enforce the existing health standards, including moving forward with the operating programs for sewage treatment, water supply, acid mine drainage and air quality improvement.
- Develop a better understanding of the links between human impact on the environment and human health so that the learning process is used as a basis for setting priorities, solving problems and deciding how resources are assigned to environmental issues.

To accomplish this objective, we should act to

- Establish a surveillance system to define, monitor and track sentinel diseases triggered by environmental and other factors, possibly including lead, pesticide and chemical poisoning and respiratory disease.
- Link environmental data systems with health data systems so that the correlation of environmental and other factors with health outcomes is better understood.
- Create a cooperative working tie among universities, states, other countries and other appropriate entities, with the mission of developing and publishing data describing environmental and health relationships. In accordance with our vision of Pennsylvania as a model for the nation, site the new research and information partnership in the Commonwealth.
- Widely communicate what is learned from the preceding steps to government, business, environmentalists and the general public with the intent that individuals and agencies use the knowledge gained to set priorities.
- Improve the effectiveness of the way we use our resources to deal with environment-human health links:
 - Set Commonwealth priorities for action based on our best available scientific understanding, tackling the largest environmentally related health impacts first.
 - Link environmental, health and economic policymakers with one another as a way to ensure that decision-makers in each area considered the impact of their policies on the others.
 - Similarly, connect air, water and land policy-makers to promote the same reciprocal consideration.
 - Establish an expectation that all these policy-makers will operate from a strategic plan that outlines desired outcomes, priorities for actions and for allocating resources according to those priorities and with attention to the linkages with other actors in other areas.
 - Promote pollution prevention strategies that continuously reduce emissions of harmful environmental contaminants from point sources, non-point sources and, individual activities. Risk to the public health and ecology from environmental pollution stems from emissions. Emissions come from point sources, such as factories, non-point sources such as agriculture and urban run-off, and individual behavior such as use of cars, lawnmowers, and fireplaces.
- Involve Pennsylvanians more effectively in this effort:
 - Broadly educate Pennsylvanians about what we know and what we learn and encourage people to use that information to help realize the vision of the best quality of life for all citizens.
 - Develop incentives for individuals and organizations to go beyond compliance.
 - Develop more effective ways to involve Pennsylvanians in making environmental decisions perceived as having an impact on human health.

Reduce, toward the ultimate goal of eliminating, human exposure to harmful levels of environmental contaminants.

While we should base priorities and regulations on our best available scientific understanding, in situations where environmental harm may be serious or irreversible, scientific uncertainty about the degree of damage should not be the basis for inaction and should not limit government from taking appropriate actions.

- Reduce, toward the ultimate goal of eliminating, human exposure to harmful levels of environmental contaminants. While we should base priorities and regulations on our best available scientific understanding, in situations where environmental harm may be serious or irreversible, scientific uncertainty about the degree of damage should not be the basis for inaction and should not limit government from taking appropriate actions:
 - Link the data from the surveillance system to the process of setting priorities.
 - Create incentives to companies to invest cooperatively in research and development of technologies that further our understanding of the link between human health, environmental quality and economic health.
 - Widen the scope of policy and action beyond individual pollutants, beyond specific media (air, water and soil) and beyond individual institutional roles to bring into sharper focus such interrelated systems as watersheds, airsheds, ecosystems, regions and communities.
 - Form a stakeholder group to study and make recommendations to the Governor on issues of cumulative environmental impacts and environmental justice. To ensure that no individual or community carries a disproportion-

ate share of the environmental or health burden our society chooses, we need to better understand the impacts of those choices on specific areas. We also need to incorporate more fully the latest technological advances into the decision making process so that we can accurately model predictive conditions and outcomes.

- Enhance our already outstanding water and air resources as described in the following sections.

Water Resources

In order to ensure water quality and quantity sufficient to meet the needs of the Commonwealth in the 21st century, the Commission has developed three water resource goals:

- Ensure that water use does not exceed the sustainable yield of Pennsylvania's ground and surface water supply.
- Protect our high quality, unpolluted ground and surface waters and diverse aquatic ecosystems and restore degraded systems.
- Develop comprehensive watershed management strategies that incorporate water quality and quantity, surface and groundwater, aquatic ecosystem and natural diversity considerations.

Background: The overall quality of an aquatic system depends on water quantity, the water's chemical quality, the suitability of stream bottoms and sides (substrate) to support aquatic life, spawning and nursery needs, the land uses in the watershed and vegetative cover along the stream banks and shores. Groundwater quality and quantity are also critical components of our water systems.

During the last 25 years, diligent federal and state control of point source discharges of pollution (from industry and municipal wastewater treatment plants) has significantly improved water quality but not necessarily overall aquatic ecosystem quality. While the health of the water bodies biological community does



Recommendations

Making a Healthy Environment for Healthy People

depend on the quality of the water, it is also affected by all the other factors mentioned above. We need to understand those influences more fully and better manage all the factors that affect aquatic health.

Because of our successes in the control of point source discharges, the most significant impact on streams and on other water bodies today comes from non-point source runoff. It occurs when storms wash pollutants and sediment (soil) into streams and creeks. Coming from agricultural land, urban streets and suburban communities, sewage overflows from combination sewers in older communities, and drainage from mine lands, non-point source pollution affects more than chemical water quality. It also smothers the substrate in silt, reducing the quality of habitat and nursery areas.

DEP is in the process of an intense effort to assess the quality of our state waters. As of April 1, 1998, 12,831 of our 83,261 miles of stream have been assessed for water quality and condition of the aquatic community. Of these assessed waters, 4,314 miles are impaired. Of these impaired streams, 1,297 miles are documented as impacted by agricultural activities. Acid mine drainage (AMD) has impacted 2,244 miles more.

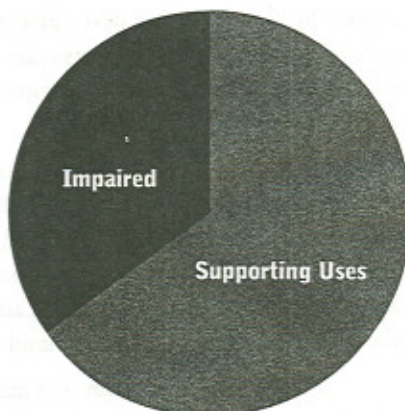
Storm water and flooding add to water quantity and quality problems. As our population has spread out and paved over once-porous soils, the new impervious surfaces and loss of wetlands have led to faster flows of water and increased flooding. Current storm water regulations, however, concern water quantity, not quality. They require short detention times that may be effective for sediment control, but do little to remove dissolved nutrients, metals and organic pollutants. Where we have allowed building and clearing along streams and lakes, the lack of natural buffers prevents the cleansing of water from runoff and non-point pollution sources.

Because of its natural abundance, Pennsylvania has historically taken water supply for granted. Droughts or floods counted as infrequent emergencies requir-

ing short-term corrections, not long-term policy. However, the available quantity of water will be an increasing problem for the Commonwealth. As the state's population has grown and shifted, per capita water use has risen, causing increasing conflicts among water users. With an outdated state water plan, we do not have a solid understanding of the amount of water available by subbasin, the amount of water needed by the streams and rivers to support their aquatic communities or the amount of water available for future land uses.

Quality of our groundwater resources is also an issue. About 50 percent of Pennsylvania's drinking water (individual wells and public supplies) comes from groundwater for which clear protection plans, in most cases, do not exist. We need, for instance, to continue sealing oil and gas wells to prevent pollution from unused wells. Also, while we regulate deep-well disposal of pollutants, we will feel the effects of past contamination for thousands of years. Failing septic systems and leaking underground tanks add to groundwater pollution. It is imperative that the integrity of the source of many small community

Assessed PA Stream Miles Supporting Uses/Impaired



Of Pennsylvania's 83,261 miles of streams, 12,831 miles have been assessed within the last 5 years. The remainder are scheduled to be assessed within the next 10 years

Pennsylvania Department of Environmental Protection, Harrisburg, PA 1998

water supplies be protected. The fact that in the late 20th century, some Pennsylvania citizens are required to boil their water amounts to a call for change.

As part of that transformation, the Department of Environmental Protection needs to take a holistic approach to water resource management. In DEP regional offices, under current practices, one program handles water supply/water quantity issues while another regulates the impact of point source discharges. A number of voluntary programs work to control non-point sources, but the state is just starting to regulate such pollution through the Nutrient Management Regulations and new strategies for concentrated animal feeding operations. Many of the County Conservation Districts offices that provide valuable education and technical expertise in non-point source control to farmers and municipalities are understaffed and overworked.

Recommendations

Given such existing and anticipated challenges, we must change our approach to water resource management and better assess the linkage between water quantity, water quality and aquatic habitat. Fishing and boating activities across the state bring in estimated earnings of more than \$2.5 billion a year, an economic and environmental treasure that we need to protect. To do so, we should:

- Conserve and protect water supply and find better ways to treat and reuse wastewater.
- Improve quality of point-source discharges through pollution prevention approaches.
- Address non-point sources of pollution from agriculture, suburban and urban areas.
- Change the way we treat the edges of our streams, the stream buffers where vegetation can provide food energy, habitat and shade to the aquatic communities, act as a filter to reduce pollutants reaching stream system and provide habitat for wildlife.
- Address our past, yet unsolved problems such as the drainage of acid from old mining activities that has essentially eliminated life in 17 percent of the assessed streams in the Commonwealth.

We will not attain the future we envision if we simply address discharge points one at a time. Instead, we need to adopt a watershed approach that weighs and combats the cumulative impact of our activities on water quality, quantity and aquatic communities.

Water Supply

Because responsibility for planning and management for water quantity is inadequate and fragmented, Pennsylvania does not have enough information to assess or mitigate the impact of new development and growth on our water resources. Our most time-critical need is to assess our water supply resources and develop and implement management plans for them. The Commission proposes such comprehensive planning for each of the six major Pennsylvania river basins (Ohio, Lake Erie, Genesee, Susquehanna, Potomac and Delaware) with information available by subbasin. The subbasin assessment process should enable us to set priorities among subbasins according to the likelihood of water shortages and to develop plans of response that can be carried out through a public/private partnership including DEP, existing river basin commissions and watershed organizations. So that we never repeat the current situation, we recommend that the plans be updated every five years. Specific recommendations include:

- Obtain authorization and funding for comprehensive water resources planning.
- Inventory surface waters and develop a water balance in all subbasins to include minimum stream flows to protect aquatic ecosystems and natural diversity while providing for other water uses.
- Inventory groundwater systems, including recharge locations, recharge amounts, discharge amounts and withdrawals.



Recommendations

Making a Healthy Environment for Healthy People

- Develop a prioritized list of subbasins that experience or will experience shortages.
- Establish planning criteria for water basins in full cooperation with all interested partners. Such criteria could include minimum stream flow, sustainable yield, aquatic ecosystem and natural diversity needs, wetlands needs, water quality impact, emergency water management actions.

- Develop model ordinances for stormwater management and floodplain management. It is the floodplain that should be protected, not just the floodway.

To be effective, the knowledge of water issues needs to be shared. We recommend the following:

- Make water resource databases and basin plans available to local governments, developers, regional planners and natural resource managers.
- Undertake an aggressive educational program with local and regional interests to ensure that any local watershed plans are consistent with the major basin resource plans.
- Implement those portions of basin plans that can be carried out under existing authority and develop legislation and/or administrative proposals where additional implementing authority is needed.

Flooding is also an issue that must be addressed not with the idea of avoiding it totally but with the intent of reducing its impact. We recommend the following:

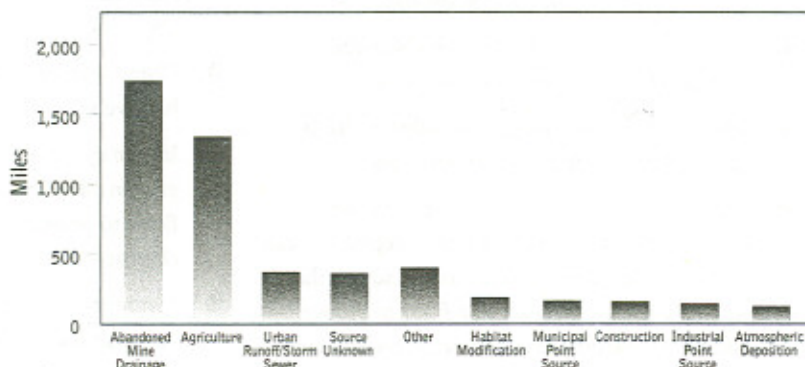
- Educate citizens, government officials and especially streamside landowners on ways of abating flooding conditions (infiltration, minimizing impervious surfaces, etc.), best land use practices for floodplain areas and safety procedures during floods.

Improving Water Quality

Water Quality Data: To determine what actions are needed for protection and restoration, we must have a better baseline of water quality data for both surface and groundwater (aquifers). We propose that DEP establish cooperative programs with private industry, research institutions, watershed organizations, citizen volunteer monitors and other appropriate entities to complete the inventory of baseline data and update it periodically. These data will be useful for monitoring the success of water quality protection efforts, prioritizing streams for restoration and comprehensive watershed planning and management.

Point Sources of Pollution: We take a two pronged approach to control of point sources. All existing point-source wastewater discharges from industrial plants, sewage treatment facilities and urban storm water systems must be brought into compliance with existing water quality standards. Developed in order to protect human health and aquatic systems, these standards represent the maximum levels of allowable discharge.

Sources of Impairment to PA Streams — 1998



Total number of miles impaired = 4,329
 Most impaired segments are impacted by more than one source
 Pennsylvania Department of Environmental Protection,
 Harrisburg, PA 1998



In addition, DEP should create a program of incentives and assistance to help those who discharge wastewater perform better than the standard requirements. This program should:

- Incorporate pollution prevention approaches in the process of issuing water quality permits.
- Integrate into the permit issuance process incentives for programs that plan and evaluate the reduction/elimination of toxics use.
- Deny permit variances and waivers to permit applicants who have not engaged in toxics reduction/elimination planning and evaluation processes.
- Work more closely with municipalities to speed elimination of combined sewer overflow systems and to find ways to reuse wastewater.
- Implement watershed-based approaches of pollutant trading and non-point source reduction.

21st century Discharge Goal: Currently we regulate the discharge of pollutants, any substance that at some concentration has an adverse effect on human health and/or other organisms. For instance, our bodies require very low concentrations of zinc, which can, at higher levels, have a toxic effect and would be considered a pollutant. Discharge limits on such substances reflect a risk-based approach meant to ensure that the maintenance of in-stream standards protects humans and aquatic organisms.

Our goal is to reduce, toward an ultimate goal of eliminating, the exposure of people and other organisms to harmful levels of environmental contaminants. This should be done by two methods. We must strive continually to reduce loadings by methods that process and treat discharges to remove or minimize the pollutants they carry. Equally important is research and development that can find chemicals whose safety in selective use has been established or whose effects are not harmful under normal conditions of use.

Through systems based on education, stewardship and incentives, we can assist the regulated community to eliminate harmful substances by 1) changing the raw materials utilized in industrial processes, 2) developing closed loop systems and/or 3) using waste productively as raw materials for other systems. While the ultimate goal of eliminating a discharge may not be totally attainable because of economics, risk priorities or technology, we believe we can go far beyond existing regulatory standards. Dischargers can make process changes that benefit the environment and, in most cases, benefit the operation and cost effectiveness of the facility. We recommend that DEP establish and begin implementing a policy for continuous improvement. Relying on a program of incentives, assistance and education, this policy would operate in parallel with — not replace — existing regulatory programs.

In addition to our goal of reducing, toward the goal of eliminating the exposure of people and other organisms to harmful levels of environmental pollutants, another goal is to maintain the natural hydrology of all streams and watersheds. The health of aquatic ecosystems is highly dependent on their hydrologic regimes (the pattern of volume and flow rate over time). To maintain that healthy balance, the transfer of water out of watersheds should be limited, properly treated wastewater should be recharged to the groundwater, preferably at the same location or higher in the watershed from the place where it was removed. Encouraging closed-loop systems or land application (spray irrigation) of wastewater will help maintain a stable and adequate baseflow in a watershed.

We recommend charging a partnership of DEP and DCED to:

- Compile and distribute information on existing technologies and practices for preventing and eliminating pollutants in wastewater, seeking out case studies that demonstrate the economic benefits of using these technologies and practices and case studies of companies that have successfully prevented and eliminated wastewater discharge;



Recommendations

Making a Healthy Environment for Healthy People

- Encourage and provide incentives for research by the private sector and academic institutions to develop new technologies and practices for preventing or eliminating the discharge of water pollutants.
- Develop strategies and incentives to attract new businesses to Pennsylvania that will develop and/or utilize discharge facilities and/or technology that prevent wastewater discharges. Such incentives might include eliminating regulatory requirements and/or awarding tax credits or tax forgiveness based on the cost of discharges saved.
- Develop a parallel strategy to induce existing businesses to develop and/or utilize discharge facilities and/or methods that prevent wastewater discharge.

Non-point Source Pollution: We can make the greatest strides in water quality improvement by addressing the five major categories of non-point sources of pollution: agricultural runoff, urban/suburban runoff, septic systems, atmospheric deposition and acid mine drainage (AMD).

Agricultural Runoff: The problems can be greatly reduced through strengthening existing programs of education, technical assistance, financial assistance, monitoring and incentives, through the following measures:

- Establish and fund a comprehensive state-wide agricultural non-point source pollution abatement cost-share program and a low-interest loan program administered by the State Conservation Commission and County Conservation Districts to assist the agricultural community through education, economic incentives and traditional methods such as land use planning. Ensure that the conservation districts are adequately staffed and funded to accomplish these tasks.
- As agricultural practices change to more intense operations, we must develop regulatory processes to deal with the increased threat to water

quality from concentrated animal feed lots (CAFOs). These intense operations and the wastes they generate require urgent attention.

- Support land stewardship and continued improvement by establishing a reward program for farmers who manage their land best. One model is the existing Dairy Network Partnership program that provides a milk premium to dairy farmers who achieve a high level of environmental protection on their farms.

Urban/Suburban Runoff: Storms carry most contaminants from non-point sources into streams and lakes, yet most stormwater management plans aim only to control the quantity (rate and volume), not the quality of runoff. We recommend that the existing stormwater management program (under Act 167) be improved to address quality of surface and groundwater. Specific steps include:

- Develop pollution prevention strategies for sites with high potential for non-point source pollution such as service stations and exterior chemical storage facilities.
- Develop strategies to reduce the use of nitrogen fertilizer for residential, commercial and institutional lawn care.
- Develop less polluting alternatives to road salt for use in de-icing and skid control and improve the implementation of erosion and sediment control during construction and earth-moving activities.

Septic Systems: Malfunctioning septic systems can pollute our drinking water sources and our streams, lakes and wetlands. Because of ties to issues of land use and local control and the frequent high costs to individual homeowners, the challenge septic systems pose is complex. In addressing it, we recommend:

- Developing training programs for local governments and their agents to identify and treat malfunctioning septic systems and to explore new technologies that can eliminate pollution from existing systems. We should encourage

municipalities to develop septic system maintenance programs and require them where state funding is made available.

- Developing special programs for low-growth areas to integrate community septic systems and individual upgrades as appropriate and to replace failing systems. The sewage facilities planning project in Broad Top Township, Bedford County is an excellent example.
- Researching alternative, affordable technologies for nitrogen removal and developing management strategies for areas of existing nitrate pollution where more stringent septic requirements apply.
- Developing financial assistance programs to reward municipalities for developing low-cost and innovative approaches for community sewage treatment, removing barriers to multi-municipal regional sewage facilities planning and improving consistency between sewage facilities planning and land use planning.

Atmospheric Deposition: Excess nitrogen is a major cause of eutrophication (potentially damaging aquatic biological systems) in rivers, lakes and estuary systems, and air deposition is a major source of nitrogen. As an example, modeling techniques show that approximately one third of the nitrogen input to the Chesapeake Bay comes from the air. Some nitrogen falls directly on the bay, but some descends to the ground in the watershed and then passes into tributary streams. DEP needs to better assess the contribution of atmospheric deposition to water quality problems so that it can be factored into watershed management plans and better addressed in air pollution reduction programs.

Acid Mine Drainage (AMD): Our past mining practices have left us with a large, seemingly insurmountable problem of impacted streams. Since the inception of Pennsylvania's first significant reclamation efforts in the 1960's, however, the Commonwealth has led the nation in identifying and addressing abandoned mine problems.

As we enter the 21st century, Pennsylvania, in concert with various stakeholders, needs to do more to maximize abandoned-mine reclamation and restoration. We need to find ways to prioritize sites and come up with creative solutions to the multitude of different situations. We need to free up federal funding. In furtherance of our goal that all impacted streams be remediated by the year 2025, we recommend:

- Prevent potential AMD problems in future mining activities. DEP should deny permit requests for those sites where it has reason to believe, based on sound predictive technology, that a permitted activity would result in a post-mining discharge. The permit-seeker must bear the burden of proof.
- Develop a comprehensive strategic plan (led by DEP) that identifies the full extent of the existing problem, contains a prioritized AMD clean-up list based on environmental impacts and costs and including possible funding mechanisms for restoration of these sites.
 - Catalog and prioritize abandoned sites according to health, safety and environmental risks.
 - Identify all existing funding sources and develop new sources for financing AMD restoration projects, including:
 - Streamline and integrate the Federal and State process for obtaining funding for restoration work;
 - Enact legislation to establish a mine drainage cleanup fund; and
 - Petition for a multi-year appropriation of the Federal Title IV AML (Abandoned Mine Lands) Trust Fund for states with approved long-term reclamation management plans.
- Develop a watershed-based approach to solving AMD problems.



Recommendations

Making a Healthy Environment for Healthy People

Government can not solve the problem alone. We must combine private and public resources to clean up AMD. Recommended actions are:

- Facilitate and coordinate activities of citizen groups, university researchers, the coal industry, corporations, the environmental community and local, state and federal agencies.
- Increase the exchange of information and eliminate duplicative efforts among these stakeholders.
- Provide forums to transfer technologies and other information about improving or restoring watershed degraded by mine drainage.
- Encourage voluntary restoration activities by industry and private organizations.
- Develop an AMD Citizens Guide and other outreach materials to support citizens and watershed organizations interested in restoration.

According to DEP, remining has removed or buffered pollutional loading of acid discharge in nearly 98% of the sites given permits for remining. We must establish and implement an effective program that encourages the remining of abandoned mine lands:

- Reduce unnecessary regulatory barriers to remining, for example, obligatory perpetual treatment of pre-existing discharges even where operators mined in accordance with permit provisions. We should develop other incentives that reduce the risk and cost associated with remining.
- Support research efforts and demonstration projects to promote the science of AML reclamation.
- Enact legislation that creates remining tax credits that can be applied against an operator's total state tax liability.

Protecting and Restoring Aquatic Systems

The health and diversity of our aquatic biological systems (fish, macroinvertebrates, algae) in streams, lakes, ponds, wetlands, and riparian areas are the

best indicators of the quality of our waterways. The Commission has established a goal that DEP, in partnership with other public and private interests, achieve a 33 percent net gain in non-degraded aquatic ecosystems by 2010, both by maintaining 1998 levels of such systems and by restoring degraded ones. The following steps are recommended:

- Assure an effective Special Protection Waters program that prevents degradation of existing water quality. This program and its implementation should be based on the use of best available scientific understanding and the qualifying characteristics of the assessed waters.
- Continue to implement a wetlands protection program for new development with the goal of no net loss.
- Develop and implement — through a partnership of DCNR, DEP and other public and private interests — a program to restore historical wetland losses. Our goal is to generate a net gain in wetlands.
- Implement programs to protect habitat in streams. We should, for example, 1) limit dredging in rivers and streams not used for commercial navigation, 2) maintain water flow at levels adequate to protect fish and aquatic life, and 3) ensure that stormwater management facilities during and after construction do not produce runoff peaks, sediment or other pollutants harmful to fish and other aquatic life.
- Develop and implement a program to conserve and restore riparian forests, and establish other appropriate vegetative streamside buffers, expanding the voluntary Chesapeake Bay Riparian Forest Buffer Initiative statewide.

Stream and other Aquatic System Buffers: We can better protect our streams and other aquatic systems by having setbacks and maintaining these areas in a natural state. We recommend development of incentive programs to encourage municipalities to require



minimum setbacks/distances for agricultural and non-agricultural operations and facilities that carry the potential for non-point source pollution and are located close to waters.

We would like to see vegetated buffers along as many stream stretches and lake shores as possible.

In our vision for the next century, community-based watershed management will be the principal method of improving water systems and ensuring adequate water supply.

Protection of these waterside banks and the land immediately adjacent to them is necessary to provide shade and a food source to the aquatic community, provide habitat and cover to animals using the stream, provide recreational and open space opportunities

and reduce the sediment and pollutant load reaching the aquatic system during storm events. The specific actions we recommend should:

- Create a state-wide enhancement program to supplement the federal Conservation Reserve Program (CRP) funds to provide a financial incentive for farmers and other landowners to maintain streamside buffers.
- Pursue legislated authority to secure conservation easements.
- Establish site plans for stream-bordering operations and facilities that will prevent and mitigate pollution.
- Develop incentives (funding or technical assistance) to municipalities to require adequate stream setbacks and develop stream buffer zones.

Comprehensive Watershed Management

The ultimate goal for the protection of our water resources is the development of comprehensive watershed management strategies that incorporate water quality and quantity, surface and groundwater and aquatic ecosystem and natural diversity consider-

ations. In our vision for the next century, community-based watershed management will be the principal method of improving water systems and ensuring adequate water supply. Actions required to realize that aim are:

- Reorganize DEP regional offices to be in accordance with watershed management principles and coordinate water-related DEP regulatory programs with other DEP deputates, DCNR and other state and federal agency watershed management, protection and restoration programs. This will require DEP not only to realign regional office jurisdictional boundaries to conform to major river basin boundaries; but also to internally reorganize regional office responsibilities to create cross-program teams to address environmental issues on a comprehensive watershed basis.
- Coordinate all watershed-based state and federal programs to deliver consistent policies and services to local watershed protection and restoration efforts.

In order to encourage communities to initiate watershed management plans, government must be willing to be a partner, provide a workable regulatory framework, and supply information, technical assistance and funding. Most importantly, watershed organizations, citizen groups, land owners, and local governments must be empowered to address their water problems on a watershed basis.

Specifically we must:

- Provide assistance, tools (water quality models, baseline data, GIS mapping etc.) and funding to communities to develop ways to integrate on a watershed scale concerns for elimination of point and non-point sources of pollution, for protection and restoration of surface and groundwater quantity and quality, for protection of sources of drinking water and for aquatic resources.



Recommendations

Making a Healthy Environment for Healthy People

- Integrate water and wastewater planning with watershed plans and local land use plans. In particular, we must address the compatibility of Act 537, the Sewage Facilities Act, with local land use planning authorized by Act 247, the Municipalities Planning Code.
- Designate one state agency to lead the development of a statewide Geographical Information System (GIS) and standards of compatibility. This tool should be made available to communities, local watershed organizations and partnerships.
- Create regulatory and financial incentives for multi-jurisdictional cooperation in watershed management activities.
- Create a watershed-based pollution credit trading system to encourage various approaches to the goal of raising water quality above the minimum standards required to protect health and aquatic life.
- Establish a pollutant banking system for each major watershed to facilitate the trading of point and non-point sources of pollution.
- Create a Watershed Technology Center to serve as a data clearinghouse and a supplier of technical expertise, including assistance in database creation, modeling and monitoring to all watershed-management planners. The Watershed Technology Center is to be the product of a federal, state, local government, private sector and academic partnership.

Air Quality

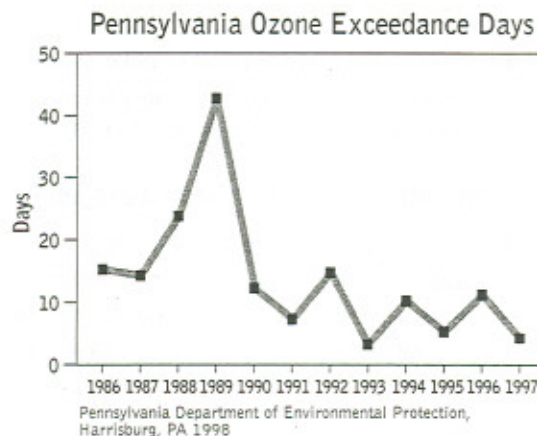
In order to assure that public health and welfare and aesthetic values related to clean air are protected and that air quality will improve as Pennsylvania's economy grows and prospers, the Commission recommends the following goals:

- Ensure that all of Pennsylvania meets the health-based air quality standards and protect and maintain those areas where air quality presently satisfies or exceeds the health-based standards.

- Reduce toward the goal of eliminating human exposure to harmful levels of air contaminants.

Background: Air quality in Pennsylvania has improved substantially over the past 25 years as the state scored successes in solving the majority of the problems associated with the six criteria pollutants listed in the Clean Air Act of 1970. Sulfur dioxide and particulate matter, for example, no longer count as problem pollutants. The five-county Philadelphia area was successfully re-designated to attainment for carbon monoxide in 1995, and ground-level ozone, the most persistent air pollutant in the Commonwealth, has even declined significantly. Throughout the Commonwealth, the magnitude, frequency and geographic scope of high ground-level ozone occurrences have steadily decreased since the late 1970's. Air quality in many areas of Pennsylvania is better than the health-based standards require.

In spite of these significant improvements, some areas still periodically exceed the health-based standard for ground-level ozone. Due in part to local emissions from point, mobile and area sources, these incidents also arise in part from pollution transported into Pennsylvania from upwind states. Transport of air pollution is one of the most challenging issues of the ground-level ozone phenomenon. Likewise, emissions within our borders contribute to the air quality problems of our neighbors to our north and



east. Air quality modeling and monitoring show that it will be very difficult to achieve the current health-based ground-level ozone standard, to say nothing of attaining the tougher new standard, without emission reductions from the upwind states. In fact, the level of the new ground-level ozone standard adopted by USEPA is lower than the background levels of ozone entering Pennsylvania from other states.

Fine particulate matter is an emerging air quality concern. Emissions of sulfur oxides, nitrogen oxides and organic compounds all participate in chemical reactions that result in various sizes and kinds of particulate matter. Transport, not particularly important to solve problems associated with larger particles becomes extremely important in reducing fine particulates across the Eastern United States.

Toxic air pollutants are those pollutants that are hazardous to human and environmental health. Despite the success gained through voluntary reductions and the "Community Right to Know" law (SARA Section 313), 41 million pounds of toxic air pollutants were emitted in Pennsylvania in 1996.

Airborne pollutants can harm human health, water bodies including the Great Lakes and the Chesapeake Bay, as well as terrestrial ecosystems and historically significant buildings. Reductions in sulfur compounds are particularly important, as they, along with nitrogen emissions, are the major contributors to acid rain. These sulfur and nitrogen compounds — like volatile organic compounds and particulates — can be carried hundreds or thousands of miles.

Considering the progress already made and the newer concerns we face, it is clear that in the future, different air quality challenges will require broader and more innovative approaches than those of the past. We will have to more fully address emissions from smaller industrial sources (print shops, gasoline stations, dry cleaners, e.g.) and those related to individual lifestyle choices, including mobile (cars, busses

and trucks) and "area" sources such as consumer and commercial products. We will need market-based mechanisms to encourage emission reductions from point, mobile and area sources in order to provide more cost-effective approaches to improving air quality. And because of the gravity of pollution transported from other states, we cannot expect any real success in reducing emissions unless we work effectively with others outside of the Commonwealth. Finally, we will need to consider multimedia effects more extensively than before as we establish our air quality requirements and policy.

Recommendations

Implementing the following recommendations will move us toward our goals. The Commonwealth should:

- Expand public education and outreach efforts to better inform and educate the public about the effect of individual lifestyle choices on air quality. For example, it would be useful to support and encourage vigorous advances and same-day publicity for high ground-level ozone days (Ozone Action Days) and to pursue an aggressive campaign to inform the public of action to be taken during such occurrences.
- Provide additional market-based incentives to encourage individuals and businesses to opt for energy conservation, carpooling/mass transit, and rail freight for consumer and commercial products that generate lower levels of emissions.
- Continue to pursue a broad regional strategy, including improved cooperation and partnership with other states, to reduce transported air pollutants that adversely affect Pennsylvania's air and water quality.
- Expand and encourage emission trading and other market-based incentive programs to reduce emissions from all sources of pollution (point, area and mobile) in a cost-effective manner, improving air quality and supporting business growth and development at the same time.



Recommendations

Making a Healthy Environment for Healthy People

- Integrate air quality, water quality and land use policy, legislation, regulation and decision making to encompass multimedia effects more fully.
- Develop innovative approaches to encourage emissions reductions and energy efficiency and to provide margins so that new business growth does not jeopardize air quality.
- Broaden air quality protection activities to more fully address the choices we make as individuals.

Waste

Near the beginning of this chapter we set out the objective of reducing, toward the ultimate goal of eliminating, human exposure to harmful levels of environmental contaminants. Solid waste can carry such contaminants. Solid waste management in the Pennsylvania of the 21st century must ensure that human exposure to harmful levels of them is held to a minimum and ultimately eliminated.

Background: In our vision of the next century, there will be very little or no waste. For most of this century industrial processes and marketing reflected a linear model in which companies manufacture and sell products that buyers must eventually dispose. This mindset creates waste during the manufacturing process, and the final product becomes a waste. For the 21st century, we must model our industrial systems, as much as possible, after natural systems. Cyclical, not linear, they utilize one organism's waste products as another organism's food stock. As we change our patterns, we must be mindful of waste in every step of the process, encouraging and supporting the reuse, recycle and reduce philosophy.

Recommendations

Our recommendations for applying and spreading that philosophy are:

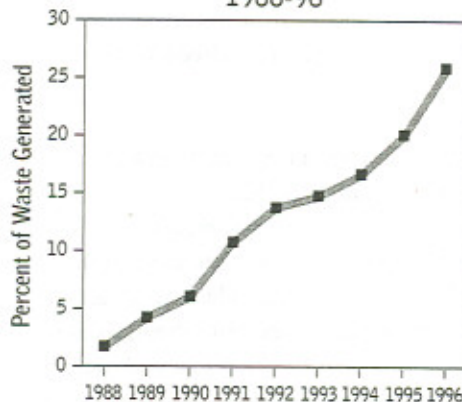
- Encourage innovative approaches to waste minimization and recycling. For example, eco-industrial parks have been developed elsewhere to allow industries to use each other's by-products as resources. The Commonwealth

should encourage the development of such parks and eliminate regulatory barriers standing in the way of their development.

One way to minimize waste during the manufacturing process is to hook up industries and power sources that can utilize each other's waste materials. Paul Hawken in *Ecology of Commerce* (1993) cites a prototype of industrial ecology in the industrial park in Kalundborg, Denmark, where several industrial facilities have physically linked their plants to share hot water, steam, chemical compounds and fly ash. Plants have also linked to the surrounding community to heat homes and a local fish farm. In Pennsylvania, we are just beginning to see the environmental and economic benefit of these partnerships. Recently, a coal-fired power plant and a sheet-rock manufacturer, in Beaver County announced a similar collaboration under which the manufacturer will use calcium sulfate from the power plant to make wallboard. Another example is US Generating's Northampton facility. Fueled by waste-coal and built on an abandoned industrial site, it is selling steam to a neighboring recycling facility.

- Encourage changes in the marketing and manufacturing of products, so as, for example, to encourage producers to develop processes to use recycled/reused feed stock instead of virgin materials.

Statewide Recycling Rates
1988-96



Pennsylvania Department of Environmental Protection,
Harrisburg, PA 1996



We are optimistic that our manufacturing processes and consumer preferences can and will change in the next century, leaving significantly less waste to handle. Until that time, though, we must have management programs that reuse, recycle and reduce waste.

To illustrate the point consider the manufacturing of a typical product — carpeting. Interface Inc. from Atlanta, GA is presently making and marketing carpet in a different way. It leases carpet to customers and takes it back when the buyers no longer need the comfort, noise reduction and aesthetics carpet provides. Interface then recycles the old product

back into new carpet. DEP is presently leasing carpet from Interface in the newly constructed, environmentally friendly South-central Regional Office. How many products that we now discard could be reused in such manufacturing processes? Enough so that we should work to educate industries and consumers about the possibilities and formulate government programs and policies that encourage cyclic systems.

Other specific recommendations include:

- Having decided commendably to extend the state-recycling goal to 35%, the Commonwealth should look for ways to improve that rate even further. It should establish an incentive program that encourages and rewards waste minimization with fees based on the amount of trash disposed.
- Take the lead to manage and minimize landfill waste disposal. Work with other state environmental agencies to ensure consistency between states and to learn from best management practices on recycling and per capita waste generation rates.
- Clearly define the term “co-product” and identify the regulations and laws that are standing in the way of safely and beneficially reusing these materials.

- Develop a statewide solid waste management plan specifically to address ways to encourage the reduction and reuse of waste and to ensure statewide collection of household waste.
- Where appropriate, the Commonwealth should develop waste exchange programs that coordinate and track beneficial uses of waste between companies.

We are optimistic that our manufacturing processes and consumer preferences can and will change in the next century, leaving significantly less waste to handle. Until that time, though, we must have management programs that reuse, recycle and reduce waste.

Efficient Energy Use

Background: Specific sources of energy generate various environmental problems. In view of the need for energy consumption to provide for a viable economy and improved standard of living, energy should be generated and used in ways that take into account the environmental effects of energy. Given current energy consumption practices and available technology choices, ample opportunity exists to reduce the present effects of energy use. Conservation of energy and improved efficiency are perhaps the most effective methods available today to save energy. Conservation involves reducing unneeded use of electricity — turning lights off, turning down the thermostat, drying laundry on a line. Efficiency involves the deployment of a technological device — a compact fluorescent bulb or an energy-efficient clothes dryer.

One example of inefficiency is in the area of outdoor lighting that is designed so that nearly half of the energy to light the lamp is wasted shining upward instead onto the ground. While it may appear to be relatively minor item, redesigning a bulb is the kind of solution or example that can be more broadly applied. Our sound land use practices can include model ordinances for outdoor lighting.



Recommendations

Making a Healthy Environment for Healthy People

Commonwealth procurement practices can be revised to include a provision for efficient lighting. Such leadership by example would produce efficient outlays of public funds, would conserve energy and would reduce emissions.

Separately or together, conservation and efficiency alone unfortunately do not offer long-term solutions to the environmental problems — emissions, extraction scars, waste disposal — associated with energy consumption. Sustainable sources of energy must be found, and the environmental impact of energy consumption must be de-coupled from economic growth.

Recommendations

The following recommendations will move us toward our goals. The Commonwealth should:

- Support research and development for solar, hydrogen, wind and ground-source heating and cooling technologies.
 - Encourage the development and implementation of energy conservation programs and plans.
 - Provide a framework within which alternative, clean fuels can be researched, developed and distributed.
 - Promote energy conservation through programs that give utilities flexibility to make needed emission reductions by encouraging customers to save on energy use.
 - Encourage and promote energy conservation in the private sector through programs such as the USEPA Green Lights Program.
 - Develop a fleet of alternate-fuel vehicles and build the infrastructure to support it.
 - Continue to improve and extend the mass transit and rail freight system.
 - Create incentives for companies to invest cooperatively in research and development of energy technologies that improve efficiency or promote the use of renewable energy.
- Develop educational programs to make individuals and businesses aware of environmentally friendly choices that will become available as a result of deregulation of the electric utility industry.
 - Participate in the national debate on climate change and greenhouse gases, especially as we become more integrated into the global economy.

IV. Developing a New Foundation for Teamwork

Since the early 1970's governments have consistently sought to advance environmental protection by emphasizing enforcement, one-size-fits-all policies and prescriptive technologies. Although conditions initially warranted that approach, leaders now realize that to obtain further improvements in environmental quality they must enlist commerce. In our Commonwealth as well, commerce must be the engine, in cooperation with governments and communities, that carries us toward environmental, economic and social prosperity.

Forward-thinking companies in Pennsylvania and around the world have already started to look for ways to reduce waste and minimize the impacts of environmental pollutants. For their part, governments have only limited resources to respond to changing sources of pollution. These parallel realities dictate a significant change in the ways business, communities and government relate to one another. As we look into the coming century, we see business striving to eliminate waste and to involve communities in problem solving. We see governments adopting flexible, customized strategies to pursue the outcomes they want, approaches that utilize a mixture of enforcement, incentives and assistance depending on individual circumstances and reflecting community and company needs. Communities will be involved in developing and managing strategies for achieving community goals.

In these altered circumstances, but seeking true advances in human and environmental health, the Commonwealth must:

- Have a globally competitive economic system that:
 - Provides a rising standard of living for all Pennsylvanians.
 - Embodies a clear commitment to the health of the environment and the quality of life of our citizens.

- Establish the nation's leading environmental performance management system, one that:
 - Recognizes the value of broad public involvement;
 - Is simple to use;
 - Integrates priorities based on risks and community needs;
 - Encourages and motivates — rather than mandating — voluntary continuous environmental improvement;
 - Allows for flexibility — rather than insisting on uniformity — in achieving standards;
 - Springs from a foundation of trust, collaboration and fairness; and
 - Approaches the environment holistically, looking across media (air, water and soil), across agencies and components of society, as well as across regions, watersheds, ecosystems and airsheds.

Background Premises: Since the early 1970's environmental laws and regulations have been hugely successful in protecting the environment. Some will say these measures were drastic, while others will say that these were drastic times. Today, policymakers, analysts and activists increasingly recognize that the measure of successful environmental performance is not to be found in the number of inspections performed or the total of fines levied. Rather, the actual outcomes that we find in the air, water, land, organisms and ecosystems of our Commonwealth define how well or poorly we are doing. Solving the environmental issues of the 21st century will require new approaches not only in the measurement of progress but also in the means of achieving it. We must improve the way we do business together by promoting teamwork instead of accepting confrontation. We cannot simply add new layers of government or regulation, sapping innovation, stressing our resources. We cannot afford that conduct of affairs. Instead, we must find ways to fulfill the basic role of government as the definer and enforcer of health and welfare standards while we



Recommendations

Developing a New Foundation for Teamwork

encourage the regulated community, including business and individual citizens to go beyond compliance, and find more cost effective ways of meeting environmental improvement objectives.

We must find ways to prompt individual Pennsylvanians to explore their personal lifestyle choices — where they choose to live and work, how and how much they travel each day, how much energy they consume or save, and consider changes in those patterns that will not only improve the long-term quality of their lives but also contribute to a better quality of life for all citizens of the Commonwealth.

We must move to a new level and ethic of collaboration. Our system now is primarily litigious and adversarial — clogged with lawsuits and conflicts, treating good performers the same as bad ones, practicing a command-and-control approach toward the regulated community, requiring policing and promoting defensiveness. We will attain the next level of environmental improvement when we develop policies and practices that retain and use appropriate enforcement tools when necessary, but emphasize wide-ranging teamwork and provide guidance and incentives to all and rewards to the good performers.

We need to evaluate the way all of us — individuals, public and private institutions and communities — take environmental protection into account in the conduct of our business. For example, we should gauge our ways of identifying and prioritizing issues; the relationship between our goals and policies affecting human health, ecological health and economic health; the interaction of institutions, individuals and communities; the relationships between regulators and the regulated community; the level and quality of citizen involvement.

Recommendations

Our goal of a globally competitive economic system in Pennsylvania that not only provides a rising standard

of living for all and the wealth we need to achieve our environmental and social aims carries with it a clear commitment to ensure the simultaneous health of our environment, economy and communities.

We believe these actions will help us accomplish this goal:

- Make Pennsylvania the top state in the creation of high paying jobs friendly to environmental and human health.
 - Provide incentives and assistance to existing Pennsylvania businesses to become cleaner.
 - Identify and target “clean,” high-paying businesses and provide incentives for them to locate in Pennsylvania.
 - Invest Commonwealth research and development money in developing the clean, state-of-the-art technologies of the future.
- Invest in improving the overall performance of existing and new Pennsylvania businesses, by helping them achieve greater efficiency, helping them become simultaneously more competitive and more friendly to environmental and human health.
 - Charter the development of a new accounting process which appropriately accounts for desired levels of economic, environmental and human health and measures progress toward their simultaneous achievement.

Collaborate with the accounting community, other states, universities and successful businesses to put this process into practice.

We need to evaluate the way all of us — individuals, public and private institutions and communities — take environmental protection into account in the conduct of our business.



- To strengthen Pennsylvania's long term competitiveness we propose that Team Pennsylvania members — economic development experts working through the state — become aware of and trained in and encouraged to refer businesses to the resources available through the Pennsylvania Environmental Assistance Network, a partnership of public and private organizations, including DEP and DCED.
- Facilitate the development of technologies and management systems that achieve higher efficiencies, less waste and fewer emissions.

21st century Pennsylvania, we believe, should achieve the nation's leading environmental performance management system, one characterized by:

- Simplicity,
- Integrated priorities (health, environment, economy) based on best available scientific understanding,
- Voluntary performance beyond compliance,
- Innovation,
- Flexibility,
- Trust and collaboration,
- Fairness, and
- Broad involvement of all components of society.

We believe that the following actions will help move us towards that objective:

- Develop new ways to encourage positive environmental performance beyond compliance, among individuals and organizations, and to encourage flexibility and agility in dealing with current and emerging issues. For example:
 - Promote a mindset in government and in the regulated community favoring continuous improvement in efficiency — increasingly less waste, increasingly reduced emissions, increasingly fewer negative impacts on the environment. Do this without additional regulations.

- Develop and implement a covenant system to win commitments to the public by the regulated community that environmental expectations will be met. That system should define expected outcomes and allow flexibility in meeting them and should include self-management among its incentives. Let such commitments and their fulfillment broaden the options available to regulators.
- Develop and use easily accessible reporting systems — through the Internet, for example — that provide the public with up-to-date information about localized environmental performance.
- Have Pennsylvania take the lead in working with the Federal Government to introduce greater flexibility into the legal framework and standard operating procedures, so that our approach to environmental issues allows for broader options and more agility enabling us to encourage performance beyond compliance.
- Increase the knowledge of good industrial systems which have successfully changed their culture to value sound environmental practices.
- Broaden existing environmental recognition programs as one way to foster change in the legal framework and promote desired environmental practices.
- Champion a business culture that provides education and support for a work place ethic that results in superior environmental action.
- Create an incentive system that rewards performance beyond the minimum.
- Improve the linkage between environmental, economic, and health leadership and policymaking at the state government level, and extend it to the regional level. For example:
 - Use compliance data to better understand facility performance and the impact of regulatory limits on environmental outcomes.



Recommendations

Developing a New Foundation for Teamwork

- Develop performance measures that more accurately reflect environmental outcomes and that depend less on traditional measures of activity such as number of inspections and fines.
- Establish regular policy coordination among key agencies, such as Health, DEP and DCED, for example, as a way of assuring simultaneous progress toward economic, environmental and health excellence. This teamwork might include cabinet-level clusters, cross-department advisors and interchange of printed materials.
- Report to the public at least annually with descriptions of progress achieved, of conflicts eliminated and of reductions in actions at cross purposes with one another.
- Follow this model at the regional level, as well, involving regional directors of agencies and sectors.
- Institute an annual Governor's Conference of leaders — government, business, labor, environmental, education, lay people, — as a forum for reporting on our success and sharing lessons learned.
- Assign and staff programs that lead employees to see and act across all three goal areas — economic, environmental, health — and across all sectors of the Commonwealth — government, business, general public, — and that focus on objectives and principles, rather than just on regulations.
- Establish, within government, the use of ad hoc, cross-functional teams, as a way of doing business. The teams might address and reduce barriers to the goals of this Commission, work with the Governor's Action Team and Team Pennsylvania to drive toward simultaneous excellence in human health, the environment and the economy.

- Develop, within government, the technical expertise and philosophical attitudes needed to serve on such teams.

The perspective of the Commission on the interdependence of economic, environmental and health objectives clearly dictates the new, collaborative style and practices this chapter has identified. It also puts a crucial responsibility on all of us, as the following chapter explains, to act as vigorous, knowledgeable, forward-looking stewards of the natural legacy we have inherited and as conscious, committed architects of the environmental and economic well-being we must pass on to the future.

V. Promoting Environmental Education, Training and Stewardship

The Commission's vision of the 21st century is one of transformation, and one of the transformations we must achieve will change us from bystanders and consumers to active stewards of the environment. Education is a vital tool of that transition, and environmental stewardship is the key instrument for converting our recommendations to reality.

Pennsylvania is clearly a national leader in environmental education. While other lead states and we are considered progressive, none of us has given environmental education the prominence it deserves. Our understanding of the environment's contribution to economic health and of prosperity's crucial role in support of effective environmental protection does not come automatically. It needs to be learned. Teaching it, we also need to demonstrate the practical ways in which that lesson can shape and raise the quality of our life.

Education about the environment — an activity that must be a priority in Pennsylvania — is more than a classroom challenge. It must also provide instructive models of environmental stewardship in and for both

We look to Pennsylvanians to act and behave in ways that help regenerate and sustain a healthy natural environment.

the public and private sectors. Environmental education, including education on land use, must be continual and sequential in scope and process. It should begin early in the formal educational system and, through sus-

tained adult education, provide life-long learning. Based on this premise, the 21st Century Environment Commission recommends the following goals:

- Easy access for all Pennsylvanians to sound environmental information through all available and emerging technologies.
- Heightened public awareness of the impacts that public and private decisions have on the environment.
- Actions by government, business, educational institutions and non-governmental organizations to model and incorporate into their missions and goals sound environmental practices and education.

Background: Pennsylvania's Constitution establishes our obligation to be stewards of our natural resources and to promulgate stewardship for "generations yet to come." Stewardship is the careful and responsible management of something entrusted to one's care. The best way to assure the future health of our environment and economy is to make certain that each generation of Pennsylvanians has the knowledge and skills necessary to make environmentally sound decisions in all spheres of life. That ability must be coupled with their understanding of the broad social and personal benefits such decisions promise to deliver.

We look to Pennsylvanians to act and behave in ways that help regenerate and sustain a healthy natural environment. Such action and conduct should arise voluntarily. We cannot coerce or regulate the individual behavior of 12 million people. Since we look to Pennsylvanians to be sensitive toward the environment far into the future, we realize that their actions must express deeply held individual and community values, not passing enthusiasm.

According to many analyses and descriptions of the concept of environmental stewardship, a good steward must possess respectful awareness of the environment based on and understanding of the workings of natural systems and the interaction between them and social systems. Effective stewards also use their problem-solving skills whenever opportunities arise to advance environmental objectives.



Recommendations

Promoting Environmental Education, Training and Stewardship

The National Report Card on Environmental Knowledge, Attitudes and Behaviors, an annual survey undertaken by Roper Starch Worldwide on behalf of the National Environmental Education and Training Foundation, asserts that:

- Two-thirds of Americans fail a simple 12-item test of environmental knowledge;
- The majority of Americans are supportive of environmental protection at a level consistent over six years of the survey;
- 90% of Americans engage in at least 6 of 10 activities to protect the environment;
- 95% of Americans support environmental education in the schools;
- The more environmental knowledge an individual displays, the more likely he or she is to behave in environmentally beneficial ways; and
- As individuals display more environmental knowledge, they are less likely to take polarized positions on environmental issues.

While Americans clearly have a strong environmental awareness at a basic level, we have a long way to go in improving knowledge, understanding and skills so that awareness translates into effective action in a public policy setting.

Environmental protection efforts beginning in the 1970's relied primarily on laws and regulation to combat pollution. That model is now being supplemented with collaborative programs that can take us beyond minimum standards and achieve regeneration. Education in environmental stewardship is key to this paradigm shift. The Commission, recognizing the value of gathering environmental data and information, also recognizes that knowledge, in of itself, is only one of the multiple components of education. It must lead to comprehension and application. Application with analysis, synthesis and evaluation skills will produce creative and critical thinkers willing and able to solve complex environmental problems. Trained and encouraged by new efforts on our

part, they will be the competent, trustworthy, imaginative stewards of our future.

Recommendations

How can we raise awareness among our fellow citizens of the vitality and fragility of the natural environment? How can we obtain and share with others the knowledge we need to understand the relationship between our actions and the regenerative capacity of the environment? How can we develop an appreciation for nature that takes the health of the environment as a cherished first principle? And how can we be sure that when it is time to act, we're not caught up in webs of red tape and conflicting interests?

To answer these tough questions, we first identified several key populations or target groups. We then sought within those populations effective methods for implementing environmental education and training and for applying the stewardship model. Beyond the general population of Pennsylvania, all 12 million of us, institutions such as schools, business and industry; voluntary organizations and government agencies define groups with well-defined channels for communication and particular powers of action. For the population at large and for each of these institutions, we propose a set of goals, objectives, actions and measures to improve environmental awareness, knowledge, skills, attitudes and behavior.

The General Population

Because an informed and active citizenry is the single most important resource for exercising environmental stewardship, the general population plays an ever more critical role in ensuring environmental quality. Indeed, all Pennsylvanians have more power than ever to improve the health of our environment through environmentally sound choices based upon their considered evaluations of comparative risk. To assist in providing information upon which to base decisions, we must take into account the extraordinary growth of information and communication systems in the past decade, especially the Internet.



The commission offers the following objectives and actions to meet our stewardship and education goals:

- We should ensure easy access for all Pennsylvanians to sound environmental, economic and health information; technical support for environmental education; training and voluntary environmental stewardship opportunities that lead to regenerative environmental activity.
- State government should take an active role in assuring the quality and flow of environmental information and publicizing models of environmentally regenerative activities. We recommend a public awareness campaign to increase public, media and producer awareness and knowledge of environmental problems, issues and solutions, especially those that individuals can affect. Topics should be timed to parallel implementation of the initiatives recommended in this report, and a partnership of public and private sources should provide funding. This campaign can be enhanced by regional "Environmental Expositions" to showcase accomplishments by Pennsylvania's environmental businesses and non-governmental organizations. Schools should highlight environmental technologies, present diverse environmental education programs and offer hands-on experiences in conducting environmental activities.
- To get the most from new information technologies, the state should become a partner in coordinating a network of environmental information web-sites, especially among colleges, universities, libraries and research centers within the Commonwealth beginning with the State System of Higher Education.
- To assess our progress, we should determine the status of environmental literacy in Pennsylvania. The Commission recommends that the Commonwealth conduct baseline and follow-up adult environmental literacy surveys to measure environmental knowledge, attitudes and actions.

Such research will provide an indicator of future success for select environmental initiatives recommended by the Commission.

- We should revisit the environmental education master plan to designate an existing, non-governmental, environmental education entity as a clearinghouse for environmental education materials and stewardship opportunities that would also disseminate environmental information and provide Internet links to such resources world wide.
- The Governor should expand the prestigious Environmental Excellence Award to recognize and provide financial rewards to individuals and communities for exemplary environmental behavior.

Schools

Education is the foundation upon which policy initiatives rest. Pennsylvania has a strong foundation of environment and ecology in our formal education system and in the museums, environmental education and nature centers, libraries and community organizations that comprise our informal system. By several measures we are national leaders in our commitment to environmental education and the resources we devote to it. By acting on the following recommendations, Pennsylvania can become a leader in all aspects of environmental education:

- Starting with their construction, schools should reflect regenerative environmental principles so that the very buildings become local models of "green" construction and informed, creative and critical thinking. A careful assessment of construction reimbursement formulas and their impact on land use needs to be undertaken.
- The formal education system (K-12 and higher education, including teacher preparation and professional development for educators) must provide a continuum for learning and assessment for environment and ecology.



Recommendations

Promoting Environmental Education, Training and Stewardship

- The State Board of Education, continuing to identify environment and ecology as an academic core subject in Chapter 4 of the Pennsylvania School Code, will promulgate clear, rigorous academic standards for environment and ecology.
- All Pennsylvania students will have access to a variety of planned courses (e.g. Math, English, Social Studies and Civics) which meet the proposed standards for environment and ecology. School Districts may choose between locally derived assessment or standardized assessment such as the Science, Technology, Environment, Ecology Process, which is currently being piloted. Assessments of the way these new standards are applied will provide a sound basis upon which to judge progress in this area.
- Chapter 49 of the Pennsylvania School Code will require teacher preparation programs to provide instruction in environmental education and ecology. Standardized assessment of teachers on environment and ecology should be integrated into future or existing instruments.
- Professional development opportunities in environmental education should be enhanced, encouraging more able teachers, for example, to take advanced courses in the field.
- We urge non-governmental organizations and community resources such as museums and natural science institutions to form closer links with the formal education system in their communities to provide stewardship and lifelong learning opportunities.

Business and Industry

A thriving Pennsylvania will advance economic prosperity and environmental health through the next century, especially as more and more businesses and industrial operations adopt processes which regenerate the environment at the same time they enhance profitability. Understanding that they can meet their

environmental responsibilities in ways that enhance both their community standing and their economic efficiency, businesses will act in environmentally responsible ways.

In this field, the Commission proposes these objectives and recommendations:

- Assist businesses in discovering ways to increase profit through environmentally responsible products and processes. We seek to link economic and environmental objectives to build more prosperous companies and richer ecosystems.
- As models for environmentally responsible business actions continue to proliferate, government, as well as business and industry, should work both to create them and encourage their implementation in the Commonwealth.
- Establish a voluntary program of environmental audits of Pennsylvania firms aimed at raising awareness of ecologically efficient practices and reinforcing positive changes through public recognition.
- Expand the Pennsylvania Environment Assistance Network, a regional link-up of professionals who facilitate ecologically efficient business and manufacturing practices.
- Create a state program of research and development grants to expand the scientific and technical knowledge base of companies related to the environmental impact.

Understanding that they can meet their environmental responsibilities in ways that enhance both their community standing and their economic efficiency, businesses will act in environmentally responsible ways.



Voluntary Organizations

Pennsylvania's voluntary organizations, religious organizations, youth groups, social clubs, educational, environmental and political organizations have a powerful effect on our community and social life. To most of us, they are closer than government and as significant a part of our daily life as school or work. These organizations can vastly multiply the effectiveness of a strategy for environmental stewardship.

The Commission proposes:

- To enhance stewardship opportunities, voluntary organizations should seek partnerships with state resources (additional resources, people, facilities, etc.) when appropriate to enhance their ability to conduct activities in environmentally responsible ways.
- One resource could be the DEP, which could supply upon request for partnering sets of suggested or "best practices" that not-for-profit organizations may use. Such guidelines might include ways in which to physically "green" their buildings or procurement practices and could also provide information for educating their memberships on the organization's role in sustaining the environment.
- Utilize not-for-profit institutions such as museums and nature centers to involve our citizens in hands-on learning about the environment and to foster stewardship. Encourage these institutions to support performance requirements for environmental education in schools.

Government

Many states are re-casting the role of government at all levels as partners in the protection of environmental health, a process that requires environmentally literate government officials knowledgeable about environmental problems and issues, skilled at problem solving and able to communicate the essence of these problems to their constituents and stakeholders.

To ensure such skills and attitudes throughout our government, the Commission proposes:

- State-level officials often have the resources to conduct extensive hearings and gather information that can determine environmental impacts before legislative and policy decisions become final. Equally as often, other levels of government may lack such opportunities and resources. Therefore, we propose government officials at all levels receive education, training or information as needed and as appropriate to enhance their knowledge base and decision making skills before they act so that their decisions and actions can sustain and help regenerate the environment. An example of the type of appropriate application of this recommendation is the dirt-and-gravel-road program that conservation districts conduct for local officials, providing them needed information and skills required to minimizing environmental impact.
- To promote outreach from government, all environmentally related state and local agencies should include education about the environment and effective public communication as part of their goals or mission statements.
- Require that all government agencies follow regenerative environmental practices daily. The Governor's Green Government Council can be a key, state-level resource in coordinating dissemination of guidelines to those practices and in aiding the development of stewardship models.



Recommendations

Promoting Environmental Education, Training and Stewardship

Training ourselves, our children, our teachers, volunteers, businesses and officials in the duties and rewards of environmental stewardships requires a continuing commitment and continuous effort. Both will bring Pennsylvania welcome results. As our final chapter argues, we must move now to sustained implementation of the proposals the Commission has advanced and to the development of a measuring tool that will gauge our positive progress and stimulate more of it.



Conclusions

VI. Making and Measuring the Next Steps

The recommendations detailed in the preceding pages are not self-implementing. Governor Tom Ridge, who asked for them, and the citizens of the Commonwealth he leads, will decide whether and how to put our suggestions into practice.

Throughout the report we have named agencies or organizations we believe should be responsible for implementing specific actions.

These specific management recommendations should be helpful, but the process we intend to set in motion also requires a reanalysis of authority, of organizational issues, of governmental culture and of the incentives and funding to be used as leverage in bringing our 21st century vision closer to reality. This chapter examines various options for the next steps that government, the private sector and Pennsylvania citizens — individually and in association with others — need to take. And it offers a suggestion for devising a new way to measure our forward motion: a tally of positive achievements instead of the more familiar listing of shortcomings and problem areas.

Change in Perspective

That proposal is one expression of our firm belief that implementation of our recommendations will require a change of government perspective.

The costs associated with implementing the recommendations in this report could amount to billions of dollars in public monies if traditional approaches are used. That prospect is neither realistic nor desirable. First, government must reassess its priorities and reallocate resources to ensure that its policies advance the dual, conjoined goals of economic and environmental progress. At the same time, it must eliminate unnecessary or obsolete services and programs. Furthermore, it must ensure that all programs provide the necessary incentives and disincentives to accomplish its priorities. For example, government

should evaluate the tax structure to make certain it supports these priorities and does not create barriers or conflicting incentives.

Although most of us understand the impact that global competition has had on American industry, few have considered the impact of the global economy on government. To succeed in today's super-competitive global markets, corporations need the highest quality "inputs" they can get — the most skilled workers, the most advanced research, the cheapest capital, the best infrastructure and predictable costs of doing business. In its various roles as educator, trainer, research funder, regulator, rule-setter and infrastructure provider, government exerts a far more important influence on competitiveness than it did 50 or even 10 years ago. Given that power to help or harm, government must make its own activities more businesslike and its programs more customer-focused. It must be willing and able to function as a strong, strategic partner with corporations, organizations and individuals, wherever appropriate.

In the 21st century, government must find ways to help others deliver the services that society demands and move only into the gaps others cannot fill completely and equitably. While shifting the delivery of service where appropriate, government must keep the responsibility for it. Services can be turned over to the private sector, but governance cannot. We can privatize discrete functions but not the critical processes of governance. The fact that a road was built by a private contractor does not make that road a private road. By contracting activities to the private sector, governments can still make policy decisions, set design/regulatory standards and provide some level of guarantees or financing.

Most of us have been brought up to think that the public and private sectors are mutually exclusive. That separation was the central tenet of the bureaucratic model. But the public sector provides very few services that the private sector does not and vice versa. Businesses are running schools and fire departments. Governments are running professional sports



Conclusions

Making and Measuring the Next Steps

teams and venture capital funds. Nonprofit groups control banks and develop real estate. Indeed, we are constantly creating and mobilizing new, privately owned and controlled entities that exist not to accumulate private wealth but to meet public and community needs. This “third sector” offers new and powerful resources for change. It is clear that the world is changing too much to allow old, traditional models and roles to impede important progress.

We are advocating a major shift in focus for government — becoming a catalyst for change.

To this end, we have developed ten principles to help manage change within government to match the 15 Beliefs that accompanied our vision statement. These guidelines are meant to redirect government’s role into a more enterprising posture in the implementation of all the recommendations in this report, while ensuring that it will always carry out its vital role in maintaining equity and cohesion within the Commonwealth.

Ten Guiding Principles for Managing Change:

1. **Be strategic** — steer and invest in actions that maximize assets and resources and use appropriate leverage.
2. **Fund performance (outputs), not inputs** — develop performance measures and environmental indicators and use them to link pay to performance and spending to results. Ensure that all stakeholders learn of the changes and progress achieved.
3. **Ensure innovation** — set guidelines, allow experimentation, manage risk and allow new processes and new technology to develop new levels of performance.
4. **Focus on customer needs and continuously improve service delivery** — recognize the impact each individual makes. Develop supporting tools, such as a statewide GIS system, to reduce cost and enhance accuracy, user-friendly applications and widespread usage.

5. **Prevent and avoid rather than cure** — focus on creating incentives to eliminate potential problems.
6. **Decentralize decisions** — collaborate with more stakeholders and make important, collaborative decisions at all levels.
7. **Communicate** — provide relevant data and information electronically and take time to listen and talk to stakeholders.
8. **Empower the private sector with incentives** — where appropriate.
9. **Earn rather than spend** — be entrepreneurial.
10. **Leverage change through the market when and where possible** — use the power of government to help direct markets in healthy directions.

Change in Culture

Anyone who has held both public and private responsibilities knows that attitudes, values, priorities and sought-after abilities differ — sometimes dramatically — from one setting to another. These cultural differences can be seen below in terms of the skills considered most useful in government and business.

Government Skills

Policy Management
Regulation
Ensuring equity
Preventing discrimination or exploitation
Ensuring social cohesion

Business Skills

Innovation
Performing economic tasks
Replicating successful experiments
Adapting to change
Abandoning obsolete activities
Performing complex technical tasks
Using technology

If we want government to become a catalyst for change, the culture of our government must change. Public and private employees view risks and rewards very differently. Avoiding mistakes is a powerful incentive in government. Entrusted with the protec-



tion of the public good and paid by tax dollars to perform those tasks, government employees tend toward conservatism. Because they are entrusted with the public funds, they tend to be risk-averse. Standard motivational methods in the private sector are not available in the public sector.

Therefore, the environment must change. The government must change the way it does business and provide a setting in which employees are:

- Motivated to excel.
- Ranked against defined performance measures of action on behalf of economic, social and environmental sustainability.
- Accountable for their results.
- Free from overly restrictive rules and regulations.
- Permitted flexibility and collaboration.
- Rewarded based on team performance.

The personnel selection and promotion system must improve. In the current state employment system, selection pools are limited and since pay increases are not tied to performance, there is little motivation for the good performer or disincentive for the below-average employee. In the private sector, by contrast, employment is not assured and pay raises are usually tied to performance. The public sector, moreover, provides few incentives for employees to move into management. Greater responsibilities there go with relatively modest increases in financial compensation.

Realize the Full Potential

Government does not have to change completely. Many aspects of traditional government will be critical to implementing the actions listed in this report. In the future, government must make every effort to use its full potential by mastering a wide range of implementation tools and finding ways to increase knowledge and continuously improve performance. We can define three primary patterns of government activity: 1) Traditional — the tax and spend approach; 2) Enterprising — finding innovative ways to leverage

others — use resources, build partnerships and create new means for improving the environment and the economy; and 3) Knowledge Building — stimulating long-term research and educating the populace as to ways to improve our Commonwealth. Below is a more detailed discussion of each.

Traditional Government

Since the early 1970's, the approach governments have taken to protect the environment has emphasized command and control and has been very prescriptive. The poor condition of the environmental conditions — rivers on fire, dirty air and toxic chemical releases — and the way society viewed our natural resources warranted that approach. Command and control approaches still have a significant role in environmental protection programs. However, traditional government is often conditioned to rely on generic solutions without regard to individual circumstances. Decisions often come with unnecessary delay. Few incentives foster innovation and high performance. Too often, the process focuses on symptoms rather than causes. Bureaucratic systems, built upon laws and regulations, designed for consistency and uniform fair treatment, get bogged down as markets. Conditions and issues change. Bureaucratic systems are not designed to be agile — to respond flexibly to emerging issues — and are difficult to change.

The traditional approach can, however, be useful in evaluating each of our recommendations to determine the potential capital outlays involved in their implementation. One suggested method of evaluating recommendations is to develop a table with the following headings: recommendation, total project funds, annual project funds, level of importance, time to complete and implementing agency, to indicate orders of magnitude and levels of importance and urgency.

Enterprising Government

Entrepreneurial governments can find ways to earn money and leverage the resources of others in one or more ways:



- Making money through services.
- Making profits through development.
- Gaining returns on spending — investments.

Most government budgets drive people to spend money, not make it. Few in government have been trained or encouraged even to think about revenues and making a profit. One of the best examples of how government can make a profit over merely spending money was the 1984 Olympics games in Los Angeles. After the Montreal Olympic games lost \$1 billion in

taxpayer dollars, the Los Angeles Olympic committee, driven by the tax revolt of the 1970's and 80's, decided to find ways to offset the costs of putting on the Games. The 1984 Olympics turned a profit of \$225 million after officials successfully searched for ways to cut costs, measure return on investments, find sponsors, manage assets, and so on.

Below, we provide illustrations of similar performance on a different scale around the United States, including four instances in Pennsylvania.

Examples of Enterprising Government

Technique	Description
Mitigation banking	Palm Beach County, Florida, is developing a mitigation bank to help reduce wetlands treatment costs, restore habitat and natural diversity and raise dollars through the sale of mitigation credits to developers in the county.
Vendor profit-sharing and stewardship	Coca Cola's recent contract as exclusive vendor in the Pennsylvania state parks included a profit-sharing clause putting a percentage of profits toward park maintenance and management.
Market-based regulation	The State of New Jersey is proposing a \$.07 per gallon gas tax to finance transportation improvements and help provide a reliable funding source to help purchase over one million acres of farmland and open space. In addition to the gasoline tax, New Jersey proposes to use \$50 million in existing proceeds from the state's tax on real estate and \$36 million from a 30-day surcharge on car rentals to create an annual fund of \$170 million for the acquisition of land to help prevent sprawl. Business and environmental groups are supporting this proposal according to the April issue of <i>Environmental Synopsis</i> .
Voluntary Associations	Montgomery County, Maryland, has created a Transportation Management District in Silver Spring (a Washington, D.C. suburb) that enlists all firms with more than 25 employees in a concerted effort to reduce commuter traffic. By combining financial incentives and discounts with requirements that all such employers develop traffic mitigation plans and participate in an annual commuter survey, the county has brought the percentage of commuters who drive alone down from 66 to 55 percent. Although the Transportation Management District is an arm of county government, it has an advisory board made up of citizens and business leaders.

Examples of Enterprising Government (continued)

Technique	Description
Public-private partnership	In Pittsburgh, the Advisory Committee on Homelessness, made up of government, university, community and religious leaders, coordinates the city's response to homelessness. It uses federal, state and corporate funds to fund dozens of food banks, soup kitchens, counseling centers, job training programs and housing initiatives. According to the Washington Post, "this kind of broad-based response to homelessness has helped this city of 387,000 dodge the bullet that is crippling cities like New York, Chicago and Washington, DC."
Public – private partnership	The road toll along Everglades Parkway (Alligator Alley) in Southern Florida pays up to \$2 million per year in excess tolls above road maintenance costs for the purpose of restoration of the Everglades and Florida Bay.
New business-waste is a resource	Milwaukee and the City of Philadelphia Water Department are among cities that have developed a business out of taking bio-solids from their wastewater treatment process and selling top soil and manure for growing grass, shrubs and trees. These sales reduce volumes and the costs of waste disposal.
Infrastructure management	The State of Oregon developed infrastructure boundaries to control sprawl and decrease infrastructure costs.
Conservation banks	The State of California is in the process of trying to develop ways to use its permit-issuance and regulatory oversight to generate trading credits for a series of activities.
Assets management	The United States Air Force Academy has instituted a program to ensure preventive maintenance at a level that ensures cost-effective investment. All primary institutional elements from motors to roofs are given a maintenance life cycle to ensure maximizing return on investments, maximizing efficient use of warranties, maintenance time and replacement parts. The consequent savings are estimated to be 15% of annual operation and maintenance costs. Australia and England require an assets management approach in contracting all major infrastructure.
Public-private partnerships smart business management-	The sustainable forestry program in Pennsylvania provides research and collaboration between business and the state to protect the state's resources along with a valuable business opportunity.
New business: waste as fuel	The City of Phoenix is earning \$750,000 a year by siphoning off the methane gas generated by a large wastewater treatment plant and selling it to the City of Mesa for home heating and cooking. This is a classic example where "waste becomes fuel."
Changing the Market	Vermont banned the sale of new cars that use ozone-depleting chemical in their air-conditioning units.

Knowledge Building

Earlier we stressed the importance of education in improving environmental stewardship. The role of government in communicating to and educating the public is paramount. Without knowledge, the public will not be able to make the most informed, environmentally sound decisions. Government can establish that critical link between comprehensive information and sound practice.

By providing information about and access to existing and emerging programs, government can also provide powerful tools for various market sectors. The development of base information about our natural systems is a function critical to all informed business and personal decisions. From such information we can then devise the necessary solutions. Since such a public good will never be a private enterprise, public investment must be allocated to strengthen private resources and decisions. Moreover, government can play a valuable role in building and instilling the guiding principles that underlie the essence of public policy.

The success of all the initiatives outlined in this chapter depends ultimately on education. The impact of the report depends in large part on the Commonwealth taking a proactive role in creating and disseminating accurate information and guiding others not only to absorb the information but to use it in creating knowledge and employing sound practices based on such knowledge.

Where do we go from here?

The Commission has not tried to draw a definitive road map but, instead, to provide a compass. Our recommendations offer guiding principles and new ways of defining the role of government so that, for instance, requests for new, continued or expanded services are routinely subjected to a rational policy and evaluation technique. That examination should answer two questions: "How well will stakeholder needs be addressed?" and "Where does Pennsylvania get the best return overall?"

Our final recommendation is that, using that compass, the Commonwealth set out to develop and implement a result-oriented action plan that:

1. Continues the learning — finding the best models.
2. Generates seed money.
3. Engages stakeholders on goals, incentives and milestones.
4. Ensures ongoing dialogue between public and private sectors regarding enterprising initiatives.
5. Creates enterprising opportunities for exchange programs.
6. Identifies partners.
7. Forces internal change.
8. Identifies core business processes.
9. Creates performance measures and indicators.
10. Creates internal incentive programs.
11. Integrates environmental indicators and performance measures.

Measuring Our Results

Executive Order 1997-4 specifically requires that the Commission propose evaluation criteria by which to measure progress toward the goals it defines and to initiate an annual environmental report card using scientifically valid environmental indicators. We propose that the measures of our progress be structured around the interconnected management of our communities, our businesses and our natural resources — not just the environment. Nowhere before in the Commonwealth has a single report been compiled to track our progress toward simultaneous excellence in environmental quality, community vitality, and economic strength. We believe, however, that such a comprehensive approach is warranted and potentially very valuable in changing from a compartmentalized culture to one with a holistic perspective on our responsibilities and achievements.

We also propose departing from the traditional measurements in the environmental field — number of fines, number of violations and number of spills and accidents — in order to start measuring environmental, health and economic outcomes that are important to the citizens of the Commonwealth and are indicative of the priority recommendations established by the Commission. Recognizing that much more work is needed to flesh out this concept, we recommend that a process be developed to gain broad public support and involvement in elaborating a statewide report card. Our aim is to give birth to a system that identifies and monitors indicators that are important to Pennsylvanians and their quality of life, a system that allows priorities to be easily identified and integrated with the budgetary process and is based on real community needs.

In developing the list of indicators below, we reviewed the goals of each chapter of the report and determined which indicators — environmental, health or economic — would clearly indicate progress in that area. The Commission did not restrict itself to the use of existing indicators. Methodologies and measurement techniques may need to be developed for some. An initial task should be to identify and report on the indicators now being measured. Moving into the next century, we should devise ways of obtaining information and setting definitions for those indicators that we do not yet measure.

Our Potential List of 21st Century Environment Commission Indicators are:

Land Use

- Percent change in population versus percent change in land usage.
- Number of municipalities implementing sound land use practices.
- Number of multi-municipal regional plans for land use, transportation and infrastructure.

- Number of land use plans and zoning ordinances conserving agricultural land and natural and historic resources.
- Number/percentage of Pennsylvanians with access to mass transit.
- Average acreage/person density of new development.
- Vehicle miles traveled per day.
- Number/acre of open space in developed areas.
- Miles of greenways and trails.
- Number of schools retrofitted vs. new schools built.
- Number of businesses located/jobs created in existing urban areas.
- Number of local governments that have developed sustainable development plans.

Natural Resources

- Acres/percentage of abandoned mine lands restored and productively utilized.
- Miles/percentage of streams affected by acid mine drainage restored.
- Number/percentage of sites polluted from oil and gas extraction restored.
- Increase in volume of beneficial use of waste products from extraction, processing and use of nonrenewable resources.
- Number/acre/percentage of contaminated sites (brownfields) restored and productively utilized.
- Acres/percentage of farmland/forestland protected from incompatible land uses.
- Acres/percentage of farmland/forestland using sustainable, environmentally sound management practices.
- Number of Pennsylvania processors of agricultural and forest products.



- Level of economic activity of agricultural and forest products processing in Pennsylvania.
- Level of economic activity of ecotourism and recreation in Pennsylvania.
- Number/percentage of county natural heritage inventories completed.
- Acres of state park land.
- Reduction in maintenance backlog on public lands.

Environmental Quality

- Number/percentage of priority sites being conserved and managed for natural diversity.
- Index of natural diversity to measure ecosystem health.
- Number/percentage of watersheds with ground and surface water budgets in balance.
- Miles/percentage of non-degraded and restored surface waters.
- Measure of non-degraded and restored ground waters.
- Number/percentage of watersheds with comprehensive watershed management strategies in place.
- Miles/percentage of floodplains protected from incompatible land uses.
- Miles/percentage of surface and ground waters affected by non-point pollution.
- Number/percentage of municipalities with septic system maintenance programs.
- Miles/percentage of streamside forest buffers protected and restored.
- Acres of wetlands protected and restored.
- Total level of waste generated and disposed in Pennsylvania.
- Total pounds of toxic chemicals released to the air, water and land.

- Number of times ambient air quality standards for criteria air pollutants were exceeded.
- Number/percentage of water supply source protection plans implemented.
- Per capita water use.
- Per capita energy use.
- Per capita waste recycled.
- Statewide recycling rate.
- Energy generated in Pennsylvania by fuel type.
- Waste imported into/exported from Pennsylvania.
- Per capita hazardous waste generated.
- Nutrient loadings to surface waters.

Human Health

- Incidence of sentinel diseases triggered by environmental factors.
- Frequency of human exposure to harmful levels of environmental pollutants.
- Number of people whose drinking water meets Safe Drinking Water Standards
- Number of people living in areas that meet air quality standards.
- Percentage of homes with radon levels below established safe levels.
- Number of days per year air quality exceeds moderate levels.

Teamwork

- Number/percentage of high paying, environmental and human health-friendly jobs in Pennsylvania.
- Contribution of environment and natural resources to Gross State Product.
- Number of new, high-paying, environmental- and human health-friendly businesses/jobs created in Pennsylvania.

- Number of businesses with environmental performance management systems.
- Pennsylvania Index of progress toward optimization of human, environmental and economic health goals.
- Number of people below poverty level.
- Per Capita Income for Pennsylvania and U.S.
- Per Household Disposable Income for Pennsylvania and U.S.
- GINI Index (measures income distribution) for Pennsylvania and U.S.
- Median Weekly (or Annual) Wage for Pennsylvania and U.S.
- Share of jobs in highest 20% of occupations.
- Share of jobs in lowest 20% of occupations.
- Number of full-time jobs paying over \$X for Pennsylvania and U.S.
- Total Employment/Unemployment for Pennsylvania and U.S.
- Gross State Product for Pennsylvania and Gross National Product for U.S.
- Amount of R&D money spent on clean, state of the art technologies.
- Number of "Green" Businesses (needs to be defined).
- Number of companies that meet ISO 14000 standards.
- Number of companies using P2 (Pollution Prevention) and QEM (Quality Environmental Management) strategies.
- Reduction in non-point sources of pollution.
- Percent of Pennsylvania college graduates finding jobs in Pennsylvania.
- Number of eco-industrial parks.

Stewardship

- Number of Pennsylvanians served by environmental information, technical assistance and voluntary stewardship opportunities.
- Status of environmental literacy, attitudes and behavior.
- Number of buildings constructed or retrofitted with "green" materials and technology.
- Number of Pennsylvania businesses performing voluntary environmental audits.
- Number of governmental and non-governmental organizations with sound environmental practices incorporated into their missions and goals.
- Measure of Pennsylvanians' activities in regenerating the environment.
- Number of professional development workshops for environmental educators.
- Teacher/Student assessment of environment and ecology.

We recommend that the list above act as a starting point for a longer-term project to track the progress outlined in this report. That initiative should:

1. involve extensive public participation,
2. develop an organizational framework appropriate to the vision and goals of the Commission,
3. determine additional monitoring, assessment and analytical needs,
4. respect existing indicators and results,
5. be readable on a state scale as well as a local scale,
6. provide an appropriate period of review, assessment and updating.



Conclusions

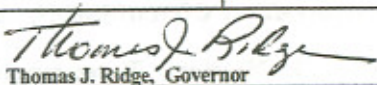
Making and Measuring the Next Steps

We further recommend that the Commonwealth investigate the utility of developing a Pennsylvania index to track progress toward reaching the goals of the Commonwealth. Such a Pennsylvania index should be designed to consider the health of the environment and the natural resource base, the health and well being of our citizens and the health of our economy. We further propose that a task force of environmental, health, academic and business professionals come together to study the utility of the index for the Commonwealth.

As the adage goes, you get what you measure. To quote Maureen Hart from Hart Environmental Data, "It's time to measure what we want to be."

Commonwealth of Pennsylvania
GOVERNOR'S OFFICE

EXECUTIVE ORDER

Subject:		The 21st Century Environment Commission		Number:	1997-4
Date:	July 1, 1997	Distribution:	B	By Direction Of:	 Thomas J. Ridge, Governor

- WHEREAS, the 21st Century presents us with exciting new opportunities and challenges in protecting and enhancing our environment, built on a 25-year foundation of environmental stewardship; and
- WHEREAS, Article I, Section 27 of Pennsylvania's Constitution states "The people have a right to clean air, pure water, and to the preservation of the natural, scenic, historic and esthetic values of the environment. Pennsylvania's public natural resources are the common property of all the people, including generations yet to come. As trustees of these resources, the Commonwealth shall conserve and maintain them for the benefits of all people;" and
- WHEREAS, there has been significant improvement in the quality of Pennsylvania's environment, resulting in a decrease in the risk of disease and harm to public health and the environment since the first Earth Day in 1970; and
- WHEREAS, environmental science and engineering have made important advances in understanding the relationship between pollution and potential harm to the environment and public health; and
- WHEREAS, there is a recognition that the role of government in promoting environmental improvement must change to one of preventing pollution, promoting community participation, educating all segments of the public and encouraging continuous improvement and innovation, if further progress is to be made; and
- WHEREAS, there is a new emphasis on providing more effective public participation in permit decisions and the development of environmental policies, regulations, and legislation; and
- WHEREAS, the revolution in the collection, analysis, and presentation of information gathered as part of environmental programs is providing greater opportunities for setting scientifically valid environmental priorities, determining the effectiveness of environmental protection programs, and providing the public with greater access to information; and



WHEREAS, there is a growing recognition that environmental problems and conflicts are related increasingly to the pattern of land use and economic and social development; and

WHEREAS, state and local governments now shoulder most of the responsibility for implementing environmental protection programs, particularly those mandated by the federal government;

NOW, THEREFORE, I Thomas J. Ridge, Governor of the Commonwealth of Pennsylvania, by virtue of the authority vested in me by the Constitution of the Commonwealth of Pennsylvania and the laws of the Commonwealth, do hereby establish the **21ST CENTURY ENVIRONMENT COMMISSION**, as hereinafter set forth:

1. Mission. To recommend methods and policies to improve the environmental quality of the Commonwealth and measure the results, while allowing for enhanced economic and social progress.

2. Functions. The functions of the 21st Century Environment Commission shall be to:

a. Recommend environmental priorities as we enter the next century guided by the principle of providing a better environment for future generations without inhibiting their ability to prosper.

b. Propose strategies to meet the environmental priorities. Strategies should incorporate the most cost effective approaches founded in good science, considering all levels of government, institutions and the private sector, including proposed legislative and regulatory changes.

c. Propose evaluation criteria by which to measure progress toward the established environmental goals. Initiate an annual environmental report card using scientifically valid environmental indicators.

d. Involve the citizens of the Commonwealth during the completion of the above tasks.

3. Composition of the Commission.

a. The Commission shall consist of no more than 40 members, including environmental, business, academic, elected officials, government and community leaders, who are appointed by and serve at the pleasure of the Governor. The Majority and Minority leaders of both chambers of the General Assembly shall each provide a list to the Governor of eight candidates and the Governor shall appoint four members of the Commission one from each list.

b. The Governor will designate two members to serve as co-chairpersons.

c. Each Commissioner may designate a person to represent him or her on the Commission.

d. Eleven of the members will serve *ex officio*. These *ex officio* members will be the Governor's Director of Policy, the Secretaries of Agriculture, Community and Economic Development, Conservation and Natural Resources, Environmental Protection, Health, and Transportation, and four legislative members.

4. Terms of Membership.

a. Members shall be appointed for terms commensurate with the life of this order. All members shall serve at the pleasure of the Governor.

b. Should a vacancy occur on the Commission due to resignation, disability, or death of a member, the Governor shall appoint a successor as expeditiously as possible and the successor shall serve the duration of the unexpired term. A successor so appointed may thereafter be reappointed.

5. Compensation. Members of the Commission shall receive no compensation for their service, except that such members may be reimbursed for actual travel and related expenses in accordance with the Commonwealth Travel and Subsistence Regulations.

6. Reports. The Commission will issue a final report which will be presented to the Governor on or before September 15, 1998, and will include environmental goals, recommended strategies for implementation, and environmental indicators.

7. Meetings and Communication. The Commissioners will meet on a regular basis during the life of the Commission. In addition, the Commission shall inform the public of the Commission's activities and solicit advice and direction by holding forums around the Commonwealth and through the use of the Internet. The Commission may appoint such advisors or advisory committees, from within or outside the Commonwealth, as it deems necessary to accomplish its objective.

8. Executive Agencies. All agencies under the Governor's jurisdiction shall cooperate with and provide assistance as needed by the Commission in performing its functions. The Commission will receive administrative services from the Department of Environmental Protection and will be served by an Executive Director employed by the Department of Environmental Protection.

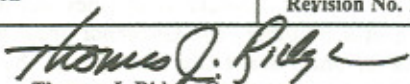
9. Effective Date. This Executive Order shall be effective July 1, 1997.

10. Termination Date. This Executive Order shall terminate on December 31, 1998, unless reestablished or sooner rescinded.



Commonwealth of Pennsylvania
 GOVERNOR'S OFFICE

EXECUTIVE ORDER

Subject: The 21st Century Environment Commission		Number: 1997-4 Revision No. 1
Date: September 9, 1997	Distribution: B	By Direction Of:  Thomas J. Ridge, Governor

The Secretary of Education and the Commonwealth's Physician General are being appointed as *ex officio* members of The 21st Century Environment Commission. Therefore, Section 3., paragraph d. of this order is replaced by the following:

d. Thirteen of the members will serve *ex officio*. These *ex officio* members will be the Governor's Director of Policy, the Secretaries of Agriculture, Community and Economic Development, Conservation and Natural Resources, Education, Environmental Protection, Health, and Transportation, the Physician General, and four legislative members.





Implementation Options by Category

Traditional Governmental Role		Enterprise Role		Knowledge Building Role	
<p>Regulation</p> <p>Legal rules and sanctions</p> <p>Regulation and deregulation</p> <p>Monitoring and investigations</p> <p>Licensing</p>	<p>Fees/Taxes/Incentives</p> <p>Tax policy</p> <p>Sales tax revenues</p> <p>Fuel tax revenues</p> <p>Ad valorem property taxes</p> <p>Grants</p> <p>Subsidies</p> <p>Loans</p> <p>Loan guarantees</p> <p>Traditional municipal general obligation bonds</p> <p>Pooling of communities' debt for credit enhancement/small community bond bank</p> <p>Extension of maturity of state revenue bonds to reduce annual debt payments</p>	<p>Partnerships</p> <p>Contracting</p> <p>"Traditional" revenue bonds</p> <p>Franchising</p> <p>Mini-bonds for stream restoration</p> <p>Special service assessment districts</p> <p>Watershed improvement districts</p> <p>Stormwater management utility (also property right)</p> <p>Development Permit (land dedication)</p> <p>Land re-adjustment through Joint venture partnerships</p> <p>Land Donation or exchange</p>	<p>Property Rights</p> <p>In-lieu or impact fees (developer and mitigation fees)</p> <p>Recreation fees</p> <p>Annual user fees for the depletion/degradation of aquifer</p> <p>Effluent trading</p> <p>Establish wetland mitigation banks for wetland restoration at state and local level</p> <p>Establish Forest mitigation banks at state and local level</p> <p>Tree and wetland planting for air quality credits</p>	<p>Education</p> <p>Information</p> <p>Operations assistance</p> <p>Technical assistance</p>	<p>Research</p> <p>Information</p> <p>Create an endowment fund for environmental protection and restoration</p>
	<p>Lawn and garden fertilizer surcharge</p> <p>Procurement</p> <p>Rewards</p> <p>Changing public investment policy</p> <p>Apply community re-investment act requirements for local investment to environmental projects such as tree planting, stream restoration, stormwater retrofits, etc.</p> <p>Increase cost-share cap for livestock waste storage</p>	<p>Purchase of environmental easement by the private sector</p> <p>Purchase Development rights</p> <p>Public-private partnerships</p> <p>Public-public partnerships</p> <p>Quasi-public corporations'</p> <p>Public enterprise</p>			

Appendix 2

Implementation Options by Category

	<p>Use federal or state housing grants to finance public sewer extensions to areas with failing septic systems</p> <p>Expand tax deduction for conservation tillage and animal waste handling equipment to include other environmental equipment</p>			
	<p>Buffer incentive programs</p> <p>Full-cost pricing for service fees</p> <p>One-time septic tank system installation fee</p> <p>Environmental Trust Fund</p> <p>State Revolving Funds seeded from the state</p> <p>Extension of SRFs for private sector</p> <p>Allow individual property owners to receive loans for erosion control without being required to join a designated district</p> <p>Insurance</p> <p>Surcharge on prepared food and beverages</p> <p>Pollution charges</p>	<p>Multiple-owners specific plan (open space land dedication financed by open space assessments or impact fees)</p> <p>Public-private partnerships for financing wastewater treatment plant upgrades</p> <p>Green Seal Fee</p> <p>Require nutrient management plans on all State Agricultural land preservation easements</p> <p>Develop local agricultural area cooperatives on a watershed basis to assist farmers in financing activities resources</p> <p>Insurance</p> <p>Privatization</p> <p>Operations assistance</p>	<p>Transferable development credits (negotiated)</p> <p>Tradable conservation credits</p> <p>Transferable development credits (by ordinance)</p> <p>Develop a sustainable currency program for cross-media trading</p> <p>Purchase of environmental easement by the private sector</p> <p>Purchase Development rights</p>	
	<p>Tax Increment Financing (value capture)</p> <p>Special Congressional or state appropriations</p>			

Appendix 3

Ten Notable Initiatives with Example of Possible Actions

Introduction and Explanation of 21st Century Environment Commission Chart of Ten Examples of Possible Actions

Pennsylvania has a magnificent environmental heritage: vast forests, rich agricultural land, three major river systems and a wealth of wildlife. Shortsighted practices in resource extraction and release or improper disposal of industrial, agricultural and municipal wastes have threatened that heritage. While great strides have been made in addressing the sources of air and water pollution through traditional regulatory techniques, much remains to be done to address old damage such as acid mine drainage and to meet new challenges to our heritage such as urban sprawl. Moreover, the larger challenge is to move away from the past pattern of damage and (incomplete) repair to a new pattern of sustainable environmental practices. Our mining, forestry, agricultural and industrial practices and the growth and life of our communities must sustain our environmental heritage.

To move to a new era of sustainability, the Commonwealth must play new roles. It must refine and refocus its traditional governmental roles as a regulator and shaper of tax policy. It must learn to play new roles as a partner and facilitator for private enterprises and initiatives that build sustainable practices. In addition, it must promote and finance research and education that support its other roles.

The following table is intended to illustrate actions the Commonwealth can take to build a sustainable environmental future. The left hand column, headed "Initiatives," presents ten broad initiatives that are intended to summarize the 25 priority recommendations of the 21st Century Environment Commission. The columns to the right give examples of specific actions the Commonwealth can take on each of these initiatives. The examples are divided in columns corresponding to the different roles that the

Commonwealth can play to illustrate both the nature of those roles and the exciting possibilities as government seeks to be less commanding and more steering and integrative. Education appears not only as examples of actions to support other initiatives but also as an initiative itself to build the institutions and programs that will provide the support.

Finally, the examples in the Chart are just that, examples. Working towards a sustainable future deserves and needs all of our best ideas. The overarching role of the Commonwealth is to sustain a dialog and provide support which allows new ideas to be brought forth and nurtured to fruition.



Ten Notable Initiatives with Examples of Possible Actions

Initiative	Traditional Governmental Role		Enterprise Role		Knowledge Building Role	
	Regulation ¹	Fees/Taxes/Incentives ²	Partnerships ³	Property Rights ⁴	Education	Research
1. Education/ Environmental Stewardship		Partial tax credit for endowment (see Partnerships)	Start a program for businesses to endow chairs in environmental studies and land use at universities in PA.		website.id. product alternatives with environmental impact	
2. Clean Business	“One stop shopping” permit approach — a single application for all approvals for an activity or project Blanket permit for process use statewide	Target existing incentive programs to clean businesses	ISO 14000 certification program for PA businesses. Public investment policy reflecting environmental goals.	Allocate tradable pollution credits for clean job creation.	Environmental product labeling for commercial products	
3. Eliminate Sprawl	Amend Municipalities Planning Code to require that local plans and applications be consistent with regional plans.	Provide funding and aid conditioned upon municipality’s agreeing that its local plan and applications be consistent with regional plans.	Create service districts where centralized utilities and transportation are available and tax exempt financing can be obtained, conditioned upon development being centralized according to a regional plan.	Create transfer development rights that can be traded among municipalities and are governed by regional plans.	Facilitate education of local officials on opportunities and advantages of joint planning under the existing municipalities’ planning code.	
4. Reduce Contamination	Regulate rates of fertilizer application. Enact a “toxic catastrophe” type statute requiring planning, with release reduction requirements.	Create state authorities to construct pollutant reduction projects to facilitate tax exempt financing that might be unavailable today. Tax on lawn and garden fertilizer. Taxes on all pollutant emissions.	Public/private partnerships for water, wastewater utilities	Tradable pollution credits		Finance research necessary to support inter-pollutant trading mechanisms.

Ten Notable Initiatives with Example of Possible Actions

Appendix 3

5. Acid Rain Reduction	<p>Lower emissions limits for acid gas precursors.</p> <p>Enhance enforcement of existing limitations for acid gases.</p> <p>Regulate unregulated sources of acid gas.</p>	<p>Tax on acid gas emissions.</p> <p>Subsidies for solar, nuclear and other forms of non-acid gas means of generating energy.</p> <p>Tax on fertilizer production</p> <p>Tax on acid gas-generating fuels</p>	<p>Provide partnerships for construction on non-acid gas generating means of power production.</p> <p>Create public and private partnership for companies installing insulation, passive solar and other mechanisms to reduce burning of fossil fuels.</p>	<p>Current SO₂ trading program</p> <p>Create NO_x trading program</p> <p>Add additional sources to current trading program</p> <p>Create mechanism for trading between precursors (e.g., NO_x-SO₂ exchange)</p>	Provide information on methods to reduce acid gas generation.	<p>Fund research on sources of acid gas.</p> <p>Fund research on appropriate exchange rate among acid gases.</p>
6. Acid Mine Drainage		<p>Partial funding for cleanup</p> <p>Provide density bonuses and periods of tax free use (similar to those used in empowerment zones) of properties that are cleaned up and put into productive use.</p>	<p>Public cleanup districts eligible for tax-exempt financing with private operation, landowner partnerships.</p> <p>Provide mechanisms for construction of bogs and maintenance as park or recreation areas.</p>	<p>Give full release from state liability after agreed ameliorative steps at change of use.</p> <p>Create a pollutant trading scheme on a watershed by watershed basis that would create discharge credits for those who reduce acid mine drainage through reclamation.</p>	Provide landowners with information on uses of land which could reduce acid mine drainage.	Quantify problem and study possible solutions
7. Agriculture and Forestry		Tax exempt bond pool for capital cost of innovative agricultural waste management.	Public/private partnerships for management of forest and recreational areas.	Carbon Bank — permanent (rentable) rights rather than one time sale of development rights.		



Ten Notable Initiatives with Examples of Possible Actions

Initiative	Traditional Governmental Role		Enterprise Role		Knowledge Building Role	
	Regulation ¹	Fees/Taxes/Incentives ²	Partnerships ³	Property Rights ⁴	Education	Research
8. Comprehensive Watershed Management	Require TMDLs on a watershed by watershed basis and apply requirement to non-point sources, including existing land uses.	<p>Provide a dedicated source of revenue for Watershed-based planning groups to provide local incentives.</p> <p>Provide tax exemptions for streambeds and other areas which are restricted against development and reforested.</p> <p>Provide tax credits for reforestation of stream banks, critical recharge areas and highly erosive areas. The availability of tax credits would be conditioned upon the development of plans identifying the critical areas within the watershed.</p>	<p>Create public-private partnership for ownership and management of stream edge, highly erosive and critical recharge areas for recreational purposes.</p> <p>Create partnerships between water companies and land owners who own critical areas that would protect or enhance the quantity and quality of water used by the water companies.</p>	<p>Provide for pollutant trading on a watershed basis, based on TMDLs for that watershed.</p> <p>Tradable credits for development that can arise from providing for other desired uses: e.g., stream buffers or recreational set asides.</p> <p>An alternative program for water rights could be created. For example, a landowner might create credits for activities enhancing water quality or quantity and companies or municipalities withdrawing water from within the affected watershed would be required to "purchase" those credits when using the water.</p> <p>Withdrawal permits could be conditioned upon the water company "purchasing" recharge and water quality credits from landowners who restrict land uses to promote water quantity and quality protection.</p>	<p>Provide educational programs for planners to identify critical areas.</p> <p>Educate the public on importance of stream edge areas, erosive areas and recharge areas.</p>	Fund research on effects of pollutants, including synergistic and ecosystem effects, to allow development of TMDLs.

Ten Notable Initiatives with Example of Possible Actions

Appendix 3

<p>9. Preserve Environmental Diversity</p>	<p>Require that the habitat of rare threatened or endangered species be preserved in public actions.</p> <p>Condition development approvals on habitat preservation.</p> <p>Prohibit sustenance or propagation of harmful invasive species.</p>	<p>Provide tax reductions for habitat preserved to conserve rare threatened or endangered species.</p> <p>Provide opportunity to trade existing state lands for valuable private lands</p>	<p>Allow inter-local trade-offs for siting undesirable land uses as Act 101 does for waste disposal</p> <p>Public/private partnerships for management of state recreational and forest areas or private areas.</p>	<p>Create a habitat trading bank, tied to transfer development rights, whereby valuable habitat which is preserved would create credits to increase density in other parts of the state. The increased density would be allowed in areas consistent with statewide or regional plans.</p>	<p>Create educational programs for local engineers on habitat types of importance and methods for their preservation in land planning.</p>	<p>Develop and inventory of important natural areas.</p> <p>Fund research on invasive species and their effects.</p>
<p>10. Brownfields</p>		<p>Partial funding for cleanup</p> <p>Provide density bonuses and periods of tax free use (similar to those used in empowerment zones) of properties that are cleaned up and put into productive use.</p>	<p>PA sponsored insurance for residual federal law risk</p>	<p>Give full release from state liability after agreed cleanup.</p>	<p>Promote areas with brownfield sites</p> <p>Provide information on Act 2 and other existing state programs.</p>	

- ¹ Use of laws, regulations, and permits to define norms of behavior enforced with civil and criminal sanction.
- ² Use of tax policies, fees and subsidies to discourage less desirable behavior and to encourage desirable behavior.
- ³ Cooperative ventures involving government entities, private entities and not-for-profit entities to encourage private entities to undertake traditional government functions or desirable projects to improve the environment.
- ⁴ Creation of property rights to create market for "free common goods," such as clean air, clean water or open space, to allow compensation to be provided to those who preserve or create the goods.

Sustainable Community Information

Sustainable communities are counties, cities, towns, boroughs or municipalities that are doing well — socially, economically and environmentally — because people in these communities work together to forge a quality of life that they want to sustain and improve. A sustainable communities approach is therefore much broader in its focus than the specific assistance recommendations contained in Chapter III Promoting Responsible Land Use.

U.S. cities with advanced local sustainable communities programs as of 1997 include: Albuquerque, NM; Austin, TX; Berkeley, CA; Boston, MA; Boulder, CO; Burlington, VT; Chattanooga, TN; Grantsville, UT; Miami-Dade County, FL; Mount Washington Valley, NH; Olympia, WA; Canonsburg, MO; Portland, OR; San Francisco, CA; San Jose, CA; Santa Cruz County, CA; Santa Monica, CA; Seattle, WA; Sherwood, OR; T. Jefferson Regional Planning District, VA; Tucson, AZ; and Wayne County, NY. In addition dozens of other communities have implemented some aspects of a sustainable communities program.

National funding sources to support the development of sustainable communities programs include:

- EPA's Sustainable Development Challenge Grants Program provides up to \$250,000 per community to support sustainable development programs;
- Public Technology, Inc support for planning sustainable communities;
- EPA's Partnership for Environmental Research funds research topics in the range of \$60,000 to \$300,000 for two-to-three years.

There are also significant technical and training resources available that support sustainable community work including:

- U.S. EPA's Office of Sustainable Ecosystems and Communities (community planning and management guides, ecosystem planning and protection);
- U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy;
- U.S. Department of Energy's Center for Excellence for Sustainable Development
- U.S. Department of Housing and Urban Development's Roadmap of Adopting Local Community Sustainable Development Strategies;
- Joint Center for Sustainable Communities, a program of the National Association of Counties and United States Conference of Mayors (publications, training, awards, peer matching, codes, ordinances, and sustainability agreements)
- Public Technology Inc. (training, publications)
- The United States Local Sustainability Project , International Council of Local Environmental Initiatives (information, publications, website linking to worldwide sustainable community programs)
- Center for Livable Communities of the Local Government Commission (information and publications)
- Global Cities Project (handbooks on water efficiency, energy, solid waste, urban forestry, toxics, water quality, transportation, air quality, open space, land use)
- Community Indicators Network (community indicators training and publications)
- Rocky Mountain Institute (Economic Renewal Guide)

Glossary

Acid Mine Drainage (AMD) — Water contaminated with sulfuric acid caused by mineral deposits containing sulfur being exposed to air or water during mining operations.

Airshed — A geographic area that shares the same air mass.

Aquatic Biological System — The community of life including plants, animals, fungi, and microorganisms occupying any aquatic habitat.

Atmospheric Deposition — The depositing of airborne contaminants on water bodies, structures and land.

Attainment — The act of reaching a goal or threshold. Attainment of a particular standard is met when the level of air pollution in a representative sample meets health-based standards for that pollutant.

Beneficial Use — Placement or utilization of waste material for some productive purpose as opposed to being disposed of in a landfill.

Best Management Practices — A series of practices and management techniques designed to control point and non-point pollution.

Brownfield — Property that has been taken out of productive use as a result of actual or perceived risks from environmental damage.

Concentrated Animal Feeding Operation (CAFO) — Relatively small confined area where large numbers of animals are housed before being sent to market.

Conservation Easement — A legal agreement between a landowner and a land trust where landowners voluntarily restrict the type and amount of development that may take place on their property without giving up ownership of the land.

Environmental Justice — Ensuring equal protection under all environmental statutes and regulations for all citizens without regard to race, ethnicity, and/or socioeconomic status.

Eutrophication — The natural and artificial addition of nitrogen and phosphorous to bodies of water, often to the extent that dissolved oxygen is decreased, as is the capacity of the water to support animal life.

Fossil Fuel — Natural gas, petroleum, coal, and any form of solid, liquid, or gaseous fuel derived from such materials for the purpose of creating useful heat or energy.

Geographic Information Systems (GIS) — A computer system for capturing, storing, checking, integrating, manipulating, analyzing and displaying data related to positions on the Earth's surface.

Greenfield — Land that has not been previously used for industrial purposes.

Ground-Level Ozone — Sometimes referred to as smog. A type of air pollution formed when hydrocarbons (VOCs) and nitrogen oxides (NO_x) bake in the sun. These gases come primarily from the burning of fossil fuels.

Ground Water — Subsurface water that fills available openings in rock, aquifers, or soil materials to the extent that they are considered water saturated.

Habitat — The native environment or specific surroundings where living things naturally grow or live. These surroundings include physical factors such as temperature, moisture, and light together with biological factors such as the presence of food or predator organisms.

Holistic — Relating to the study of complete living systems, rather than their component parts in isolation.



Natural Diversity — Plants, animals, fungi and microorganisms that make up the web of life and that work together to maintain the vital processes and products that sustain all life on Earth.

Natural Resource — A material source of wealth, such as timber, fresh water, or a mineral deposit, that occurs in a natural state. Natural resources are considered nonrenewable when they do not naturally replenish themselves within the limits of human time or renewable when they are more or less continuously replenished in the course of natural events within the limits of human time.

Nitrogen Oxides (NO_x) — Gases created during the burning of fossil fuels from atmospheric nitrogen and oxygen. Nitrogen Oxides are smog formers, which react with volatile organic compounds to create ground-level ozone.

Non-point Source — Causes of water pollution that are not associated with point (fixed) sources. Non-point sources include runoff from agricultural, urban, construction, and mining sites, as well as septic systems and landfills.

Particulate Matter — Any airborne material with a diameter smaller than 100 micrometers.

Point Source — Stationary location where pollutants are discharged, usually from industry or municipal sewage facilities.

Remining — The process of extracting additional minerals from a previously mined site.

Restoration — The act or process of bringing something back to a previous condition or position. For example, the establishment of natural land contours and vegetative cover following extensive degradation of the environment caused by activities such as Surface Mining. Under this condition, the term is used interchangeably with Reclamation.

Riparian Buffer — The land that borders and interacts with a river, stream, lake, or coast.

Runoff — Water that is carried off an area by streams and rivers after having fallen as precipitation; the water itself; also, water that runs straight off the ground without first soaking into it.

Sentinel Diseases — A set of conditions that can be used to gauge the stability or change of health levels of a population, usually by monitoring morbidity or mortality statistics.

Sprawl — A spreading, low-density, automobile dependent development pattern of housing, shopping centers, and business parks that wastes land needlessly.

Stewardship — The careful and responsible management of something entrusted to one's care.

Sustainable Development — To meet the needs of the present without compromising the ability of future generations to meet their own needs.

Sustainable Yield — The withdrawal or use of a resource at such a rate that is consistent with its natural growth rate.

Transfer of Development Rights (TDR) — A land use zoning technique used to preserve public resources, such as open space, farmland, historical landmarks, and environmentally sensitive lands. A person who wants to preserve land can sell the development rights to a developer who, by purchasing these rights will then be permitted to develop above the density currently permitted in another area.

Transport — To carry particles or dissolved substances, in this context by air, from one geographic location to another.

Watershed — Land area that drains into a stream, river, or lake.

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Membership (continued)

Alternates to Commission Members

Dr. Edward Bellis, Pennsylvania Trout Unlimited, Environmental Committee
Lou Biacchi, Director of Governmental Affairs, and Megan Milford, Regulatory Specialist,
Pennsylvania Builders Association
Elmer Bloom, U.S.W.A., Local 1557, U.S. Clairton Steel Works
Karl Brown, Executive Director, State Conservation Commission
Joanne Denworth, President, Pennsylvania Environmental Council
David M. DeSalle, Ryan, Russell, Ogden & Seltzer LLP
Rusty Diamond, Vice President, CH2M Hill
George Ellis, President, Pennsylvania Coal Association
J. Andrew Hadley, Environmental Manager, Procter & Gamble
M. Abraham Harpster, Evergreen Farms, Inc.
Elam Herr, Director of Legislation, Pennsylvania State Association of Township Supervisors
Joel H. Hersh, Director, Bureau of Epidemiology, Department of Health
Terry Kauffman, Chairman, Lancaster County Commission
Wayne Kober, Director, Bureau of Environmental Quality, Department of Transportation
Andrew McElwaine and R. John Dawes, Howard Heinz Endowment
Bernard McGurl, Executive Director, Lackawanna Corridor River Association
Tim McNulty, Executive Deputy Secretary, and Georgia Masters, Executive Policy Specialist,
Department of Community and Economic Development
A.E. (Gus) Moffitt, Jr., Senior Vice President & Chief Administrative Officer, and William Riley,
General Manager, Env. Affairs, Safety, Health & Environment, Bethlehem Steel Corporation
Marci Mowery, Pennsylvania Director of Population and Habitat Campaign, National Audubon Society
Dr. Larry A. Nielsen, Professor and Director, School of Forest Resources, Penn State University
Dennis W. Okorn, Vice President, GAI Consultants
Patrick K. O'Neill, Deputy City Solicitor, City of Philadelphia
John Padalino, President, Pocono Environmental Education Center
John Plonski, Executive Deputy Secretary for Parks and Forestry, Department of Conservation and
Natural Resources
Ronald L. Ramsey, Senator Musto's Office
Lynn I. Ratzell, Manager, Environmental Management Division, Pennsylvania Power & Light Company
Jill Schwartz, Mid-Atlantic Field Director, American Farmland Trust
Dr. Donald F. Smith, Jr., Executive Director, Center for Economic Development,
Carnegie Mellon University
Charles Spano, Director, Bureau of Community and Student Services, Department of Education
Dr. Bernard Sweeney, Academy of Natural Sciences, and Vice President of Environmental Group
and Director of Stroud Water Research Center
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