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The Commission on Maine's Future

Working Papers For Maine's Future

RESEARCH REPORTS OF THE SUBCOMMITTEES OF THE COMMISSION ON MAINE'S FUTURE

September, 1989

INTRODUCTION

In June, 1988, after seven months of preliminary study and discussion, the Commission on Maine's Future organized itself into a structure of working subcommittees to direct the research that underlies the Commission's final report. Six subcommittees were defined by subject area: Technology, Education, Natural Resources and the Environment, Global Issues, Government, and Demographics.

Each subcommittee was given the authority, scope and resources to investigate a field of interest according to the best judgement of its members. Each subcommittee developed its own research plan, hired staff or consultants, commissioned specialized studies, debated findings and recommendations and prepared a report for the full Commission. As an integral part of their research, a number of the subcommittees held meetings, hearings or conferences with experts, scholars and members of the public.

In December, 1988 and January, 1989, each subcommittee presented a draft of its findings and recommendations at a series of three meetings of the full Commission on Maine's Future. The draft reports were discussed, challenged, debated and appended by the full Commission, which charged the subcommittees to conduct additional research, to refine their presentations and to prepare final versions of their reports. The reports were again presented to the full Commission for discussion and debate during March and April of 1989. During the following months, the data, findings, options, strategies and recommendations developed in the subcommittee reports were drawn upon again and again as the Commission crafted its own report to the Governor, the Legislature and the people of Maine.

This publication, *Working Papers for Maine's Future*, presents to the general public the reports of five of the subcommittees as they were presented to the Commission on Maine's Future. It presents, as well, three related studies commissioned by individual subcommittees to supplement their own research. One report, that of the Subcommittee on Demographics, was expanded under the auspices of the full Commission and has been published separately under the title *Maine's Changing Face.*

With the publication of these working papers, it is the intention of the Commission on Maine's Future to make available to a wider public, the full range of information and policy options that formed the basis of our final report. Without the work and dedication of the individual commissioners who contributed to these studies, the Commission's own report, *Maine at the Millennium*, would not have been possible.

THE FLIGHT OF THE ARROW OF CHANGE:

TECHNOLOGY AND MAINE'S FUTURE

THE REPORT OF
THE SUBCOMMITTEE ON TECHNOLOGY
TO THE
COMMISSION ON MAINE'S FUTURE

April, 1989

THE ARROWS OF TIME

The increase of disorder or entropy with time is one example of what is called an arrow of time, something that distinguishes the past from the future, giving a direction to time. There are at least three different arrows of time. First, there is the thermodynamic arrow of time, the direction of time in which disorder or entropy increases. Then, there is the psychological arrow of time. This is the direction in which we feel time passes, the direction in which we remember the past but not the future. Finally, there is the cosmological arrow of time. This is the direction of time in which the universe is expanding rather than contracting.

Physicist Stephen W. Hawking
"A Brief History of Time"
Bantam Books, 1988, at pg. 145

Maine Arrows of Time

"All technology does is enhance what people do. In our mill, laser beams or photo lights measure a log and send an image back to the computer. The computer goes through myriads of calculations and decides how that piece of wood should be sawed in order to produce the best and most lumber out of that log. The same job can be done by a person, but not as well, as accurately, or as fast."

-- Kenneth Hodsdon, Pinkham Lumber, Ashland

"Just walk into some textile mills. Even if you're not a textile expert, you can see the difference between the brightly lit mills operating with new equipment and the ones that look like dungeons, where the equipment is 50 years old. Those old plants are in low-margin fields; they can't afford to modernize."

-- Shaun Flatley -- Maine Textile Council Executive

"Technology changes the definition of good medical care."

-- Kala Ladenheim, Executive Director,
Maine Health Policy Advisory Council

"It's scary. European machine tool producers sell more sophisticated tools in Europe, where there are more skilled workers, craftspeople.

-- Ivan Most, Production Technology Center,
University of Southern Maine

"In today's environment, instead of looking at the machine, you look at a computer screen. The computer gathers information from sensors. You have to be comfortable with computer screens, and be able to understand graphic arrays and flow charts, and from them visualize what's happening at the machine."

-- Bruce Curley -- Maine Paper Industry Executive

"One of the things that surprises me most when I go into industries is how crudely some manage their technology. Buying a new machine that's state-of-the-art is fairly simple; getting people in management who know how to use the machine in conjunction with other machines and with people is much more difficult."

-- John Zaner, School of Applied Science,
University of Southern Maine

FOREWORD

We submit this report for consideration by the full membership of the Commission on Maine's Future. The report is the work of the Subcommittee and its consultant, Lisa Derman, and is intended to help the Commission envision a future which is both desirable and achievable by the people of Maine. The report has all the strengths and weaknesses of any committee report. If its conclusions are incorrect, and some probably are, it is our intention to provoke revelation of the correct conclusions. If some conclusions are correct, and some probably are, the purpose is not merely to be correct but, also, to help guide the public policy of Maine to the creation of a better future.

Members of the Subcommittee were: The Honorable John Baldacci, Bangor; Tony Buxton, Chair, Portland; Rosemarie Butler, Lewiston; Dori Corliss, Dover-Foxcroft; Bradford Payne, Lincolnville; Lisa Derman, Subcommittee Consultant, Portland; John Piotti, Albion, Advisor from the Maine Commission on Science and Technology.

We thank the scores of Maine people who contributed directly to this report, as well as the hundreds more who contributed indirectly, for their perceptions, recommendations and hard work.

INTRODUCTION

The Technology Subcommittee of the Commission on Maine's Future was asked by the Commission to investigate the role technology will play in the creation of Maine's future. In the course of our several months work, it was a premise of our investigation that technology is a force which will strongly influence Maine's future. Some of those with whom we discussed technology, however, raised the interesting question of whether technology is a force or merely a tool. The answer to this question has consequences for Maine. If technology is a tool, for example, some will argue that most necessary regulation can be provided by the free market. If technology is more a force than a tool, society may desire to regulate technology affirmatively, as it does other forces.

We believe that technology is properly considered a tool, and more than a tool. Technology is one means or device to achieve personal or societal goals. In our view, however, technology also includes our desire to use tools, our sense of the usefulness or promise of tools and the physical and societal consequences of reliance or dependence on or enjoyment of the use of tools. When a new tool is developed and used, it becomes part of our environment, conditioning the way we behave, and even changing our perceptions. Our acceptance of the automobile, for example, changed the structure of our cities and towns, altered our perceptions of distance, and modified our views as to the meaning and relative importance of convenience and scenic value. In recent years, the computer has incited a similar revolution in our thinking. We now expect as a matter of course to receive instantaneous answers to complex questions. Similarly, the widespread use of fax machines and modems has made distance increasingly irrelevant.

Further, while societal trends may be easily confused with the technology used to implement societal desires, technology is virtually impossible to distinguish from some societal trends. Waste incineration, for example, was developed as a technological solution to the exponential increase in and environmental complexities of the waste stream. The effectiveness of waste incineration as a technology affects the cost of the production of waste, and thereby, the cost of consumption. Moreover, the technology is controversial for more than technological reasons: use of the technology exacerbates the problem of misallocation of the costs and benefits of waste production. As society deals with the

impacts of incineration, it is proper to focus on both the technology and the purposes to which it is put.

Having completed the preparation of this report, the Subcommittee is convinced that the initial Commission conclusion was correct: technology is a powerful force shaping Maine's future. More importantly, the Subcommittee is convinced that, by treating technology as a force, both individuals and society will achieve a level of sophistication in technological decision making which will improve life in Maine. This level of sophistication will not be reached if we consider technology to be merely a tool. The quality of life in Maine will diminish if we do not begin immediately to fully assess the long-term implications of the decisions we make about the uses of technology.

The preparation of this report has been difficult for us, for much of our work and discussion has been devoted to efforts to perceive and describe the peculiar dualism of technology: the ability of technological change to be simultaneously positive and negative for society. To better capture the essence of our perceptions, this report contains views of technology from different perspectives, rather than the more traditional, sequential analysis of a stated problem or question.

Our study of technology has made us more acutely aware that no one can view the future: the arrow of time flies before us, not toward us. By reviewing the present uses of technology in Maine, however, and by assessing the impacts of both uses and changes of use, we may perceive trends in the flight of the arrow of technological change. Accurate perception of trends in the demand for technology, the development of technology and the impacts of its use will help us to control events, and thereby, to influence Maine's future.

I.
TECHNOLOGY SNAPSHOTS:

A MAINE FAMILY ALBUM

On the main street of a Maine mill town, members of the United Paperworkers International Union stand stiffly in the cold wind of a winter afternoon, resolute pickets in a long and bitter labor dispute. Within the pulp mill, where wood chips are transformed into wet pulp by application of great amounts of heat and chemicals, two management employees sit with a replacement worker before the control panel which commands the pulp mill. Outside the control room, the pulp mill throbs like a huge prehistoric creature, all the more animated by the absence of human presence. The three men in the control room collaborate on how to handle a malfunctioning pump, using a Japanese consensus building technique taught in company seminars. To implement their decision, one team member touches a computer screen repeatedly with his forefinger, each touch raising greater schematic detail of the pulp mill until the pump appears sizably on the screen, color-coded to show temperature, flow and pressure. With another touch, the pump is shut off and a backup activated. Only one of the three has ever seen the pump. None has touched it.

As the shift starts to change, the town police cruiser arrives to keep union members and replacement workers separated. Despite the police presence, replacement workers and union members exchange angry shouts. When the mill gate closes on the shift change, the pickets exchange anxious glances. One more shift of production is underway aided by non-union workers from Maine and many other states.

* * *

In an office in Augusta, a young attorney glances at the computer screen on her desk and types the final paragraphs of a legal brief. Inputting the proper codes, she orders the word processor to check each word in the twenty-page document for spelling, set the margins, prepare a table of contents and print the brief. The document prints in a few

minutes. Placing the original in the facsimile machine on the desk outside her office, she dials the facsimile telephone number of her client and conveys a copy of the brief electronically to his office in Texas. Retrieving the original, she places it and fourteen copies with a cover letter to the receiving federal agency in Washington, D.C., in a Federal Express envelope in the firm's mail room. The overnight package will arrive at the federal agency the next morning. Having completed her work for the day, the attorney goes into a meeting with the office manager to discuss her need for affordable, on-site child care.

* * *

In eastern Maine, a nine-year old boy, just home from school, contemplates his choices to pass the afternoon until his mother returns from work: a quick ride on the all-terrain vehicle, a NINTENDO computer game played on the screen of the television set, or television. As he thinks, he presses hard on the channel button of the remote control, flipping his way through the hundreds of channels provided by his family's satellite disk television system. Passing by live coverage of a debate in the United States Congress, a fire in Chicago, pre- recorded local City Council meetings, a man and a woman making love on a cabin cruiser, innumerable pre-recorded sports events, including an old Roller-Derby show, a few westerns and several space-age, laser-filled cartoons, he settles on a rerun of Lassie, filmed in 1958, and broadcast by an Atlanta, Georgia, television station. He looks wistfully out the window, wishing he had a friend with whom he might play. At the supermarket, his mother selects several microwave dinners for her family. Minutes before, she has left her job as a nurse at a small textile company. She is pleased that she regularly works the day shift now that she has left her hospital job, and she is eager to see her son.

* * *

In a Portland hospital, a young couple from northern Maine, accompanied by the young man's elderly parents, peers through the glass into the neonatal intensive care unit at their infant child, who is barely moving and who bristles with life-support systems. A doctor explains that the child's prognosis, while still guarded, improves each hour. The air ambulance gave the doctors the chance, and the availability of a new antibiotic, coupled with more sensitive monitoring equipment, may make life possible for the child. Cost is far from the young couple's minds, even though they are uninsured and have few assets. The couple prays and silently wonders if their choices have been right, or even fully theirs.

The grandfather wonders how his son will support his family if recovery is only partial, now that his small sawmill has closed, another victim of subsidized Canadian competition. If their prayers are answered, if the physicians have properly used their medical skills, and if the hospital has selected the right combination of human and technological excellence, the infant may be expected to live to nearly eighty years of age.

* * *

In a southern Maine suburb, an insurance executive leaves his ranch-style home with a briefcase in one hand and two trash bags in the other. The bags, to be deposited at the end of his driveway for weekly trash pickup, contain a large number of diapers soiled by his twin boys. The diapers are wrapped in several bags, to avoid exposure to the crew of the trash truck and possible citation for violation of the municipal ordinance which prohibits the disposal of human waste. Although the town sends its trash to a new waste incinerator, the incinerator was filled to capacity from the day it opened, due to rapid population growth in southern Maine, and now rejects certain kinds of trash. Having no other options for waste disposal, and no desire to use cloth diapers, the executive risks the fine and drives off to work.

At the same moment, in a northern Maine community, a former insurance executive climbs into his pickup and heads toward the school gymnasium where the state environmental hearings will begin today on the application by a southern Maine trash incineration company to build a secure landfill for ash from its incinerators and for waste from local communities. The bed of his pickup is covered with handpainted "NO DUMP" signs. As he drives, he reflects on the life he once lived, and silently rehearses the speech he will give in opposition to the proposal.

* * *

Each of these occurrences is fictional; each is based on fact. Each displays the dual effect of technology on Maine life: the expansion of individual choice and opportunity and a concomitant reduction in interaction with local institutions and values over which people perceive they have control. In each instance, it is somewhat difficult to imagine how, when or why society would have said "no" to the particular step in the relentless march of technology many Americans have come to believe is synonymous with progress. Yet in each instance, it is also clear that the technologies which enhance choices, opportunities and

change also produce consequences which can be negative - at some time, if not immediately.

The mill town which owes its economic life to the technology of papermaking suffers the agony of a bitter strike partly because of the spread of the technology to nations with cheaper labor and less rigorous environmental laws, and partly because of the development of paper technology to the point that paper production relies less and less on the special senses and skills of veteran papermakers.

The young Augusta attorney who represents a Texas client in a case in the nation's capitol works increasingly without secretarial help, has little personal interaction on her job, and cannot find proper care for her child while she works. Technology directly enhances her ability to engage in her profession, and it indirectly diminishes the quality of the remainder of the life she leads.

The nine-year old boy commands a wide array of technological choices for his entertainment. Most of his options are vicarious, including some likely to violate the values his parents seek to teach him, and he considers even these options routine. His mother senses something about the life her son leads and has left her high-stress, difficult work schedule, nursing position at the local hospital to spend more and better time with her family.

The young couple awaiting recovery of their newborn in a Portland hospital barely comprehends the complex and extraordinarily expensive life-saving and life support systems at their disposal: the bewildering technology, the excellence of the hospital staff and the Byzantine system of state, federal and private finance mechanisms which will pay the tens of thousands of dollars of cost. Neither the hospital nor the doctor is theirs, nor will they likely see either again.

The insurance executive understands the costs of his choices, but believes his double income, two-children life gives him few options. The former insurance executive understands the choices he has made as well, and may understand that the environmental regulators to whom he will speak believe they, too, have too few options.

To a large extent in these instances, the central individuals are cradled by options provided by technology. In one sense, they use their free will to select from among the

options. But, in another sense, the options condition the choice finally made, and without question make an event of the making of the choice itself. In each instance, technology has transformed time, shortened distance and indirectly challenged values perceived as traditional and local. Technology has influenced the path and speed of the arrow.

II.
A BROADER VIEW OF TECHNOLOGY AND MAINE LIFE:

THE PERCEPTION OF TRENDS

Technology infuses American life; life in Maine is no exception. Technology improves our lives spectacularly in ways we take for granted; technology subtly diminishes life by threatening more than our values - it threatens much of what we value. Most perceptibly, technology accelerates the pace of change in our lives. To use technology wisely, and to control its effects upon us, we must understand it; to understand technology, we must attempt to perceive causal trends related to technology. We recognize that the formulation of perceptions carries the risk of error, of confusion of societal trends and the true effects of technology. To risk no perceptions, however, is to risk a future neither desired nor anticipated.

We see a wide variety of trends related to the ways technology affects Maine life. Among the more important trends are the following:

* Maine people share the American appetite for technology. Our economy and way of life participate in the response to consumer demand for technology and its products. Technology shortens distances, transforms time and reduces physical labor; we see little abatement of the desire for these benefits of technology. If present trends continue, the role of technology in our lives will increase continuously and substantially over the next two decades.

* Much of our use of technology has followed the pattern of greater productivity leading to greater production, which in turn leads to greater resource use, waste production, and pollution. Maine people are increasingly concerned about the resulting degradation of our environment, as it undermines one of Maine's most highly prized qualities of life. There is a strong and growing demand for government to limit environmental degradation and act to ameliorate the damage already incurred.

* In the home, technology increases leisure time by reducing the time and labor necessary for household chores. Increasingly, leisure time is spent using technology -- from VCRs to ATVs to computer games. These particular forms of recreation arguably foster more individual effort and less interpersonal interaction.

* Transportation and communication technologies allow greater flexibility in lifestyles. For example, a small but growing number of people may choose to live in a rural environment and work via modem in the larger world.

* Other technologies, most frequently those that increase productivity in manufacturing, also sometimes reduce flexibility by displacing workers with low or outmoded skills.

* We perceive a growing gap between the skills our educational system presently provides and the skills and abilities people will need to live successful and rewarding lives in a world transformed by technology. Future workers need not only strong basic math, verbal and reasoning skills, but also a strong foundation in the humanities. Students must develop a capacity for lifelong learning and skill-building to be able to adjust to job and career shifts; technologically- oriented students should be exposed to consideration of the social impacts of technologies. Workers will increasingly need to understand not only how to operate sophisticated machinery, but also the principles of the work the machinery performs.

* The advent of computerized facilities for making reservations in our parks suggests the potential for better managing tourism in Maine. A statewide computerized reservations system could suggest alternative destinations (such as Rangeley) when more popular sites (such as Acadia) are fully booked, thus potentially alleviating overcrowding in coastal areas to the benefit of local residents and tourists, and spreading the economic benefits of tourism to other parts of the state.

* The world has indeed become a global village, as telecommunications and transportation advances erase physical and political boundaries and as the technology of analysis, innovation and production diffuses from the industrialized western world to developing industrial nations. The evolution of the global village stresses the villages of Maine: foreign competition can quickly devastate a local employer, and foreign interests

own an increasing share of the United States, including Maine. We expect these trends to continue and to diminish the quality of life in Maine. Relatively, and perhaps in absolute terms, the people of the United States, including the people of Maine, are becoming poorer. Foreign competition will continue to pressure wages downward, increase use of technological substitutions for labor, and require upgrading of existing technology. Impacts include displacement of workers and increased labor-management strife, as well as increased production efficiency.

* Technology continues to increase the efficiency of manufacturing in Maine. This trend may improve manufacturers' competitive position, but it is also likely to continue to shrink the size of the manufacturing work force. The workers who remain will need new and different skills. More and more jobs in manufacturing will be related to information technology as, for example, computers control more machines. While this change makes firms more efficient, it also may alienate workers who will rely less on their senses and physical skills to perform their jobs.

* There seems to be a trend toward increased production networking of small firms. Linked in temporary, flexible production networks which form to handle one job and then disband, allowing other networks to form for other jobs, these small firms can act as suppliers to major firms, government or the military, and they may be able to compete with larger firms. Networking is relatively new to Maine; if it catches on, it will be a boon to the state's small-business economy. Presently developing within the metal, electronics and printing industries, the networking trend may make a particular advantage of our environment and offset our historic geographical disadvantages. Quality air and other forms of transportation and telecommunications, however, are essential to networking in Maine.

* Information technology has powered most of the recent expansion of the service economy. The part of the service economy that collects, analyzes and presents information will continue to grow, although perhaps not as rapidly as in the past. Continued replacement of paper-processing by information technology may lead to the elimination of more menial service jobs, and further limit service sector growth.

* Due in part to technology, most Americans are living longer, healthier lives. In recent years, we have seen Americans taking greater responsibility for maintaining their own health. The burgeoning of sophisticated health-care technology, however, is one of

the forces increasing health-care costs. There is disagreement about how much money should be devoted to high-tech health-care equipment, and how much should be directed to more basic forms of care. Health care is increasingly technology-oriented. The increasing reliance on technology diminishes interpersonal contact between health-care provider and patient, and apparently contributes to alienation of health-care workers. AIDS-related issues and the development of genetic probes that can predict the likelihood of an individual developing a specific disease may change the nature of health insurance.

* In our political system, we see the technology of politics continuing to transform the nature of elections and of our democracy. The power of television continues to increase, and with it, the power of its owners and commentators, as well as those candidates whose personal qualities are treated kindly by it. The effect of television, and television-based campaigns, on the quality of local, state and national debate, and consequent public understanding, is both pervasive and distressing. The effect of interactive television on these trends is unclear.

* The use of and reliance on computers at all levels of government will increase dramatically, as in the private sector. Better regulation may result. Although concerns for invasion of privacy and government surveillance remain, the present inherent incompatibility of data collection methods appears to have diminished the realization of these problems.

* Over the course of history, machinery and other technology have developed in distinct stages: 1) muscle substitute, 2) mechanization, 3) automation (slave robots), 4) semi-intelligent robots (such as the control on a furnace), 5) intelligent robots (capable of decision making), and, 6) person-robot combinations (such as guns that follow the eyes of the gunner). The next stage will include person-robot combinations that work without conscious effort on the part of the person.

Computer-operated technology has developed separately in discrete parts manufacturing (such as automobiles) and continuous-process industries (such as oil refineries and pulp and paper mills).

Continuous-process production requires continual measurement and control of variables such as time, temperature, raw material characteristics, steam pressure, and chemical levels. Process computers evolved from simple data-recording devices, through

open-loop systems in which operators use information from the computer system to help them adjust process conditions, to today's supervisory process-control systems, which receive information directly from instruments, set control points, perform computations, and continually adjust control variables for optimum levels of functioning. Such systems minimize the need for operator involvement, except in upset conditions.

In discrete parts manufacturing, computer technology includes computer-aided design, computer-aided manufacturing (including robots and numerically controlled machine tools), flexible manufacturing systems, automated material handling, and automated storage and retrieval systems.

Most robots today can perform only well-defined and repetitive tasks, but efforts are under way to incorporate more intelligence and sensory capacities within these machines.

Computer-numerically-controlled machine tools fashion metal according to programmed instructions. Increasingly, these machines are being linked to one another and to a central controlling computer, creating a hierarchy of computer control, in which one computer is used to program and run more than one numerically-controlled tool simultaneously.

Flexible manufacturing systems integrate computer-controlled machining centers, robots that handle the parts, and remotely guided carts that deliver materials, all linked by computer-based controls that dictate what will happen at each stage of the manufacturing sequence. These systems, which can achieve low-cost production in small volumes, are costly and relatively rare, but their number is growing.

The differences between computer technologies in the discrete parts and continuous-process manufacturing domains are now diminishing with the development of computer-integrated manufacturing, which increases the continuity of the production process in discrete parts manufacturing. In this system, workers' tasks emphasize monitoring and control, as do the tasks of workers in continuous-process manufacturing.[1]

The advent of more sophisticated computer-controlled manufacturing systems is likely to continue the trend of displacing low-skilled workers and creating a demand for workers with different, highly specialized skills. We anticipate that flexible manufacturing

systems will be critical to Maine's competitiveness in the discrete parts manufacturing domain, much as computer-controlled machinery has already proved vital to our competitiveness in continuous-process production.

* Better use of materials is a serious challenge and a valuable opportunity. Many of the materials we produce today are environmentally persistent: they do not decay. For example, the DDT sprayed in the 1950s is still in our environment today. Our decisions about what materials to produce should include an examination of the end state of the material. We may be able to develop substitutes for environmentally persistent materials. For example, cellulose from trees might be manipulated to substitute for petroleum-based products, such as plastics.

III.
THE USES OF TECHNOLOGY IN MAINE TODAY AND IMPLICATIONS FOR THE FUTURE

As futurists have predicted for the last quarter-century, the United States has entered the Information Age. Information technology plays a significant and rapidly increasing role in virtually all aspects of our lives, including work, recreation, government, and personal life. Maine has become an active participant in the Information Age. We are only beginning to appreciate the magnitude and import of these changes. This brief sectoral analysis of technology in Maine life discusses some of these changes.

MANUFACTURING.

Paper and Forest Products.

Computer-controlled machinery in the pulp and paper, forest products, textiles, and many manufacturing industries has greatly increased productivity and eliminated some manual labor. In Maine's most advanced forest products sawmills, for example, lasers scan a log and computers calculate precisely how to saw it to obtain the most and highest-quality lumber, working much faster and more accurately than a human.

New, computer-controlled papermaking machines allow faster, more efficient production of paper at many of Maine's pulp and paper mills. An older machine that makes 40-50 tons of paper per day requires the same number of workers as a new computer-controlled machine that makes 500 tons a day with generally higher quality and greater uniformity of product. The enormous ($50-100 million) capital investments needed to purchase and install papermaking machines mean that existing machines are replaced cautiously. The transition to computer-controlled machinery in the pulp and paper industry probably will continue for the next twenty years. The chemical engineering program at the

University of Maine, supported in part by the pulp and paper industry, helps to provide the technology transfer needed to keep the industry technologically modern.

Textiles.

The Maine textile industry has suffered greatly from southern and overseas competition in the last decade. A number of Maine mills have closed as a result, but the industry still employs 6.7% of Maine's total manufacturing work force. Of the mills that remain, those that have found niche markets have invested in process technology, such as microprocessor-based controls and computerized tracking systems, as well as sophisticated spinning frames and looms. Many other mills, which manufacture low-margin, commodity items, have been unable to invest in new technology, and use machines manufactured up to fifty years ago.

Metals and Electronics.

Maine's metals and electronics industry, in contrast, has become and will remain the most growth-oriented manufacturing sector in Maine's economy, with future growth projected to result in 27% more jobs in 1995 than in 1985.[2] One reason for Maine's improved position has been the evolution of the industry from bulk commodity production to specialized production. New technology has improved market responsiveness, flexibility, and productivity. Most of the small and mid-size firms in these industries, however, have been relatively slow to adopt new production technologies.[3] Computer technology is only now beginning to play a significant role in Maine's metals industry.

Networking in Manufacturing.

Nationwide, there is a trend toward greater flexibility in manufacturing with a transition from large, centralized "assembly-line" plant processes. Computer technology, in combination with manufacturing machinery, allows for batch processing with quicker

response to consumer demands and less investment in capital items. Computerized process technology is a necessary ingredient for competing in these markets. A related trend is the move in Maine away from many commodity products, such as cotton sheeting, to specialized, niche market products, such as fabrics that cover office partitions and tennis ball coverings.

Increasingly, small firms can compete effectively in these and other markets if they are linked in production networks. In these networks, a number of small firms work cooperatively, often sharing overhead expenses and purchasing in bulk, joining forces to complete a large project. When the project is completed, the network disbands, and the individual firms are free to join new networks for other projects. This phenomenon shows particular promise for Maine's many small firms.

THE SERVICE SECTOR.

The service sector has expanded rapidly in Maine, its growth here, as elsewhere in the country, due largely to the advent of the Information Age. The business service industry has the fastest employment growth in the state, and business services are increasingly viewed by businesses as a prerequisite to locating in Maine.[4] Telecommunications and computer technology are making some service providers highly mobile in their locational decisions. Indeed, recent developments in telecommunication in Maine have eliminated many of the "end of the transportation line" constraints to Maine's development. With the advent of the Information Age, the sector of Maine's economy which sells, repairs and consults regarding computers and other data creation, analysis, storage and retrieval systems, has grown rapidly. While categorized as a service industry, the information industry should be recognized as an industry that helps us make more intelligent decisions about many activities we traditionally perceive as manufacturing. Quite simply, the computer industry has made an industry out of society's desire to make better decisions by making more efficient use of information.

TECHNOLOGY AND MAINE'S INFRASTRUCTURES.

In light of Maine's relative isolation from foreign markets other than Canada and from most of the United States, and Maine's relatively sparse population, Maine is strongly affected by technological changes in infrastructure. Reliable communication, health care, energy, solid waste and transportation infrastructures are essential to a healthy economy and to equality of access to the benefits of modern society. Education, which we also consider to be an essential infrastructure, is discussed in the report of the Education Subcommittee.

Transportation.

With the decline of rail transportation and the emergence of federally-subsidized road transport in the 1950's and 1960's, movement of durable goods, perishables, and people by highway became the dominant transportation mode of the 1970's and 1980's in Maine. As more rail lines have been abandoned and population mobility has increased, major surface arteries in southern Maine have become less able to accommodate the increasing vehicle flow. We see this trend continuing, even if oil prices rise considerably. Vehicle traffic flow in certain cities, and in southern Maine in general, cannot be allowed, however, to continue to deteriorate. Maine's present growth rate may slow, but that would only slow the rate of deterioration of some already unacceptable vehicle traffic flow problems. Due to the high cost of road and bridge construction, we recommend that government and business cooperate to use all available arrangements, such as innovative traffic planning, staggered work hours, car pooling, high occupancy vehicle (HOV) preferences and strategic public transit to achieve results at lowest public cost.

Air passenger transportation has increased dramatically in Maine in the 1980's, due largely to the deregulation of air carriers in the 1970's and resulting fare competition. With introduction of quieter and more fuel efficient technology of the Class III jet aircraft, air transport can continue to allow personal and business travel at reasonable prices and with little increased negative social impact. We see a need for the State of Maine to encourage the use of airports in addition to the Portland International Jetport, so that traffic growth and economic development are more evenly distributed, and to continue to encourage development of intra-state air carriers. Since air travel is increasingly essential to specialized

health care, a network of viable local airports also is a necessity. As Maine continues its trip into the Information Age, Maine must ensure the maximum possible availability of regularly scheduled air service to major cities of the region, nation and world.

Telecommunications.

Maine's telecommunications system was stalled technologically in the early 1980's, with a lower percentage of customers served by electronic switching than in most of the remainder of the country. A modernization program instituted in 1985 has now converted most Maine customers to electronic switching; the remainder is planned to be converted by 1992. Electronic switching requires lower maintenance and operating costs, enables provision of services such as call waiting, call forwarding, and touchtone, and enables other long-distance carriers (such as Sprint and MCI) to provide service to Maine residents in competition with AT&T.

Because Maine updated to electronic switching relatively late, Maine mostly skipped the intermediate step of analog electronic switching and moved directly to state-of-the-art digital electronic switching. By the 1990's, digital switching will allow telephone users to connect a computer and a telephone to their line simultaneously and at the same time call up a data base, such as Lexis or CompuServe. Ironically, because Maine intentionally chose not to accept the "latest" technology in the early 1980's, Maine is now ahead of most other New England states in providing digital lines to customers. In addition, by the end of next year, the development of digital transmission systems (the communications "highways" between our towns and cities) will have reached all but a small handful of Maine exchanges. These systems improve not only reliability, but also transmission quality which is particularly important for business and residential computer and data users. Fiber optics connections allow for high-speed data transmission and video transmission, such as that now being introduced by the University of Maine.

Cable television plays an increasingly important role in Maine life. Nationally, 57% of all homes subscribed to cable in 1985. By 1992, 87% of all homes will subscribe. Cable television has created highly specialized markets for advertisers, geometrically expanded information sources for citizens and represents an untapped resource for interactive communication. We recommend continued encouragement of enlargement of local cable systems.

Electric Energy.

Maine stands on the leading edge of a dramatic transformation of the way our society organizes and regulates the production, sale and use of electricity. Initiated by federal and state legislation in the 1970's and by utility financial problems, these changes include the deregulation of non-utility electricity generation at the wholesale level, and more recently, the establishment of open competition among utilities, small power producers, co-generators and Canadian utilities for the opportunity to sell power to Maine utilities. The growth in co-generation of energy, a process by which steam is used both to power a generating unit and for heating or for industrial process steam, has increased the efficiency of energy use in Maine. Recently, some utilities have instituted programs to finance directly or indirectly customer electricity conservation as an alternative to generation. One utility, Central Maine Power Company, has established a competitive bidding program to purchase large amounts of energy conservation from industry and from third-party conservation companies.

In the 1970's, Central Maine Power Company generated the vast majority of the power it sold; in the 1990's, Central Maine Power Company will purchase nearly one-half of the energy it sells to retail customers. Maine has pioneered the use of interruptible rates, by which large users are paid to interrupt consumption at time of system peaks, thereby avoiding the need for construction of new generating facilities.

Although some technological advances have occurred in the generation and transmission of electricity, the largest effect of technology has been to reduce the size of the firms that can produce power competitively. Co-generators, for example, are far smaller than traditional utilities. Most of the remaining technological change has been information-related. Small, remote hydroelectric sites are run by personal computers tied by modem and phone-line to an operator's home, saving on labor costs and increasing the efficiency of water flow. New computer models run on personal computers allow determination of costs and benefits that make time-of-use electric rates possible, in turn increasing the efficiency of electricity consumption. Wind and solar technology has improved but has yet to make a significant contribution to Maine's energy mix. Energy efficient home construction has become more prevalent due to utility programs and enactment of building standards.

Maine's future must include a strong and positive energy policy aggressively implemented by government, utilities and the private sector. The policy need not be coercive, but it must recognize that the conservation of energy is both morally and technologically superior to the consumption of scarce natural resources. Further, even those with the best of intentions do not always respond to price incentives, and the efficiency of available technology (hairdryers, refrigerators, etc.) limits consumer behavior. There exist many conservation investments which are efficient for society to make, but which are unlikely to be made without strong support from either government or utilities. Mainers need not sit in cold, dark rooms if we conserve; indeed, conservation is the most likely way we will continue to sit in warm, well-lighted rooms. Beyond conservation, Maine should encourage increased competition among energy sources, including Canadian sources. The entire energy production and delivery system, including utilities, must be given incentives to deliver conservation as a product, and to ensure full competition from regional sources in energy production and delivery.

Health Care Systems.

Nationally, health-care technology is advancing with dizzying speed. Maine is at the cutting edge of this change in the area of soft technology, such as organizing and funding home care and Alzheimer care. For the most part, however, Maine is not a leader in health-care technology and perhaps should not be expected to be.

Due largely to cost-containment policies, Maine's more sophisticated health-care technology is concentrated in centers of excellence, such as Bangor and Portland. Patients are transported to Boston for the most sophisticated technology and procedures, such as heart transplants. This concentration of technology into centers of excellence may be appropriate, but it requires a system that assures access for all Maine citizens.

Advances in biotechnology have brought us close to a significant frontier: the ability to diagnose an inherited tendency to develop a disease or condition. A need will exist for an advisory group or commission to determine who should give and receive these tests, and, most important, what should be done with the results.

Technology will have an even more major influence on health care in the next twenty years than it has in the past twenty. Many new medical technologies will derive

from developments in the basic sciences, computer and communications technology, and from our improved understanding of cellular mechanisms and the molecular biology of diseases. These new technologies, including drugs, devices, techniques, and new approaches to diagnosis and treatment, will have capacities far beyond anything we can now do.

The introduction of complex, expensive new technologies will present difficult choices about who obtains access to these technologies and how we pay for them. At a cost of approximately $100,000 for each operation, plus annual treatments for the rest of each patient's life to prevent tissue rejection, the nation's annual bill for heart transplants is rapidly approaching $500 million. The Congressional Office of Technology Assessment estimates expenses for heart transplants will reach $3 billion by the end of the century.

Complicated high-tech medical procedures, including such processes as heart and liver transplants and artificial organ implants, and complex treatments using "super drugs", occur with increasing frequency. A recent government study predicts that the nation's total health-care bill will more than triple by the year 2000 and will account for fifteen percent of the gross national product.

One-third of the Medicare cost increases in this decade are due to high-tech medicine. In 1987, for example, kidney dialysis cost the federal government $2 billion, 10% of all Medicare payments to physicians. Kidney transplants cost $2.6 billion. The cost of intensive care for premature infants passed the $2 billion mark three years ago. By making high-tech treatment accessible, health finance experts warn, we are raising medical costs to a level the existing system will not be able to afford. The challenge is to establish standards for use of the new techniques, including management of the diffusion of new technology to ensure access, but not at the expense of other services competing for limited budgetary funds. One great potential technology savings for now may be Alzheimer treatment. This is a costly condition because of the large numbers of patients involved, length of life and personal care needed.

The continuing spread of AIDS threatens on many levels. Apart from the human tragedy of debilitation and death, the debates about whether health insurers can require an AIDS test and numerous social issues, the AIDS crisis may impose a huge burden on our health-care system. Although incidence of the disease in Maine is not nearly as high as in

some major urban centers, it is increasing, and will undoubtedly strain our health-care resources.

Part of the problem is the policy decision to provide inexpensive services to a few when others receive no services at all. For example, we justify reduced and eliminated immunization money, and yet publicly fund organ transplants; we cut back on prenatal care, yet pay for pediatric intensive care treatment when the babies of untreated mothers are born prematurely.

If cost containment practices are not successful, we can reasonably expect real growth rates in health-care costs of 4% to 5%. In this environment, Government will keep the pressure on cost containment, and will also increase regulation. We anticipate enactment of more laws that mandate benefits without paying for them, as in risk pools for the uninsured, and standards set for hospitals.

Business will be increasingly concerned about the costs of health care as the pressure of global competition squeezes profits and makes health benefits a more visible cost. The federal deficit will constrain spending on health care through the 1990's. Business, government and consumers will resist cost increases for health care. By the year 2000, payers of health- care bills will be much more sensitive to issues of economics and cost effectiveness.

These driving forces of change will lead to a number of structural shifts in health care between now and the year 2000. The hospital of the 1990's will represent a core of high- intensity, high-technology care. The intensity, sophistication, and cost of inpatient care will increase dramatically, as measured by expenditures per acute-care admission. Hospital admissions in the year 2000 will be down, but there will be some rebounding in the late 1990's as the aging population grows. It will become increasingly apparent that economic failure is inevitable for small community hospitals unless beds are taken out of service or converted.

The decline of hospital inpatient activities will go hand-in-hand with the rapid growth of hospital outpatient services, such as ambulatory care facilities, "doc-in-the-box", and other community health facilities, such as hospices. By the year 2000, such outpatient activities will grow to levels of at least 25% of total hospital income. We strongly recommend public and private enhancement of hospice care in Maine, as a means to

provide the terminally ill with a less expensive, more natural and more dignified place to die.

America is facing an explosion in the number of elderly, particularly in the over-75 population, a group which is expected to grow by almost 35% by the year 2000. Even if the elderly of the future are healthier than their predecessors, the growth in the number of very old Americans will directly affect health-care costs. We will see more and more people who survive multiple heart attacks and strokes. People who just a few years earlier would have died will survive, and become by this greater longevity a greater burden to themselves and to the health-care system.

The demands of the elderly, both medical and political, will be a driving force for change. These pressures will be central to the policy debates on funding and delivery of Medicare and Medicaid, long-term care, home care versus institutional care, the use of technology, and the right to die.

New medical technologies also have crystallized on many ethical dilemmas that will challenge society to rethink what it means to prolong life. Modern procedures like resuscitation, mechanical ventilation, dialysis, and nutritional support raise questions about individual rights, the processes of living and dying, and the proper distribution of technological resources.

The use of life-sustaining technologies necessitates the development of an ethical vision that is sufficiently acute to discern the needs and wants of particular individuals and yet wide-ranging enough to guide contemporary public policy. No entities are rushing to take responsibility for making the decisions that in essence will determine who will live and who will die. Developing a fair system is not easy. At a minimum, we need structures and guidelines that will help individuals make these difficult decisions for themselves.

Solid Waste

In the United States, the existence of a planned, reliable and acceptable solid waste disposal system is essential to sustained economic prosperity and environmental protection. In Maine, we have moved from the "farm" dumps of the early part of the century, to open, burning municipal dumps at mid-century to landfills and incineration in the present day.

At the same time, the waste stream has grown rapidly and has become more dangerous environmentally. The current debate over the difficult choices created by the need for recycling, environmentally sound landfills and incineration plants has not shown any component to be unnecessary. Maine should attempt to reduce the waste stream, and, at the same time, plan landfills and incineration solutions well into the future. The present Department of Environmental Protection site and subdivision approval requirements relating to solid waste disposal are only reactionary in nature. Maine needs an affirmative process, perhaps on a regional basis, to fit the process of growth and change properly into our environment.

PROCESS INNOVATION AND TECHNOLOGY TRANSFER.

Most of the manufacturing technology utilization discussed thus far can be described as process innovation. Instead of working to make a new kind of product, these examples represent the application of new technology to production processes to make an existing product more efficiently.

Although many Maine industries have invested heavily in process technology, Maine still lags behind much of the nation in this area.[5] The use of process technology can be measured in part by productivity. Maine's 1982 manufacturing productivity (shipments per employee) was below the national average in all but three of 16 manufacturing industries: paper, leather, and apparel.[6] Better technology transfer, the application of research findings and existing innovations in the marketplace, could greatly help many of Maine's industries. Perhaps the best example of technology transfer in Maine is in agriculture. Interestingly, agriculture in the United States is the most technology-intensive industry. The Maine Department of Agriculture, Food, and Rural Resources collects information about agricultural technology from the U.S. Department of Agriculture, the University of Maine, and the Extension program and channels it to Maine farmers. The Department's Technology Transfer Program encourages the adoption of new agricultural technologies in Maine through matching grants of up to $5,000 to those willing to try new production, storage, or processing technologies for agricultural commodities.

TECHNOLOGY INNOVATION.

For the most part, Maine's involvement in technology lies in technology utilization rather than innovation. In the earliest of the three stages of technology innovation, in which a firm makes experimental models and begins development of a viable, marketable product, the firm requires proximity to a large university or technology.[7] In the second stage, the firm begins to market its new product and needs access to a highly skilled labor force and specialized services. High-tech firms tend to cluster where those resources are available. In the third stage, when the emphasis is on mass production of standardized products, firms may branch out, creating manufacturing and assembly plants separate from corporate headquarters.

Most of Maine's product innovation comes at the third stage, which requires the least special services and worker skills of all the stages. The third stage is also the most vulnerable to competition from countries with low wage rates, as it is the stage of process commercialization. It should be noted that it is at this stage that Japan outstrips the United States.

Maine experiences little first stage product innovation. Maine's public funding for technology initiatives has been among the lowest in the nation.[8] Maine has been also below national and regional norms in its capacity to support research and development. Indicators include a low percentage of the population attending vocational training programs, a low per capita ratio of science and engineering Ph.D.s, and a low per capita ratio of patents.[9]

Moreover, the increasing cost of initiating technology research is making it more difficult for states that have not already invested in high-technology centers to enter the race. Maine obviously has not invested in a high-tech center comparable to Silicon Valley or Route 128, and it is not likely to be profitable to do so now.

Maine does experience first stage product innovation in a few specific areas, notably geographic information systems, magnetic resonance imaging, biotechnology, and advanced materials. With support in training workers and creating the necessary

specialized support services, it is possible that these businesses can continue to grow to the second stage in Maine.

There is relatively little research and development investment in Maine: Maine has only 0.3% of total U.S. high- tech employment (1981 figures);[10] in 1979, government and industry in Maine received only 0.1% of total nationwide spending on R&D.[11] Maine state government investment in R&D is among the lowest in the nation.[12]

MAJOR TRENDS AND THEIR IMPLICATIONS.

1. *We expect the trend of incorporation of increasing amounts of information in technology to continue.* The computer- controlled machinery described above, for example, now incorporates much of the information that formerly was provided by the experienced machine operator.

Although many Maine industries have made advances in use of more computerized process technology, Maine's productivity in all but a few areas appears to lag behind that of the nation as a whole. This indicates a need for a greater investment in information-intensive, process technology.

Implications:

* Greater productivity per employee. More can be produced at a generally high quality using the same number of workers, or sometimes fewer workers.

* The greater the productivity of Maine's industries, the better their competitive position, and the stronger our economy.

* There is a need for investment in more process technology to improve the productivity of some Maine industries.

* There is a need for better technology transfer through university-government-industry cooperation.

* Some jobs may be "de-skilled". With new equipment, unskilled workers can take the place of skilled workers. While "de-skilling" may be cost-effective for the company, it may lead to the loss of some skills, particularly craft skills, to the ultimate detriment of our productive capacity.

* We see a rapidly increasing need for people with new and different skills related to technology. Maine needs people with expertise in electronics to repair and maintain machines, and machine operators who understand both how and why the machine operates and how to read and interpret the array of graphics on a computer terminal that give vital data about how the machine is operating. We must train people with these skills, or at least provide people with sufficient educational background to acquire these skills in company-operated training programs.

* Some workers whose jobs change from hands-on operation of a machine to observation and manipulation of that machine via computer may suffer from a sense of alienation during the period of adjustment. Businesses must learn to anticipate and adapt to this consequence of technological change, and workers should be helped to adjust to the changes technology brings.

2. *We see an emergence of small-batch processing of specialty goods, rather than mass production of commodities.* Companies with programmable, computer-driven machinery can change their systems, and their product, more quickly and at a lower cost than manufacturers without such technology. Flexible companies can respond more quickly to the market.

This trend is linked to another: the emergence of flexible production networks of small manufacturing firms. Networks of small firms enjoy the flexibility, innovation, and efficient small batch manufacturing to meet changing market needs.[13]

Implications:

* A need for more programmable, computer-controlled machinery in Maine's manufacturing businesses.

* With its predominance of small businesses, if flexible production networks prove to be the most efficient way of doing small-batch processing, Maine's relative lack of large industry and distances for some markets may be overcome as economic disadvantages.

* Flexible production networks are relatively new to Maine. The Maine Science and Technology Commission is now engaged in negotiations that may result in funding to form production networks among metals and electronics firms. We see a need for additional funding to set up similar networks in other industries.

3. *Successful research and development is increasingly important to economic vitality, but increasingly expensive as well.*

It is questionable whether Maine's research and development activity occurs in sufficient concentrations to attract substantial amounts of new activity. The fact that the state's primary research university is located 150 miles outside the state's fastest-growing area presents another obstacle to growth in research and development.[14]

More of Maine's R&D funding comes from the higher education sector and less from public and non-profit institutions than is true nationwide.[15] This disproportionate concentration of R&D in Maine in the academic sector does not provide the best possibility for technology transfer to the private sector. Cooperative industry/university/government efforts would aid technology transfer.[16]

Implications:

* In general, Maine will fall further behind the nation's high-tech centers in technology innovation.

* Maine can continue to lead in technology innovation in the specific areas in which it already excels, and perhaps in a few others for which Maine is uniquely suited. Maine's coast is one of the best for aquaculture technology innovation, for example.

* With adequate public support, Maine can build on these actual and potential areas of excellence, spinning off service industries and high-skill manufacturing businesses.

* Without a large, generally-oriented high-tech center to spur technology innovation, Maine must transfer technology to maintain modern technology utilization. Maine industries may need assistance to transfer technology to commercialization.

* Most Maine industries should continue to concentrate on process technology, rather than product technology.

4. *Both state government and industry have tended to make major decisions about technology without adequately considering all the public and private consequences.* For example, like virtually every other state, Maine built a nuclear power plant without knowing how to dispose of radioactive waste safely. In recent years, Maine has built trash-to-energy plants without finding a safe and acceptable disposal method for the ash.

Similar examples abound.

Investments in technology appear to be made without sufficient coordination with other investments. No one entity in Maine weighs, even on an advisory basis, the value of investing tens of millions of dollars in education, for example, with paying phone companies to invest the same amounts in better communication technology. Since Maine, like every other state, has limited amounts of technology capital to invest in its future, not all worthy objectives can be funded. By way of further example, Maine state government's computer systems do not interconnect in a potentially more useful fashion, largely because of differences in collection and categorization of data. There is need for coordination of other investments in technology. For example, if the state government purchases its own telephone system, perhaps that system should be connected to the University of Maine's system.

Implications:

* There is a need to consider the risks and costs, as well as the benefits, of any technology. Technology interactions should be considered as well.

* Investment in technology which has harmful environmental effects may be partially balanced by investment in technologies which benefit the environment.

* Technological decisions should be made taking into consideration the rate of technological progress. In some cases, it may be wise to delay investment in technology in order to take fuller advantage of the progress.

* Investments in technology should be made in such a way as to take full advantage of the technology.

5. *Maine's infrastructure investments - education, energy, solid waste, transportation, health care and telecommunications are larger and, therefore, more risky than in the past, and are far more important to Maine's future than past investments.* While energy and telecommunications appear to be in a positive circumstance, the remaining infrastructures show slight to substantial inability to adapt to the challenges of Maine's future. Moreover, we are concerned that the hard choices necessary in a world of limited resources by a state with limited funds to invest frequently are not made in light of the value of possible alternative uses of resources.

MAJOR STRATEGIES.

1. *Improve the education of all Maine children and adults, giving them the basic skills and technological literacy needed to learn the skills demanded of them as the pace of change increases and the workplace incorporates more technology, and to make better-informed decisions about technology.* We must guarantee that we will provide job retraining for workers displaced by new technology.

The Department of Educational and Cultural Services is working to increase the percentage of students who graduate, and now requires computer proficiency for graduation, although the utility of "computer proficiency" in isolation, rather than using a computer to do or learn something, is questionable. Ironically, technology plays only a small role in our education system.

The Commission on Maine's Future Education Subcommittee is considering the issue of lifelong learning.

2. *Increase support of technology transfer to improve the process technology of Maine's industries.*

The University of Maine's chemical engineering department performs part of this function for the pulp and paper industry, and the Maine Department of Agriculture, Food and Rural Resources provides extensive technological information to Maine farmers. The Maine Science and Technology Commission is currently funding and encouraging greater government-university-industry interaction to increase technology transfer, but much more needs to be done.

3. *Determine those areas in which Maine excels in technology innovation or in which Maine seems to have inherent advantages, such as aquaculture. Directly sponsor research in these areas, and create public-private partnerships to aid development of research-driven products and business initiatives.*

The Maine Science and Technology Commission has collected information on technology innovation in Maine, but more needs to be collected. The Commission is also sponsoring a few pilot public-private partnerships; again, more needs to be done.

State government should directly sponsor more research, based on advice from experts.

4. *Create a public advisory body that can tap local and international expertise to assist state government and industry in assessing all aspects and impacts of proposed major investments in technology*, including long-term costs, risks, benefits, environmental effects, and interactions with other technologies. This body should also give advice on the relative costs and benefits of long-term public investments in technology and other infrastructure investments. No such commission currently exists.

5. *Support development and utilization of technologies that help clean up the environment or decrease the amount of environmental degradation created by existing*

technologies. For example, a Maine inventor recently designed a new refrigeration system that uses twenty-five percent less energy and does not use ozone-depleting chlorofluorocarbons. The Passamaquoddy Indians recently patented a design that reduces industrial smokestack emissions and produces saleable by-products. No Maine organization currently collects such information, and there is no formal mechanism specifically for funding and encouraging these developments.

6. *Create an advisory body to consider the ethical and social issues involved in the uses of biotechnology and in the delivery of health care. No such body currently exists, and the need is growing.*

IV
TECHNOLOGY AND MAINE VALUES

When Mainers speak of the "quality of life" and the state tourism bureau promotes with the slogan: "Maine: The Way Life Ought to Be," both refer to a constellation of values held dear, to commonly-shared precepts that give stability and satisfaction to living. Many of the values so dear to Mainers also hold great appeal to the out-of-stater looking to settle or vacation here, and to the corporation contemplating a move to Maine.

The spectrum of values undergirding the spirit of Maine's people are worth considering. Small-town living, with its strong sense of community and neighborliness, carries over even into the larger cities of our state. Many Mainers derive a sense of place and historical "rootedness" from the antiquity of much of Maine. This sense may derive from a nostalgia for the aesthetics and simpler lifestyle of earlier times. Also, many Mainers continue to pride themselves on a strong work ethic and quality craftsmanship.

Mainers have a strong heritage of Yankee independence arising out of vocation: farmers, fishermen, woodsmen, and small business owners. Those who wrest their living from land and sea are deeply involved in the life-forces of nature. Others find their connectedness to nature through recreation, such as hunting, fishing, hiking, camping or boating. For all, Maine's sweeping landscapes of unspoiled natural beauty of shore and mountain, lake, river, and forest, its clear waters and smog-free air, nourish the soul.

Physical space and moderate pace have combined to create a more relaxed view of living in Maine than that experienced in the megalopolis to our south. Teenagers in a Maine high school class recently pointed out that a low crime rate is one of the aspects of Maine they most value.

We believe the people of Maine are reluctant to see their traditional values eroded as society rushes toward the alluring embrace of technology and "modern living." Few would reject prosperity and progress outright, yet Mainers are increasingly aware of the accompanying consequences.

The growth and progress made possible by technology threatens much of what we value about our state. Automation and robotism, while increasing productivity, may threaten Mainers' pride in craftsmanship, for example, just as polluting industrial technologies and unrestricted development may threaten to spoil our pleasure in nature and weaken our sense of small-town community. At the same time, we are increasingly aware of the profound ethical issues looming on the threshold of the twenty-first century, including such matters as biotechnology, medical care, and automation.

Less apparent, yet most profound, is the subtle assault upon our values by the technologies we have become so accustomed to using. From robotics in the workplace, to electronic data banks and computerized analyses in business and government, to the television screen in the home, the electronic revolution influences the way we experience life. Of course, we derive many benefits from the use of these technologies, but we also accrue their detrimental side effects -- unless we somehow act to check or ameliorate them.

Who will assess technologies' positive and negative impacts and grapple with values in conflict? Inevitably these matters will be resolved in the political arena -- where, unfortunately, solutions have a way of coming late, when the cost of undoing the damage is high. The political arena is crowded with a multitude of organizations espousing their particular concerns, yet there are few institutions balancing the effects of technology.

Because technology is advancing so rapidly, and so much of it is becoming so complex, adequately informing the public about new technologies and their implications is increasingly difficult. As a result, we tend to leave decisions to the experts. The experts, however, may not choose the course the majority of Mainers would desire if they were sufficiently informed or enabled to make their own decisions, and even the experts offer personal, rather than public interest-oriented decisions.

As the future rushes at us with ever-increasing speed, Maine will need greater lead time to identify the possible consequences of new technologies. Maine will need informed public discussion and weighing of the alternatives. And Maine shall need a breadth of perspective that currently is lacking.

One of the means to address these challenges to Maine's values and quality of life would be the creation of an independent advisory panel of men and women from various

walks of life, selected to be geographically representative of Maine citizenry. This panel would not only provide a variety of expertise to focus on the issues, but also add a measure of common sense and experience to the debate. When such a panel gave its assessment to the public or advised the legislature, its voice would have stature and its recommendations serve as a catalyst for wider public discussion.

Clearly, Mainers want to safeguard their quality of life.

Our challenge will be to help them get out in front on these issues, not only to protect but to nurture the values that give our state its character.

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LEARNING THROUGH LIFE

THE REPORT OF
THE SUBCOMMITTEE ON EDUCATION
TO THE COMMISSION ON MAINE'S FUTURE

April, 1989

FOREWORD

The Education Subcommittee presents its findings to the Commission on Maine's Future.

This report was prepared by the Subcommittee and its consultant, Kelly Nelson. Its purpose is to raise strategic and policy issues in education that will have an impact on the future of Maine and its citizens. The recommendations are those of the Subcommittee members and other Commission members who have provided input and do not necessarily reflect the views of current educational policy-makers.

Members of the Subcommittee include: Sharon Alcott, Jefferson; Dr. Roland Burns, Fort Kent; Andrea L. Cianchette Maker, Esq., Durham; Theodore S. Curtis, Jr., Orono; Sherry L. Nemmers, Chair, Portland' Senator Michael D. Pearson, Enfield; Representative Charles R. Priest, Brunswick; Wilfred J. Sirois, Scarborough' Geraldine Skinner, Richmond; and Consultant, Kelly Nelson, Cumberland Center.

INTRODUCTION

The Subcommittee on Education of the Commission on Maine's Future considers education to be the total of all learning experiences, formal or informal, that an individual experiences throughout life. Education is an on-going process for everyone and for the community as a whole. The challenge of the Subcommittee was to outline the components of successful education for Mainers from the standpoint of the year 2010.

The first step in this was to look at the mission of education, to answer the question, "What should education do?" Then, the Subcommittee looked at the trends that will affect education, the implications of those trends from the vantage of various life stages, and the capacity of Maine to deal with those implications.

Following this analysis, the Subcommittee proposed recommendations in four priority areas: Policy and Funding, Existing Institutions, Human Resources, and Tools. Since education is such an all-encompassing topic and since many other citizen commissions and professional study groups are currently detailing education plans, the Subcommittee did not attempt to tackle every possible adaption that should be made. Instead, we offer recommendations that attack fundamental weaknesses in Maine's ability to provide "successful" education and offer specific examples of programs that are working and have the potential to be effective.

FUTURE SCENARIOS

Tony Bickford goes to high school from 3 to 7 p.m. Tony, 18, is a student at the alternative high school in Turner. He didn't do well in the regular high school setting and the combined pressures of school, work and family led him to drop out.

Now enrolled in the alternative high school, Tony works in the morning, goes to school in the afternoon and gets home in time to take care of his daughter when his wife goes to work at night. With the individualized program he and his counselor set up for him, Tony will get his high school diploma in two more years and be able to get a better job than the one he has now.

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Greg Harriman couldn't afford to go to college after high school so he went out to look for a job. He got a job at UNUM and also found himself back in the classroom -- a corporate classroom.

While working, Greg is taking classes at UNUM during the day. These classes -- on computers and marketing -- in conjunction with his work experience will help Greg get a better job within the company and will make him more marketable if he chooses to leave the company.

#

Lucy Rollins, 35, foresees that she'll have to change jobs soon. She's been working at Blue Cross/Blue Shield of Maine for 14 years. Although she enjoys her job, she sees few advancement possibilities due to generational crowding for available jobs. Lucy has decided to start her own consulting business.

To prepare for this career change, Lucy is attending a course offered by USM on how to start your own company. She is also attending accounting seminars and

workshops held by a local accounting firm. Lucy attends these classes at night and on the weekends while still working at Blue Cross/Blue Shield.

#

Wally Vogel is making honey in Millinocket as part of the community learning network set up in his area. Wally attends a free class in bee keeping, taught at the home of a local bee keeper. There are no tests, no grades, just community members sharing their knowledge with neighbors.

Wally, an 85-year-old auto mechanic, wants to try his hand at herb gardening -- a class being taught next semester in the basement of a local church. He's also considering not only being a student in this learning network but a teacher as well, offering a course in car maintenance.

#

Jimmy Shepard, 7 goes to Japan every week. Jimmy and his fellow second graders at an elementary school in Augusta, spend one afternoon a week with second graders in a town in Japan by means of interactive telecommunication.

Jimmy and his classmates share and learn about customs, arts and family life with their Japanese friends via tv monitors and two-way communication.

#

Lorraine Blanchard goes to school at home on a farm in Gilead. Lorraine is earning a degree through independent study, conferring with professors by phone and mail.

For Lorraine, 40, who is working toward a degree in social work, studying on campus would have meant commuting many miles a day to the nearest college. This way Lorraine can spend time with her children, do chores/errands around the farm and still go to school.

Cindy Luce is an administrative assistant by day, a student by night. She works at a Bangor radio station. Wanting to advance in the broadcast media field, Cindy is studying to be a newscaster.

After working during the day at the radio station, Cindy attends night classes at a proprietary School of Broadcasting.

#

Lisa Witham, 13, is a teacher. Two days a week, Lisa tutors a younger student in math. Lisa herself receives tutoring from a high school student.

This tutoring time is scheduled into Lisa's school week. She learns new ways of looking at a subject by having to teach it to someone else and is considering a career as a teacher.

#

Chuck Wheelock was laid off from his factory job where he had worked for ten years. Finding few jobs available for someone with only an 8th grade education, Chuck decided to get a high school diploma.

Chuck attends classes at the high school in this area, getting credit for each class and paying nothing for the classes since he is a property owner in the area.

#

After 50 years of working in Boston, Linda and Dave Wright have retired to Bridgton. With lots of free time on their hands, they are taking courses offered in the area.

Linda has dusted off her camera and is taking photography course at the local high school. Dave is learning to play the piano from a private teacher. Both of them attend monthly travel seminars/travelogues.

Mang Sok arrived in Sanford a year ago from Cambodia. Unable to speak English, he had a difficult time getting a job and settling into his new home.

Mang enrolled in an ESL program at the Sanford adult education school. While learning English, Mang is also taking a computer course so he can be familiar with a keyboard thus enhancing his chances of getting a job.

I
SITUATION

I am convinced that it is of primordial importance
to learn more every year than the year before.
After all, what is education but a process
by which a person begins to learn how to learn?

Peter Ustinov
Dear Me (1977)

Mission

Learning how to learn and life-long learning are the keys to the future of Maine. To unlock that future, to enable Maine citizens of whatever age to lead effective, rewarding lives, will require significant changes in the ways we think about and pursue education. To prepare for the future, we will need to educate our citizens to recognize, adapt to and/or manage the rapid changes -- demographic, economic, technological, and political -- that will be transforming their environment. This will take a commitment of financial and human resources, but foremost, it will take changes in attitude.

The mission of education is to produce individuals who have the tools to know how to learn and how to adapt their learning to lead meaningful lives. Education should generate a responsible citizenship that is capable of producing a society that meets the needs and desires of its members.

Within this mission, education is perceived by most members of the Subcommittee, as well as most other Mainers, to have a further goal: to provide the skills needed to prosper as individuals and as a State. To that end, many have put forth objectives for education. One of the better of these set of criteria is: to develop (systems) that can allow all citizens to discover and enjoy the potential of their own intelligence; to have practical access to all knowledge; and to understand and celebrate the accomplishments of the human mind and spirit."

A Commission is currently attempting to translate such a general objectives into specific outcomes for kindergarten through high school education in the State of Maine. That Commission is attempting to answer the question: What products should we expect of our formal, public education system? But, the question asked by The Commission on Maine's Future extends further by its focus on education of **all** the citizens of Maine.

We need to be cognizant of the fact that the workforce today represents about 75% of the workforce in the year 2010. While the needs of Maine's citizens who are in their early formative years and our expectations of them as a society are crucial, the vast majority of our citizens have moved or will have moved by 2010 beyond the traditional K - 12 age group. Their education, a more problematic proposition, is at least as critical.

In a recent presentation to the Commission on Educational Outcomes, members of the Commission on Maine's Future presented some of their research findings that apply equally to all age groups in Maine. Appendices 1 and 2 address two recent studies of desirable educational outcomes, primarily form the requirements of employers. Appendix 1 summarizes a Canadian study. Interpersonal Skills are the only grouping not found in most current K - 12 curricula.

Appendix 2 addresses the issue of adaptability or transferable skills. While many of the concepts it emphasizes can be learned in standard curricula, the emphasis is far different. At the risk of over-generalizing, the transferable skills identified can be generally classified as problem solving skills or skills that enable an individual to learn and to adapt that learning to diverse situations, be they in the workplace or other facets of life. While the Education subcommittee strongly supports content-based education at all levels and will recommend further attention to basic reading, writing, and computational skills, nonetheless, the subcommittee feels that the development of skills similar to those outlined in Appendix 2 should be the goal of education as it enters the future.

Educational Constituency

Formal education is already the second largest industry in the country. It accounts for approximately 7% of personal and government spending and between $300 billion and $500 billion per year. An estimated one out of three Americans is enrolled in an education program each year. It is further estimated that even without major changes in the education

systems of today that the costs of education will increase by 20-25% per year over at least the next decade, making it the largest industry by the year 2000.

In 1986, Maine ranked 31st nationally in per capita expenditures of state and local governments for all public elementary, secondary, and higher education. While final figures are not in, that ranking will be higher for 1988 as the funding for public elementary and secondary schools increased 24.7% in 1988-89, the highest percentage increase in the nation. At the same time, public university funding also increased at a third in the nation percentage of 19% in state appropriations.

Maine ranked 28th nationally in 1986 in spending per $1,000 of personal income. Education's share of total state/local revenues was 38th nationally, but just at the U.S. average of 35%. Per pupil current expenditures in public elementary and secondary schools were just at the U.S. average and 18th nationally for the school year 1987-88. Since 1981, per pupil cost has risen from $1,236 to $2,133 for elementary schools and from $1,577 to $2,832 for secondary education.

During the 1980's, federal funds for public K - 12 education have risen by nearly 25% , while the state and local costs for education have risen from $193 million to $322 million (state) and $198 million to $319 million (local). Maine's local share of educational costs (approximately 40%) is 30th in the nation. It's state share of 54% ranks it 21 in the nation and just about at the national average.

None of these data include any non-public expenditures. On the national level, these costs are the fastest growing segment of the educational market. The percentage of the total $660 million of K - 12 expenditures allocated to adult education and other categories of "other instruction" is a mere 2%.

This picture will undergo radical change over the next two decades. As education is embedded in the entire life-cycle from pre-school to old age, some of the new demand will be picked up by private industry and by community institutions. But, the overwhelming changes that will be occurring will inevitably place pressures on the current public system as well.

Table 1 gives a qualitative breakdown of the basic life stages and some typical educational needs of each stage. These stages represent the new educational constituencies

TABLE 1

LIFE CYCLE LEARNING STAGES

Stage of Life	Typical Educational Needs
Preschool	Day care, early childhood development, parent training
Primary	Basic literacy, socialization, health screening
Middle	Health education, recreation, cultural and technical literacy, problem solving
Secondary	Critical thinking, vocational education, alternative education, workforce preparation
Career Entry	Transitional programs, post-secondary and university access
Career Development	Graduate access, professional development
Career Change	Retraining, adult aspirations
Productive Retirement	Enrichment, independent study, teaching opportunities, part-time work

that must be addressed and the basis for developing support for education in the next century.

II

TRENDS

Currently there are major upheavals occurring in education -- both in the systems of formal learning we have adopted and in the more informal processes by which individuals learn. Major trends in other areas will have an impact on all of education -- in some cases as a response, in others as a shaping force. For purposes of discussion, we have broken down the trends into several areas of analysis.

Demographic Trends

A. Social/Cultural

1. Population will shift toward the middle aged, retirement-oriented, and elderly population groups while there will be an absolute decline in population of children, adolescents, and young adults.

2. Three quarters of households will have no children at home. In 1960, half of Maine households had children living at home. In 1988, the figure was thirty-five percent.

3. Household size, which was 3.3 in 1960 and 2.5 in 1980, will decline to 2.4

4. Traditional two-parent households will continue to decline.

5. Maine's population growth will stabilize, as will the mobility of the population.

6. Overall, the population of Maine will be better off economically.

7. Substance abuse will stabilize following a decline during the early part of the new century.

8. The cultural heritage of traditional Maine ethnic groups (French-speaking, Indian) and more recent immigrants (Asian) will be in danger of eroding.

9. The number of children in poverty will continue to grow.

10. The percentage of women in the workforce will continue to increase.

B. Workforce

1. The job market will be rapidly changing. An estimated 50% of current jobs will be phased out.

2. Seventy-five percent of the new jobs will require post-secondary education, but a mere 15-25% will require college education.

3. Sequential careers -- up to five or six jobs -- will become the norm.

4. The baby-boomers will be caught in a mid-career compaction with more highly educated people available to fill top level jobs than the number of jobs available.

5. Service sector jobs will continue their growth. In the period from 1988 to 2000, financial services and insurance, retail and wholesale trade and services will increase from 52% of employment in Maine to 58%.

6. There will be reduced opportunities for upward mobility within industry for the unskilled.

7. Emphasis on retraining within companies will focus on those who already possess basic skills.

8. Jobs will be dumb-downed unless employers can count on a reliable supply of skilled workers.

9. Corporate training will continue to increase its share of the total education sector.

10. Information-processing skills will be required in as many as 95% of the jobs,

11. Social skills development will be increasingly emphasized by business.

12. The work week will increasingly move toward 32 hours with an additional eight hours devoted to education/training necessary to keep current within a given occupation.

13. The ability to learn and flexibility will be the key job skills.

Technological Trends

A. Workplace

1. New production technologies will be continually adopted.

2. Workers will be displaced.

3. Technology may reinforce illiteracy.

B. Learning Environments

1. Artificial intelligence will evaluate learning styles and pinpoint deficiencies.

2. Classroom technology will replace rote drills.

3. Interactive technology will increase access to education for everyone.

Economic Trends

1. There will be a global marketplace for the world of work.

2. All of the U.S. will be more dependent upon the actions of other nations.

3. There will be more small, entrepreneurial businesses.

4. The average size of firms will decline.

5. There will be a widening gap between the abilities of rich and poor communities to fund education.

Political/Attitudinal Trends

1. There will be increased demands for educational accountability.

2. There will be increased demands for measurement of the effectiveness of education.

3. Conflicts will escalate over the relative share of federal, state and local funding.

4. Conflict will escalate over the question of policy planning.

5. Parents and adults will change their attitudes about education.

6. Demand will increase for citizenship training and training for local officials.

7. The conflict between land rich communities and land poor communities will spill over into the political arena.

8. Conflict will arise over the relative scarcity of entry level workers causing employers to hire more youths and the increasing demands of the educational system upon those same youths.

9. Educators will be charged with addressing the growing gap between "haves and have-nots."

10. There is a decline in support for secondary vocational education.

11. There is a decrease in community-consciousness as frustrations mount over the changes in societies and the growing complexity of life.

Educational System Trends

1. There is a trend toward adding more areas of study to the K - 12 curriculum, particularly in response to social and health needs of society,

2. There has been a recent deemphasis on dealing with problems of gender and age discrimination within the current systems.

3. Youth groups have been addressing fewer numbers of children.

4. Conflicts over "values" education have escalated.

5. Corporate support for education has increased with both personnel and funding.

Future

1. Developmental guidance and developmental placement will become more popular.

2. Individual learning plans will be developed for students.

3. Teacher shortages, particularly in math, science, special education, and adult education, will become acute.

4. Administrator shortages will grow.

5. There will be a longer school day and year in the K - 12 system.

6. There will be a greater diversity learning sites/structures/times throughout all of education.

7. There will be a greater diversity of providers in post-secondary education.

III

IMPLICATIONS

Preschool

Preschoolers are most profoundly affected by demographic trends. The facts that the "traditional" nuclear family will continue to disappear and that even more children will grow up in single-parent families and in poverty mean that more children will fall into "at risk" categories. The need for day care facilities will increase, as will the need to be fully-funded, but may themselves suffer from the lack of parent volunteer time. If the country does move toward the 32 hour work week or more flexible work schedules for all parents, some of these problems may be ameliorated.

Socialization of these children will be needed, as well as early attention to health problems before a child begins formal education. While the increased age of the average population will reduce the percentage of children in this age group and consequently their parents' political clout, the fact that there will be fewer children may allow for increased per capita spending at this critical early age.

Primary, Middle and Secondary (Ages 5-18)

Children in the age groups 5-11 traditionally are beginning their formal education in graded elementary school classrooms. Although there has been a trend lately toward developmental placement, most 5 year olds begin kindergarten, six year olds, the first grade, etc. In the year 2010, more of the children this age will have had pre-school, day care, Head Start or some other introduction to out-of-the-home education because of the increase in the number of families with no at-home parent.

More children whose first language is not English will be entering the school system. Overall, there will be fewer children in this age group than there are currently. Many of the children will be entering schools in communities with well-funded education

programs; others, perhaps from rural areas or other communities with small tax bases will be entering systems whose resources are stretched.

The educational demands on these children will be tremendous. Besides the basics of reading, writing, computational skills, and geography, these students will be expected to be computer literate, to have a n appreciation of their own culture, to learn about their own health needs, among a plethora of other requirements.

Advanced measurement techniques, both in pedagogy and within the social science disciplines, will "type" many of these students -- indeed, may have already typed them by the time they enter school. The student's individuality will be outlined, but there is the very real danger of the "typing" sticking to the child as a burden he can never rid himself of.

Because of the increased expectations from the world at large from formal education, many of these children will enter a formal structure that has a multitude of requirements upon their time and young energies. Lengthening the school year will no longer be an issue of discussion. The school year will likely be year-long with vacation periods adjusted to parents' work vacations when possible. The school day itself will be longer and will be effectively even longer for children who need the services of before and after school child care.

There is a very real possibility that, even more than today, the care and upbringing, -- intellectual, emotional, social, cultural, and ethical -- will be turned over to the schools. Extra-curricula activities traditionally in the province of the schools will provide some break for the child. Youth organizations, such as Boy Scouts, the 4-H, Camp Fire, etc. will need to integrate their functions with the demands of this environment. Their role may not be as easy to perform with the declining number of mother-chauffeurs -- but their role will be increasingly important in providing alternative forms of learning for the child, particularly in areas such as socialization outside the context of the school itself and in recreation.

As the student gets older, she will be facing even more severe "expectations" from the community, and the from business world in particular. Pressures to excel will exist in some areas while in other areas the traditional problem of low aspirations will still plague some Maine students.

Secondary students will also face financial pressures. Even now, 46 % of Maine secondary students work, many as much as 20 hours a week. Work outside the school is important to a student's development and may also be a financial necessity in some cases, but the pressures to work longer and longer hours will be intensified in a period when there is a dearth of low-skill entry-level age workers -- 18 % fewer in 2010 than today.

Technology will be a boon to most older students. In additional to enabling students to have access to a greater variety of courses no matter where they live, technology will make practical the individual learning plans that can focus on individual development and learning style preferences. With routine drills computerized, students will be able to master material at their own pace, in more diverse settings, and in a greater variety of presentations.

By the same token, each student should receive more individual counsel and guidance from teachers and other school personnel relieved of the more routine tasks that currently occupy a large percentage of their time.

Career Entry

While the age of most learners in the early life cycle stages will likely be essentially the same, those individuals who are entering a career will be a considerably more varied group than in the past. The implications of this trend are already evident in the growth of the non-traditional student at Maine's post-secondary institutions and in Maine's job training programs.

The average age of the 31,591 students in the University of Maine system in 1988 was 27.3, a full two years older than the student body in 1980. Of the 4,075 student increase in the system since 1980, 83% of new students are women. Full-time enrollment has declined in the system as the "baby bust" generations reach traditional college age, but part-time enrollment has increased 43%.

As the unemployment rate in Maine has sunk well below the national average and labor shortages appeared in many areas of the state, the state and employers have turned increasingly to workers who have not previously been in the workforce. While women have been the primary target group, individuals who previously were considered marginal -

- those on welfare, the disabled, the elderly, and those without basic skills -- are being recruited in far greater numbers for the workplace. Many of these individuals have need of basic work and literacy skills.

All of these non-traditionally learners have different needs than the traditional career-entry level individual. Many need flexible course schedules at universities or VTI's; many require day care facilities. They need different hours for educational support facilities, such as libraries or book stores. Primarily, they will need different teaching methods and delivery systems because of their diverse social, psychological, economic and cultural circumstances. In most cases they will need more aggressive job counseling and placement programs. They will need educators who are trained to deal with adults.

These individuals will have better access to facilities and courses because of advances in technology that will bring the courses they need to places where they can be and at time where they can take advantage of them. Still, they will need the presence of educators who can address their needs.

Career Development

Whether an individual has entered the workplace through traditional paths or not, on-going education for career development will be a part of every workers' future. The complexity of the world of work and the rapidly changing nature of jobs will demand that all workers keep current. John Reuthe, a Vice-President at Digital Equipment Company in Augusta, indicates that right now the company spends eight and one-half percent of its budget on training programs that simply keep workers current with their field. He notes that this expenditure is spread across the board, from the plant manager to the maintenance staff.

The Digital experience is not unique. With an estimated half life of two and one-half years for engineering information; with the rapid deployment of information processing systems, telecommunications equipment; with the continuing evolution of the global marketplace, "keeping current" has become a fact of life of the workplace. The American Society of Training and Development cites current figures for industry spending for in-house worker training at $45 billion. Other cite figures as high as $300 billion. It is

projected that by 1990, the number of people in "corporate classrooms" will be equal to the number of students attending four year colleges and universities.

With so many resources being devoted to keeping workers up-to-date, the corporate world may feel less inclined to train those workers who lack the basic skills described in Appendices 1 and 2. In fact, most sources consider that those individuals who do not have basic jobs skills will find themselves falling further and further behind. Corporate training funds will first go to those who have learned to learn.

Disquieting projections by several scholars suggest that industry will make the adjustment to the labor shortage by "dumbing down" jobs when there are not enough skilled individuals to fill current jobs. They further predict that industry may chose to organize itself along the lines of third world industries, taking advantage of low-skilled, low paid labor. Maine's heritage has included many instances of this in the past.

For those who do not have basic skills, the resources of the public sector are likely to be tapped in one way or another. A major public policy choice of the very near future will be whether to dedicate the funds to increasing the aspirations and eventually the educational skills of these individuals through investment in education and training or to dedicate the funds to the social costs brought about by their unemployment or low-paid employment.

Career Retraining

In addition to the career development needs of individuals, the changing job market will force some individuals out of their jobs on a permanent basis. Maine has already experienced this phenomenon vividly in the shoe, textile and poultry industries. This process is also likely to occur in other industries as the state moves into the 21st Century. While manufacturing sectors will be among the hardest hit, even the so-called professional and managerial sectors will be feeling the pinch of this trend.

The baby-boom generation, highly educated by historical standards, has, in fact, become over-educated for the workplace that will exist in the future. As the "boomers" hit their middle years in the upcoming decade, there will be too many people chasing too few high-level jobs. The resulting mid-career compaction will result in a greater number of

unemployed or underemployed individuals whose expectations are far different from those of the usual victims of structural unemployment.

Whether they are thrown out of work because of the lack of production jobs or because of a surfeit of executive talent within their industries, displaced workers will make demands on the educational system. Some will find themselves returning to school for basic literacy skills. Others will find themselves returning to school for career changes that are in keeping with their generally higher skill levels.

Productive Retirement

The increasing age of population, and advances in health care that allow for greater mobility among most older citizens, will result in an increased demand for education by the elderly population. Many of these retirees may return for recreational courses. Many may turn their interest to community involvement and require education to address the complexities of modern-day governance. Still others, in good health and with long, productive work histories involving a variety of career changes, may opt for yet another career change more suited to their lifestyle.

On the other hand, even those older citizens who enjoy good health have indicated over and over their relative concern over health care issues and funding compared to educational funding. It will be no small task to design educational services that will convince those members of our population who see an either/or situation with education and health care or any other social objective that the choices are not that stark.

All of these interest and needs will place demands upon our educational resources. But, at the same time, the availability of educational services for whatever demands will increasingly build a new constituency for education. We can despair over the fact that just when education is becoming more expensive that there are fewer households with traditionally school-aged children. However, just a brief run through the life cycle stages indicates a growing educational constituency -- a new constituency, but potentially a more powerful one than exists today.

IV
RECOMMENDATIONS

The recommendations of the subcommittee center around building a constituency for the financial and attitudinal commitments that will be essential for the life-long learning needed by Maine's citizens. We feel that recommendations must be responsive to the needs that will exist at the various life cycle stages. The recommendations must provide equal educational opportunities for Maine citizens wherever they live, whatever their income level, and whatever their current social and educational needs. The recommendations must promise effectiveness. The recommendations must provide public accountability when public policy or public funding is involved. Finally, in the spirit of other Commission recommendations, the recommendations of the education subcommittee must focus on community building.

The recommendations will not necessarily be popular, but they must be able to generate support over the long run. Change is never greeted with widespread approval, but individuals, communities and the state as a whole must change. One of the primary responsibilities of education is to enable people to cope with change, however difficult it may be.

Policy and Funding

1. Provide funding for the development and operation of Community Learning Networks.

Community Learning Networks are free, informal learning systems based on the belief that anybody can teach and anybody can learn.

Learning networks would help meet the growing need for adult learning in Maine as well as providing learning-exchange opportunities for people in rural areas, beyond commuting distance to a college or vocational center. Learning networks also encourage local problem solving, mobilize unused community resources and foster a positive attitude toward learning.

We recommend that the legislature make state funds available to communities wishing to start learning networks. The funds would be available to each community for three years. (the average yearly amount of state support paid to participating Kansas communities in 1984 was $1,300 with an annual per capita cost of less than $8). After three years of state funding, the community's program would continue under local auspices.

Coordinating and technical assistance for communities wanting to start learning networks would best be handled by the Cooperative Extension Service. The Cooperative Extension Service is already in the adult education field and the Community Development Specialist at Orono, Jim Killacky, conceptualized, designed and implemented learning networks in Kansas and completed a doctoral dissertation on free universities ar Harvard.

2. Establish a life-long education guidance network.

This network would provide information and guidance for adults seeking to re-enter the educational system. It would be similar to the Guidance Information System presently at high schools. A data base of Maine and New England schools -- including graduate schools, massage, bartending, travel agent, real estate schools, etc. -- would be established. There would be multi-access to this data base through the Maine Job Service, all high schools, colleges and universities, the ITV system and libraries. There would also be a toll free number set up where staff guidance counselors would search requests for school information free of charge and offer counseling. A similar program is the Business Answers toll free line. The data base could possibly be housed at the Maine State Library along with the Information Exchange which already has a toll free number. The center would also advocate life-long learning with pro-education advertising campaigns.

3. Begin transferring public school funding and policy-making authority to the state; shift teacher funding to the state.

The state would thus be the employer of every teacher in the state and pay all salaries. One statewide contract would be negotiated at the beginning of the year thus eliminating debilitating and lengthy contract disputes at the local school level. The salary schedule would pay teachers based on their years of teaching as opposed to being determined by the community's ability to pay. Local schools would still govern hiring and firing and could supplement the base salary. This shift would lift the school funding

burden of the property tax as the population ages and fewer households have school age children. This state contract also creates no impediment for teachers to go to different schools and may even attract teachers to Maine.

As teachers become state employees, they should be employed on a year-round basis with their time divided among professional training, teaching and vacation time. Also, paid semester and year-long sabbaticals should be instituted for teachers at all levels.

Provide guidelines for local schools to recognize and emphasize the basic skills of reading, writing, computation, and technological literacy. Provide incentives for schools to devote primary time to these subjects.

Establish locally based curriculum review processes that call upon students, parents, teachers, and community members to develop specific curricula within the minimum guidelines set by the state.

Expand successful programs from the Restructuring Schools program, particularly in breaking the barrier of the time schedule, involving teachers in collaborative decision-making, enhancing team teaching, and promoting interdisciplinary curriculum development.

3 A. Establish a target date -- 2000 -- for completing this transfer.

4. The state should run a pro-education advertising campaign.

The prevalent image of education today is that it is over at a certain age, after a certain grade. To help prepare Mainers for a lifetime of learning and to help foster a positive image of continuing education, an ad campaign should be run throughout the state. The ads -- to appear on tv, radio, newspapers, buses -- will give a fun view of education, increase awareness of the need for education and give the message that education is never finished at any certain age.

5. Plan and build new school structure with the future in mind, including provision for future technological equipment, flexible spaces, provision for adult learners and provisions for year-around school use.

6. Open high schools to all adults.

Over the next 20 years, traditional high school population in Maine will decrease leaving high school facilities and space under-utilized. At the same time, the need for adult education will increase and demand facilities where this learning can occur.

By opening Maine's high schools to all adults, -- workers needing to learn new skills, citizens wanting to be better informed, individuals wanting to learn more -- the wider community can take advantage of high school resources. For instance, a small business owner could learn accounting, a business person could study Spanish, a retiree could take up photography -- all of this at no charge.

This won't of course be the answer for everyone going through a job change or career development due to the level of classes available and the day time hours. But those who do go will have free access to classes they need or want to further their education,. These adults will add another dimension to the high school setting and represents a step toward transforming current day schools into community learning centers.

Currently at DECS, one person with one-fourth of a secretary and a $7,000 budget, is charged with coordinating 350 school volunteer programs, developing new programs and providing training throughout the state. One person is not enough.

To effectively provide the wide range of educational needs of the 21st century, educators, learners, parents and guardians, members of business, industry and government will all need to be involved in the educational system. This cross pollination broadens the school's resource base and lightens the burden placed on classroom teachers. Schools in Maine need technical assistance on how to involve these various facets of their local communities.

By making an investment in fostering community involvement now, Maine schools in 2010 won't be just schools but community resource and learning centers.

7. Encourage Maine's public and private post-secondary schools to link with employers to develop and deliver worker retraining programs.

As Maine moves further into the information age, new skills will emerge. Before teachers can teach the new skills necessary for the 21st Century, the teachers will have to learn these new skills. And with more adults re-entering the learning system, teachers will have to learn effective ways to teach adults. Thus the most critical component of human resource re-skilling is the re-skilling of teachers.

While Maine's VTI system is already involved in providing worker retraining programs, their programs are compatible with certain industries -- manufacturers for example -- that the VTI's already serve.

Retraining is and will be needed for professions taught at public and private colleges and universities such as law, social work and teaching.

The adult education system should also be encouraged to pursue worker re-skilling, especially in the area of literacy.

Establishing such programs not only benefits Maine's workers but the school as well. If Maine's colleges and universities are to survive the predictions that many higher education institutions will close over the next twenty years due to soaring tuition, demographics, funding problems and external degree programs, they will need to expand the educational services they offer.

8. Expand the 1-year teacher certification program at University of Southern Maine to other campuses in the University of Maine system.

At University of Southern Maine, the 1-year certification programs for secondary schools is in its sixth year; for elementary schools its second year. Currently a total of 33 students are enrolled in these two programs. Students receive master's level credits in these programs.

While a 1986 report on teacher supply and demand in Maine identified only subject specific teacher shortages and didn't echo national concerns about widespreaad teacher shortages, the number of "conditional certificates" issued on an annual basis (336 in 1986) indicates that many school districts can't find enough certified teachers for existing vacancies. Certain geographic areas of the state, particularly Washington and Aroostook counties, have unique teacher supply problems.

Establishing additional 1-year teacher certification programs in other parts of the state, will enable professionals to enter teaching as a second, third and fourth career. By establishing such a program at Fort Kent, Presque Isle or Machias, people who have settled in that area can become certified and teach there.

Graduates from these programs bring varied work and life experiences to the teaching profession, enriching the students' learning experience and reinforcing the idea that we all are educators and learners.

9. Expand education programs at Maine colleges and universities that prepare teachers to work with adult learners.

The Adult Ed program at USM-Gorham has 85 students and is the only one of its kind in northern New England. With the population in Maine becoming older and more adults re-entering the education continuum, there will need to be more teachers who know about adult learners and their special needs.

10. Elevate the status and pay of adult educators.

Currently there are only a handful of full-time adult education teachers in the state. Those who are full-time are paid $5,000 less than comparably educated day school teachers and work 39 more days per year. Adult ed programs are expected to help immigrants learn English, help drop outs complete high school, help illiterates read and help retirees have productive later years.

With the importance of adult education increasing, adult education teachers should get paid at least the same amount as day school public teachers. Adult ed programs should be considered equally with other school functions in the award of grant money by the state. Professional associations of teachers should court adult ed teachers for membership and advocate for their equality and recognition.

11. Establish a review process for the hiring and promoting of school administrators and teachers that works positively toward the goals of more female administrators and more male teachers, particularly in the primary grades.

12. Move quickly at both the hiring level and within teacher education programs to differentiate specializations within the teaching profession.

Changing demographics, technology and expectations of the schools are likely to transform the teaching profession in ways analogous to the transformation of the medical profession more than a generation ago. Teamwork and specialization are likely to replace the solitary practitioner in the classroom as software developers supplement curriculum planners, experts in pedogogy supplement experts in subject areas, health and social service providers supplement guidance counsellors.

13. Implement technological innovations and teaching techniques to provide individualized learning plans for each student.

14. Work in conjunction with nationally-based Learning Research Networks to develop evaluative measures to determine the "effectiveness" of various techniques and strategies in education.

Appendix 1

SUMMARY OF GENERIC SKILLS

Mathematics Skills (11 areas; 34 skills; 192 subdivisions of skills)

1. *Whole numbers*: Read, write, and count; add and subtract; multiply and divide; work problems; round off.
2. *Fractions:* Read and write; add and subtract; multiply and divide; word problems.
3. *Decimals:* Dollars and cents; read, write and round off; multiply and divide; add and subtract; work problems.
4. *Percent:* Read and write; ratio; proportion; percentage; rate; principle.
5. *Mixed operations:* Equivalents; order of operations; work problems; quick calculations; average.
6. *Measure:* Read graduated scales; read verniers; time; weight; distance; capacity.
7. *Metric measure*: Weight; distance; capacity; weight conversion; distance conversion; capacity conversion.
8. *Geometric figures:* Forms and figures; angles; draw; sketch; perimeters; areas; volumes.
9. *Drawings and graphs:* Read graphs; read scale drawings; read assembly diagrams; read schematic drawings; draw graphs; measure from scale drawings; draw a scale.
10. *Algebra:* Single variable, open sentences; single variable, powers and roots; solve given formulas; integers and rationals; variables and expressions; two variable, open sentences; quadratics.
11. *Calculations:* Logs; slide rule; trigonometry calculations; calculator.

Communications Skills (7 areas)

12. *Words*: Plurals; prefixes, suffixes, and root words; contractions and abbreviations; dictionary; synonyms, antonyms, and homonyms; meaning and context; books.
13. *Listen:* Literal comprehension; interpretive comprehension; evaluative comprehension.
14. *Talk*: Pronunciation; diction and word choice; fluency; organization of ideas; ask 6W question; give information and directions; use telephone.

15. *Read I:* Literal comprehension; interpretive comprehension; evaluative comprehension.

16. *Read II*: Forms, notes; letters or memos; charts and tables; manuals; Roman numerals X; Roman numerals XXX; Roman numerals M.

17. *Write I*: Phrases on forms; sentences on forms; paragraphs on forms; sentences; paragraphs; short notes; take notes.

18. *Write II*: Form letters; single paragraph letters; internal memos; business letters; information reports; recommendation reports; technical reports.

Interpersonal Skills (7 areas)

19. *Attending behaviors*: Physical; cognitive; reactive; covert.

20. *One to one conversation*: Elementary conversation; task focused conversation; express own point of view; personal conversation; persuasive presentation.

21. *Group discussion:* Preparation; presentation of information or directions; control group decision-making; group maintenance; participate in group discussion; respond to information or directions; persuasive presentation.

22. *Oral presentations*: Preparation; factual information; listen, respond; conceptual; persuasive; reactive.

23. *Instructional communication*: Establish training; instruction; demonstration; monitor; evaluate.

24. *Supervisory communication*: Give directions; demonstrate; give praise; give discipline; prepare evaluation reports.

25. *Interview/counsel communication:* Preparation; closed questions; open questions; confrontation; interview job applicants; negotiate.

Reasoning Skills (9 areas)

26. *Obtain job related information:* Tools, materials and equipment; methods and procedures; sequence; other information; theories.

27. *Organize information*: Sort objects; sort data; rate; rank; develop classifications.

28. *Estimate*: Time, weight; distance; area; capacity; cubic measures; costs.

29. *Tasks*: Sequence; priority.

30. *Objectives and methods*: Goals; activities; alternatives; criteria; priority; analysis; deduction.

31. *Diagnosis*: Cause and effect relationships; possible problems; priorities; possible methods; probing questions; use senses.

32. *Problem solving*: Relevant information; alternative statements; select statement; alternative solutions; select alternative.

33. *Plan and coordinate*: Activities and sequences; outline plan; identify resources; estimate resources; critical activities; detailed plan; resource requisitions.

34. *Implement work*: Monitor results; standards of quality; standards of quantity; standards of completion time; priorities of standards; authority and responsibility; update plans.

Appendix 2

COMPOSITE LIST OF TRANSFERABLE SKILLS

Intellectual/Aptitudinal

- Communicating
- Problem Solving
- Analyzing/Assessing
- Planning/Layout
- Organizing
- Decision-Making
- Creativity/Imagination/Innovation
- Problem Identification/Definition
- Managing One's Own Time
- Basic Computation
- Logical Thinking
- Evaluating
- Ability to Relate Common Knowledge or Transfer Experiences
- Coping with the Labor Market and Job Movement
- Understanding Others
- Synthesizing
- Marshalling Available Resources
- Accommodating Multiple Demands
- Judgment
- Foresight
- Trouble Shooting
- Job Awareness
- Mechanical Aptitude
- Typing
- Accounting
- Implementing
- Self-Understanding, Awareness, actualization
- Situational Analysis
- Assessing Environments/Situations

Understanding Human System Interactions
Organizational Savvy
Conceptualization
Generalization
Goal Setting
Controlling
Quantitative Thinking
Dealing with Work Situations
Finance
Tool Usage
Bookkeeping
Artistic Ability
Business Sense
Tolerance of Ambiguity

Interpersonal

Working with, Getting along with, or Relating to Others
Managing, Directing, or Supervising
Empathizing, or Being Sensitive to Others
Teaching, Training, or Instructing
Counseling
Motivating
Gaining Acceptance, or Building Rapport
Helping, or Cooperating
Cultivating Cooperation
Selling
Accepting Supervision
Delegating
Instilling Confidence
Team Building

Attitudinal

Diligence, or a Positive Attitude toward the Value of Work
Receptivity/Flexibility/Adaptability
Determination/Perseverance
Acceptance/Appreciation/Concern for Others

Responsibility
Willingness to Learn
Ambition/Motivation
Self-Confidence
Self-Discipline
Pride
Enthusiasm
Patience
Self-Actualization
Assertiveness
Honest
Loyalty
Reliability
Risk Taking
Compromising
Kindness

EDUCATIONAL RESOURCES

Information Exchange
Maine State Library
State House Station 64, Augusta, ME 04333
1-800-322-8899 or (207) 289-5620

The Information Exchange, housed in the Maine State Library, is a service of the Maine Department of Educational and Cultural Services. It provides free data base searching services to any educator in Maine. Data bases accessible include:

• Maine Resource Bank (MRB)- contains resource information about educational programs, projects, services, instructional materials and Maine people willing to share their educational expertise.

• ERIC (Educational Resources Information Center)- a federally funded system that collects literature on all aspects of education. The collection includes 300,000+ journal articles and 250,000+ other documents all of which are indexed and abstracted. This database is updated every three months.

• A-V Online- contains 350,000+ descriptions of videotapes, 16mm films, audio tapes, filmstrips, slide sets, transparencies and film cartridges of an educational, documentary or informational nature.

Maine Center for Educational Services
223 Main Street/PO Box 620
Auburn, ME 04210
(207) 783-0833

• National Diffusion Network/Maine Facilitator Program

NDN links educators in local school systems to successful practices in other states. Several hundred educational programs have veen validated by the U.S. Dept. of Education. These model programs, accessed through the NDN, offer solutions to educational problems and consultation and support for new educational programs.

Contact: Elaine Roberts

• **ME-LINK**

A computer-based electronic information system offers Electronic Mail and Special Interest Forums for Maine Educators. Electronic Mail allows sending and receiving private messages. Special Interest Forums are electronic message boards where users can share and exchange information and news.

Contact: Cathy Glaude

The Center also offers staff development, human resource development and consulting services.

Work/Education Resource Center

State House Station 71
Augusta, ME 04333
289-2334 or 289-2331

Free lending library of 2000+ items for educators and human resource development professionals. The materials are divided into three general categories: elementary, secondary/adult, and professional development. Available in many formats including audio-visual, print and software.

Located in office of Maine Occupational Information Coordinating Committee(MOICC). Operated by Maine Career Education Consortium.

Adult and Community Education Staff Development Project Resource Center

105-126 Shibles Hall
UM Orono 04469
581-2498

A collection of 3500+ instructional and professional materials for adult education directors, teachers, counselors and support staff. Textbooks, workbooks and audio-visual materials available for 2-week loan period.

COMMON WEALTH

THE REPORT OF THE SUBCOMMITTEE
ON NATURAL RESOURCES AND THE ENVIRONMENT
TO THE COMMISSION ON MAINE'S FUTURE

March, 1989

THE SUBCOMMITTEE ON NATURAL RESOURCES AND THE ENVIRONMENT

James F. Carter, Washburn
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INTRODUCTION

But Maine, perhaps, will soon be where Massachusetts is. A good part of her territory is already as bare and commonplace as much of our neighborhood, and her villages are generally not so well shaded as ours. We seem to think the earth must go through the ordeal of sheep-pasturage before it is habitable by man.

Henry David Thoreau
The Maine Woods

1. Statement of Purpose

Thoreau's observation more than a century ago still holds meaning for a study of Maine that looks to the future for a glimpse of where our state is likely to go. From the perspective of our past we may gain the insight to form a reasonable and even probable vision of our future.

This vision, subject to unanticipated change and to intentional public choice, is our objective. It becomes clear in the study of what might be or what might happen, that we cannot predict the future but can only identify trends, make assumptions based on the past and use good old common sense to get a view of what's to come.

In the increasing urban sprawl of southern Maine, Thoreau's sheep-pasturage may have its reflection in the 1980s. In the "bare and commonplace" of suburban development, the open space of a real sheep pasture has become a scarce resource. The job of the

Subcommittee on Natural Resources and the Environment of the Commission on Maine's Future is to envision the sheep pasturage of tomorrow. The following report will attempt to do just that. It will identify trends, it will contain our recommendations and it will, to the best of our ability, reflect the views of the majority of Maine people.

2. Situation

Maine has 3,500 miles of coastline, 5,779 lakes and ponds -- 3,500 of them publicly-owned Great Ponds -- and 31,672 miles of rivers, brooks and streams. It has the largest land area in New England and the lowest population density, 38.5 persons per square mile. The state is covered with 2,314 different species of vegetation and is home to 535 different species of wildlife. Maine is nearly 89 percent forested, the greatest proportion of any state in the nation. Nine mountains rise above 4,000 foot elevations; 3,600 coastal islands rise above the level of the sea.

It would be difficult to overstate the importance of this natural environment to the people of Maine.

For generations, we have taken our livings from the wealth of natural resources that has traditionally been just outside our doors. But Maine's environment has yielded more than wealth. In even greater numbers, we have taken our leisure from those resources as well.

With Maine's intangible assets -- the solitude of woods and waters, the refreshment of beaches and bays, the drama of scenic landscapes, the reassurance of an unmistakable sense of our physical place -- we have acquired continuity, culture and a sense of who we are. We have attuned ourselves to a seasonal rhythm and discovered a depth of character in interaction with the physical and biological worlds.

To an unusual degree, Maine's people share a common sense of environmental value. In polls conducted for the Commission, majorities reached two-thirds, three-quarters and even 80 percent in favor of environmental protection, of resource preservation and of the primacy of public access to privately-held natural resources. We allege our willingness to tax more, spend more, regulate more, trade off jobs and property rights to support this common cause. By similar majorities at the ballot box we have, since the

1970s, voted to preserve mountains, buy public land, prevent dams, protect water and recycle waste. The one thing most of us would not want changed by the future is our environment; the one thing we most often say we mean by quality of life is the natural beauty of Maine.

We have not been alone in these opinions. For decades, a steady stream of inmigrants, businesses and visitors have been drawn to the state by the high quality of its natural environment. In the future, each of these groups will gain in importance in Maine's ability to sustain a vital and prosperous economy.

- As early as the mid 1990s, inmigration will become the most important growth element in Maine. Young inmigrants will increasingly supply the labor force needed by our own aging and faltering population.

- Local quality of life and available labor have become the most important considerations in many business location decisions.

- Tourism, despite current problems of labor supply, low wages and the threat of crowding to the quality of the Maine experience, will remain a basic and growing part of the state's industrial mix.

These trends are building Maine's environment back into our economic future at the same time that the traditional resource economy of our past is declining in importance. As a result, Maine's clean and healthy environment and astonishingly rich reservoir of natural resources are likely to remain, as they have always been, at the center of our lives, our livings and our legacy to the future.

2.1. Growth

But for an increasing number of people in the 1980s, less and less of Maine's rich natural diversity remains just outside our doors. The pressure of urbanization on the southern part of the state has brought radical change to the region's use of air, water, land and recreational resources. The fact of urbanization, however, has brought income,

consumption and cultural opportunities to the region that must be balanced against development, posted land and crowded conditions. Nevertheless, when the same urban conditions impinge on the eastern Maine town of Addison, the central Maine town of Troy and the western Maine town of Temple; when congestion diminishes the experience of Baxter and Cobscook Bay state parks; when the very soil of Monhegan's nature trails may be measurably reduced by the Weejuns and Reeboks of the morning ferry run, it seems difficult to deny that something fundamental to life in Maine may be disappearing.

Concern over growth was prominent in the report of the First Commission on Maine's Future. But it was not until the suburbanizing pressure of thousands of new Baby Boom households joined forces with the New England economic recovery of the 1980s, that the focus of general environmental concern shifted from the air and water issues that dominated environmental policy since the 1960s to problems that are associated with land use.

Land use problems occur in Maine on three tiers, those of physical capacity, carrying capacity and depletion of common property resources.

o At the level of physical capacity, we are faced with the need to invest in the expanded infrastructure required to serve the larger population and broader economy we have gained through the 1980s. If we are to reduce traffic congestion, we will not be able to avoid substantial new investments in roads, bridges and urban bypasses. If we are to recover an affordable housing market, we will not be able to avoid building new homes. If we are to avoid recurrent crises in water supplies and waste disposal, we will have to create the systems and locate the sites required to accommodate a level of demand that is not going to go away.

o At the level of carrying capacity, our problems are much more contentious and much less clear. While potable water is perhaps the critical limiting factor in a region's ability to support populations of a given size, we simply do not know the population level that will strain or even approach the water supply and recharge capacity available to southern Maine We do not know how rapidly we can draw down bedrock aquifers in coastal Maine before sea water intrudes to turn them brackish. Nor have we made the crucial political choice, in a state

which taps only one percent of its 3.5 trillion gallon recharge capacity, of where southern or coastal Maine's regional boundaries should be established. Water supply lines can extend for hundreds of miles in urbanized parts of the United States. Will an urbanizing Maine follow that pattern? Or will we opt for a new pattern of "sustainable development" in which population growth will be limited by the available water supply within municipal, county or regional boundaries?

A second limiting factor in urban areas is the ability of air to absorb the waste emissions from concentrations of private vehicles. Even where road systems are expanded to reduce traffic congestion, the increasing numbers of vehicles associated with urbanization contribute incrementally to the degradation of local air quality. As urbanization continues in southern Maine, abetted by established trends toward fewer people and more vehicles per household, growth may eventually be constrained by the carrying capacity of the region's air. Public regulation, not only in the interest of public safety but in the interests of public health and economic development potential, as well, may increasingly intrude in the traditionally private decisions affecting how we use our vehicles and the kinds of vehicles we use.

o At the level of common property depletion, our problems are the most intractable of all. Incremental growth produces cumulative effects on wetlands and wildlife, on open space and the visual quality of Maine's landscape, on air and water quality, and on the opportunity for relaxation and recreation within easy reach of our homes. But these are precisely the intangible assets we say we would most want to preserve about Maine. They are our common legacy, but there is no probate court where we can press our claim; no marketplace where we can put up our money and register our preference to keep these things the way they are. In the absence of more appropriate institutions, we have turned increasingly to the political process to make the fine discriminations between competing rights to private and common property.

The shift in concern from air and water to land, however, goes beyond the central, but decidedly present-tense, problems of growth. Indeed, the side effects of land use have

become the most significant determinants of air and water quality, and the behavior of individuals toward common environmental property has become the challenge of a new generation of environmental management. Even as growth pressure slows and perhaps collapses in the demographic stagnation of the next century, the central role of land use on other resources will have taught us to manage regional interconnections and not just discrete impacts on isolated resources.

TABLE 1
WATER QUALITY INDICATORS

Water Body	Percent Fishable / Swimable	
	1985	1988
Lakes, Ponds	96.4	96.5
Major Rivers	89.4	93.4
Minor Rivers	93.0	94.5
Streams	95.1	95.4
Brooks	99.2	99.2
Other Inland Waters	98.4	98.4
Offshore Marine	100.0	100.0
Nearshore Marine	98.1	99.0
Intertidal Zone	-	82.0

Source: The State of the Environment (Draft), State Planning Office, Oct. 1988

2.2. Environmental Quality

Maine's air and water quality, with significant exceptions, may be as high as they have been at any time in the 20th Century. Rapid strides through the 1970s and early 1980s in attacking industrial pollution have brought virtually every class of surface water in the state to within a few percentage points of total clean-up. Only a handful of lakes, limited sections of rivers and streams, and very specific areas of near shore marine waters fail to meet federal standards of safety for swimming, fishing and shellfish harvesting. This clean-up, moreover, has been achieved in the face of a "disappearing zero" in some state and federal standards, which has dropped from pollution measures based on parts per million in the 1970s to standards based on parts per trillion today.

Similar, if less dramatic results have been achieved for industrial air pollution as well, with the suspended particulates and sulphur oxides associated with classic smokestack pollution declining to below ambient air standards throughout the 1970s and 1980s. Reductions in carbon monoxide and lead emissions associated with obsolete automobile engineering fell through the period as well. While regulatory staff capacity remains a concern, these gains have resulted from a functioning system of fines and enforcement that has demonstrated its basic reliability for protecting fundamental air and water resources. In the future, this system is likely to be expanded to include additional scores of pollutants not now controlled by public regulation.

TABLE 2
TRAFFIC VOLUME ON SELECTED MAINE HIGHWAYS
Decennial Change: 1977 to 1987

Baseline Reference: Change in Passenger Cars Registered to Maine Residents 1977 to 1987 .....+ 31 %

Highway System	Count Location	Percent Change	Highway System	Count Location	Percent Change
I - 95	Kittery	100	U.S. 1	Ogunquit	35
	Sidney	49		Waldoboro	41
	Carmel	50		Rockport	30
	Medway	43		Hancock	32
U.S. 2	Farmington	38		Houlton	21

Source: The State of the Environment (Draft), State Planning Office, Oct. 1988

Yet the result of these achievements has been to reveal a much more persistent, if perhaps less dangerous dimension of pollution resulting from the behavior of individual consumers, individual drivers, individual householders. Virtually all of the remaining water pollution and much of what remains in the air stems from non-point sources associated with lawn, road and agricultural runoff, with private automobile emissions, with septic systems, and with municipal facilities that dispose of sewage and solid wastes.

Ozone and nitrogen oxides, associated with individual personal transportation are the pollutants on the rise in Maine. Despite national publicity about ocean pollution,

Maine's offshore waters are clean. It is the nearshore estuaries and bays that receive municipal wastewater and storm runoff, and the sediments of tidal flats embedded with overboard discharge wastes, that are below acceptable standards.

Nevertheless, while Maine has made real progress in reversing the impact of industrial pollution, much of the United States and eastern Canada have not. Much of our ozone pollution and more than 90 percent of our acid rain drifts across our borders from industrial centers elsewhere on the continent. Greenhouse gases and ozone-depleting CFCs, with minor exceptions, originate beyond our borders but threaten the long-term viability of the planetary ecosystem itself. Unrelenting ocean dumping on a world-wide scale will inexorably drift into the funnel-shaped *cul de sac* of the Gulf of Maine.

Globally and locally, non-point pollution is the environmental challenge of the future, a challenge we are only marginally prepared to address. Indeed, the risk is that, having climbed through the past twenty years to the present high point of environmental quality, we may have reached a peak from which quality levels will deteriorate in the coming decades.

2.3. Policy, Coherence and Environmental Management

Maine never did meet the challenge of sheep pasturage that concerned Thoreau in the middle Nineteenth Century. By the turn of the 20th Century the state had more sheep than people and more cleared land than does the suburbanizing society of the present day. The sheep declined only with the rest of Maine agriculture in the second wave of industrialization that followed hydroelectric development.

The seeds of an environmental policy were planted in Maine in the 1930s, when the former governor, Percival Baxter, granted the people of Maine the great gift of Katahdin and the first of what would grow to become the surrounding 200,000 acres of forestland. The philosophy was, in the wisdom of the day, Conservation, and Baxter Park was to be held "forever wild," a place where the heritage of an undeveloped continent could be set aside from change and held in the public trust. Conservation has remained at the heart of Maine's evolving environmental policy through the succeeding years, and Baxter's example has been followed repeatedly in public and private actions alike from Acadia to Bigelow; from Big Reed Pond to the continuing acquisitions by the Land for Maine's

Future Board; from the creation of a quasi-market structure of transferable development rights around Moosehead Lake to the commitment by individual towns throughout the state to purchase their own conservation lands.

Yet despite this start toward conserving the best of Maine, the State in the 1930s was still a generation away from even the first steps toward the environmental policy reflected in today's remarkable consensus. The Aroostook, Kennebec, Penobscot, Presumscot, St. Croix and St. John had been "grossly polluted," in the words of the state's own Department of Environmental Protection, right from the beginning of the century. The Androscoggin ranked among the ten most polluted rivers in the nation until at least the 1960s.

By the 1940s, Maine began t o take up the challenge of Baxter and Thoreau. The goal of preserving water quality throughout the state, and not just within the confines of high-quality and pristine preserves, was introduced with the creation of the Sanitary Water Board. At the same time, however, a critical pattern was laid with the piecemeal accumulation of rulemaking responsibilities in this agency, which was subsequently reorganized twice to emerge in the 1960s as the Board of Environmental Protection.

Abetted by new Federal initiatives, Federal standards and, especially, Federal funds, Maine moved aggressively through the 1970s to control the quality of its air, its water, its soil and even to control the use of land in the shoreland zone. Regional planning was encouraged and the small Regional Planning Commissions, created in the 1960s, were expanded and given new responsibilities. The State re-exerted its ownership and authority over the Great Ponds, the submerged lands, intertidal zone and the public lots reserved in the creation of each township in the state. Environmental Quality had become, with Conservation, a second leg under the State's environmental policy. Yet while states like Virginia and North Carolina have codified fundamental principles of environmental policy in Constitutional amendments, Maine has continued to rely on its original pattern of uncoordinated, cumulative policymaking divided between agencies and elected officials.

Through nearly fifty years of experience, Maine has evolved a system of environmental policy-making, regulation and control based on the piecemeal accumulation of goals established from time to time by the Governor and Legislature, and of rulemaking authority distributed through various agencies and departments of State and local government. While the principal responsibility for environmental management rests with

the Board and Department of Environmental Protection and with the Land Use Regulation Commission, the Departments of Agriculture, Food and Rural Resources, Conservation, Marine Resources, Inland Fisheries and Wildlife and others have also been charged with individual details of overall environmental quality control. Pesticide regulation is housed at Agriculture, shellfish beds at Marine Resources, growth management at Community and Economic Development, land use at hundreds of local planning boards. Seven different State agencies manage water quality at different stages of a single hydrologic cycle.

While the interconnectedness of all environmental resources within an ecological system is a widely-recognized biological principle, this diffusion of regulatory and rule-making authority throughout State and local government undercuts Maine's capacity to approach environmental management with a coherent policy, with clear objectives and with an integrated approach. Despite the creation in 1976 of an interagency Land and Water Resources Council at the Cabinet level to coordinate environmental policy among State, regional and University agencies with an interest in natural resources (including the Departments of Human Services and Transportation), even the assembly of a comprehensive set of basic information describing the size and current condition of Maine's natural resource base requires a team of specialists and up to a year of effort to produce. The work product of that year of effort, moreover, simply describes the current state of Maine's environment. The limited quality of the data neither allows the historic trends in environmental quality to be reconstructed, nor allows expected trends to be projected into the future. Careful analysis and rational management of Maine's environment, therefore, remain well beyond the scope of present-day State information resources -- a situation that, even if corrected immediately with a massive data base project, can be expected to persist at least through the turn of the century.

In the past, the diffusion of authority and information throughout the State environmental bureaucracy made little difference in Maine's apparent ability to manage environmental quality. The relative importance of large, individual, industrial polluters on environmental quality allowed State regulators to easily identify damage and to monitor cleanup. As a result, the State has evolved an environmental regulatory system that is adapted to controlling the activities of single, large sources of pollution. State departments most closely associated with those industries became the most natural and efficient locations for this regulatory activity. Information, coordination and the development of a comprehensive overview of the whole environment were of little practical use in this fragmented system. Policy objectives, in particular, were simple and straightforward, with

little room for confusion or communications failures between regulators and elected officials. As a result, Maine did not develop an environmental policy, as such, but rather a series of specific, achievable but unintegrated environmental goals that imposed specific costs on specific industries for the use of specific natural resources.

As a new generation of environmental challenges emerges, however, -- challenges arising from the activities of individuals as well as industries and from comprehensive, interconnected environmental impacts as well isolated, specific sources of damage -- Maine's approach to environmental management will no longer be adequate. Indeed, in two aspects, the State's management approach may already be said to have collapsed.

- In the face of an increasing number of site development applications, the State's entire permit approval system -- from the DEP and LURC to dozens of local planning boards -- has collapsed into gridlock. The State agencies by 1988 faced backlogs averaging two years from the time of application to the final decision, while the local boards in many municipalities have taken refuge in subdivision or building moratoria in order to complete comprehensive plans before ruling on permit applications.

- As the details of environmental management have become more complex, more technical and more sensitive to the subtleties of biological interconnections, the gap between policy and interpretation, and the opportunities for poor communication between elected and appointed officials, have grown. DEP, in particular, has come under fire for deviating from the intent of Legislative policymakers in, for example, imposing excessively strict interpretations of policy goals in its enforcement of the Great Ponds Act, and for excessively broad interpretations in its evaluation of the damage potential of development on wetlands.

Maine has reached a point in the evolution of its system of environmental management at which the identification of basic principles and broad policy goals can no longer be avoided. It was once clear that we did not want untreated sewage and industrial

wastes to be discharged directly into our rivers and bays. It was also clear why we did not want those discharges to occur. It is no longer so clear what we mean when we say, for example, that we want to preserve wetlands or open space.

Wetlands, particularly coastal wetlands, serve important environmental functions, including fisheries nurseries and shoreline stabilization. Freshwater wetlands are important for flood control, wildlife habitat and for buffering lakes and watercourses from nonpoint runoff. Yet Maine is fifteen-to-twenty-five percent wetland, much of which is neither coastal nor associated with larger bodies of water. The basic value is in wildlife habitat, but we have not yet answered the fundamental policy question of whether these additions to habitat are, in a state with more than 27,000 square miles of forest and nearly a million acres of public lands, worth placing a significant fraction of the state's land area off limits to human activity. Nevertheless, we have already begun the process of extending wetland protection to include the upland or "critical edge" of land that borders on these areas.

Similarly, open space or undeveloped land is an important part of Maine's traditional environment that has provided aesthetic and recreational opportunities to generations of the state's people. As this land increases in value under the pressure of suburbanization and as changing non-economic values lead more owners to post their land, this resource has become the focus of conservation efforts with broad public support but little policy direction. As in the case of wetlands, Maine's elected leaders have not yet made it clear what is to be preserved in the conservation of open space, how much of it and why.

Maine's piecemeal environmental policy has evolved on the basis of two general principles -- *Conservation* and the *Protection of Environmental Quality* -- and under conditions of regulating large, easily identifiable sources of pollution. By *Conservation* we have traditionally meant the set-aside of individual, usually high quality parcels of land for preservation from economic development and change. By *Environmental Protection* we have traditionally meant the protection of resource quality from abuse and degradation within the context of multiple use, including use for human economic activity. Neither of these basic principles seems to hold the key to the development of the environmental policies of the future -- policies that will be increasingly concerned with the conflicts between legitimate rights and the competition between legitimate demands. The techniques of regulating a small number large industrial polluters likewise do not seem to be adaptable

to the challenges of managing the environmental impacts of thousands of people in their everyday lives.

We need, rather, a new statement of basic principle and a clear statement of policy from our elected leaders, which recognizes the comprehensive, interconnected nature of our bioeconomic environment and which defines what we expect as the minimum standards of environmentally responsible activity. We need from our appointed officials a new approach and new techniques for managing this complex, interconnected community of living organisms -- an approach that limits the intrusiveness of an inevitable regulatory expansion into *everyday* life. And we need from ourselves the personal and collective responsibility to manage our own behavior, to recognize our own contributions to environmental decay, and to provide the money, people and tools our governments will need to protect the environment of the 21st Century.

FINDINGS

3. Pressure Points

Compared with the past and with much of the rest of the United States, Maine's environment is in relatively good shape. Air and waters are basicly clean. Population density is the lowest in New England and declining relative to the rest of the region and the nation.. Undeveloped land, viewed from a statewide perspective, is available in considerable quantities. Recreational opportunities, again from a statewide perspective, continue to be widely available. The natural resource base continues to provide substantial, if declining numbers of jobs for Maine citizens. Wildlife is populous and a number of endangered or once-lost species have been stabilized or reintroduced, among them Bald Eagles, Perigrine Falcons, Atlantic Salmon and, perhaps in the near future, Caribou. The natural beauty of the state's scenic vistas, rural landscapes, coastline and wildlands remains an unparalleled part of life in Maine. The preservation of environmental quality is a basic mission of State Government and a core value of Legislators and citizens alike.

Yet this pleasant picture, drawn on the basis of conditions in the late 1980s, may, from the perspective of the 21st Century, come to be seen as the high point in Maine's long term quality of life. Like the diabolical portrait of Dorian Gray, the face of Maine may, with each passing year into the future, become etched with corruption and decay.

Within the overall positive aspect of Maine's statewide environment, individual points of pressure can be clearly identified, regionally and in relation to specific resources. Because Maine's system of environmental management is diffuse and program-based rather than integrated and comprehensive, these pressure points are the nearest indicators the available information allows to the identification of emerging trends. By projecting these pressures forward and expanding them beyond their presently limited points of impact, a number of potentially disturbing possibilities emerge for Maine's environmental future.

3.1 Waste Management

Solid Waste: Maine's solid waste problem has a number of dimensions, ranging from the impact of disposal methods on water quality to the acceleration of costs, which

could rival educational spending as a share of municipal budgets by the 1990s. The issue is further complicated by an ancillary conflict between lifestyle philosophies, which pits opponents of the "throw-away" society against others who would prefer to consume the fruits of America's technological economy and to seek a technological solution to the problem of disposing of the side effects of that consumption.

Maine phased out its traditional approach to solid waste disposal by banning municipal landfills in 1987 , because these facilities -- many of which were located directly over vulnerable sand and gravel aquifers -- posed unacceptable risks to air, surface and groundwater quality. Yet State law continues to place on municipalities the obligation to dispose of waste generated within their borders. In response to this ban, the number of landfills declined from 454 in 1977 to 265 in 1988, a 42 percent reduction. Nevertheless, 114 landfills remain located over sand and gravel aquifers and 44 town dumps continue to dispose of their waste by open burning.

By mid-1988, 142 municipalities, in an attempt to adopt a responsible solution and influenced by predictions of long term energy shortages, converted to a recycling approach by contracting with waste-to-energy incinerators to dispose of their municipal trash. Transfer stations increased by 1375 percent between 1977 and 1988, rising from four to 55. The costs of these conversions have varied radically, and raise questions of equity and fairness in the town-by-town shift to new methods of disposal. Nearly 300 towns have continued to maintain their traditional methods of disposal and have incurred no conversion costs. Early-converting towns, meanwhile, like Biddeford, which hosts an incinerating plant, negotiated favorable incineration contracts with tipping fees as low as $4 per ton while towns that converted later, like Auburn, which also hosts a regional public/private incinerator, now pay tipping fees as high as $85 per ton.

With less than a decade of incineration experience, however, new problems have emerged with the waste-to-energy approach to recycling solid waste. At least two plants have experienced problems with air pollution, primarily associated with suspended particulates but also including small amounts of more noxious contaminants. While comparison information has apparently not been collected, it seems reasonable to assume that the air pollution associated with four incinerators represents an overall reduction from the levels generated by more than 400 open-burning dumps. A more critical problem is the under-anticipated need to dispose of the waste products of the incineration plants themselves.

Trash incineration reduces the volume of the municipal waste stream entering the plants but does not fully eliminate that stream. In fact, the residual ash left after combustion actually contains more highly concentrated toxins and heavy metals than did the unburned trash entering the plant. Disposal of this ash requires secure landfills, which, as the Township 30 experience suggests, will be very difficult to site. Leachate from incinerator ash could heavily impact groundwater quality if the technology entrusted with site security fails. Yet this same ash, in lesser concentrations, was routinely disposed of in unsecure landfills and open-burning dumps for years, while the regional incineration strategy was encouraged by the State as a solution to limiting the groundwater impacts of these low-tech dumps.

Because toxins, particularly heavy metals, become concentrated in incinerator residuals, local resistance to ash dumps and the availability of geologically appropriate sites have emerged as the limiting factors for the continued viability of the waste-to-energy recycling strategy. The basic geological requirement is the presence of an impermeable clay layer in the soil underlying the site. Debate continues on the desirability of groundwater associated with the site, which may have either the positive effect of exerting pressure to keep leachate contained within a liner system, or the negative effect, if the liner system fails, of transporting leachate away from the site to contaminate distant ground and surface waters. The political issue, also subject to continuing debate, is the appropriateness of sites located near the incinerators in areas which most directly benefit from their presence, or of sites located in less populated areas in which any potential system failure and water contamination would do the least human harm.

Despite the controversy over incineration, the basic objective of reducing the volume of the waste stream remains the top waste management priority. But while incineration reduces the volume of waste coming out of the incinerator, source reduction would reduce the volume going in. Two variants -- recycling and materials taxes or bans -- have been proposed.

Under an aggressive recycling regime, an estimated 25- to- 30- percent of the solid wastes now subject to incineration might eventually be retrieved, sold and converted to new products. The strategy would not only help ease the solid waste disposal problem but would also contribute to the worldwide conservation of scarce natural resources. With State assistance in identifying or creating markets that do not now exist for selected waste

materials such as white goods, an additional 25- to- 30 percent reduction in the waste stream might be achieved. It must be emphasized, however, that these reduction levels represent speculative estimates that would require not only the creation of new markets but also the wholehearted cooperation of the general public in the labor intensive process of pre-sorting household wastes by market categories. And in the process of recycling waste into new products, the same concentration of toxic residuals will often occur where the materials are stockpiled and reprocessed as has occurred in the process of recycling waste to energy through incineration. Nevertheless, in the long term, recycling represents the most likely and cost effective solution to efficient solid waste disposal.

Materials controls also hold real possibilities for reducing the volume of solid waste needing ultimate disposal. Maine's small size and relatively low market power, however, suggest that outright bans on packaging and materials entering the state would have limited effect, other than reducing the availability of products, consumer choice and the resulting standard of living to be had in the state. Such a strategy could be effective, however, if Maine could forge regional compacts with other Northeastern states to enhance its market power and enforce the ban on national or international manufacturers. Such a strategy is about to be introduced for automobiles, with the adoption of California-level air emissions standards by a compact of northeastern states. In combination, these smaller states can enforce regional equipment standards on national manufacturers. The interim strategy for solid waste control most likely to work for Maine acting alone would entail imposing taxes on undesirable materials, driving up the retail cost and providing an incentive to consumers to choose more environmentally benign products.

While objections to incineration have recently been raised on the grounds that the strategy undercuts the incentive to recycle by providing for relatively easy disposal of almost any type of waste, it seems apparent that the present constraints on both approaches to source reduction dictate that incineration will be required through a relatively long term transition to recycling.

Wastewater: Municipal and residential wastewater has become the most significant source of pollution of Maine's rivers, streams and marine waters, accounting for approximately 90 percent of the remaining pollution in these waters. The problem has become so acute in Casco Bay that a major State cleanup initiative was instituted in 1989 to forestal the deterioration of the Bay into, in the words of Gov. John McKernan, "another Boston Harbor." The Portland Water District faces suits from both the Maine Audubon

Society and the national Environmental Defense Fund designed to force action on a sewer system upgrade that could amount to $1.9 billion in costs.

Two key problems are faced by Portland and other municipalities relating to wastewater treatment. The first is cost. By 1994, the Federal government, which subsidized 80 percent of construction costs for municipal treatment systems since the 1960s, will have eliminated its assistance program. Many towns, which originally built their systems with this assistance, will be forced to replace or upgrade obsolete systems on their own resources. Other towns, which never participated in the Federal program, will have to fund new systems as growth or emerging clean-up priorities require them to finally address the pollution created by their municipal waste. The Maine Department of Environmental Protection has established a revolving loan fund to assist municipalities in meeting pollution control obligations, but the DEP loans, unlike the Federal grants, will have to be repaid.

The second problem is the dependence of many municipalities on an obsolete design criterion, which allowed outflows from stormwater and wastewater sewers to be combined at the treatment plant. Heavy storm runoff taxes the capacity of these systems and allows untreated, raw sewage to flow through the treatment plant during storms and to be discharged directly into receiving surface waters. To a large extent, this obsolete design is the source of the Casco Bay pollution, and contributes about ten percent of the river, stream and marine pollution statewide.

3.2 Imported Pollution

Pollutant Drift: Much of Maine's most serious air pollution originates outside the state from sources over which Maine people and their government have no control. Ozone and acid rain are among the major offenders, and each has significant effects on some of the most pristine parts of the state. Sulphur and carbon dioxide levels in lightly populated Washington and Hancock Counties exceed those in metropolitan Portland, while suspended particulate levels in the Downeast region were the highest in the state during the mid-1980s, after having nearly doubled between 1985 and 1986 while levels elsewhere in Maine were falling. Elevated levels of ozone-producing hydrocarbons are also in evidence Downeast, despite a generally falling trend statewide between 1978 and 1987. Acid rain is

believed to pose the greatest risks to remote, high-elevation lakes and forests, where at-risk lakes may be as high as 16 percent.

While Maine industries, fossil-fuel burning residential heating systems and, especially, individual drivers contribute a share of these various air pollutants, the vast majority are believed to be carried into the state by prevailing wind patterns which pass first over the industrial Midwestern and Middle Atlantic States before reaching Maine. The Maine DEP estimates that as much as 93 percent of the acid rain that falls on the state -- and by implication a similar proportion of other air pollutants -- originates outside of Maine and that 29 percent of the total drifts in from the Canadian provinces of Ontario and Quebec. Nevertheless, the Federal Environmental Protection Agency contests the scientific basis for these estimates and, in a March 1989 decision, the U.S. Supreme Court severely restricted Maine's ability to influence the generation of pollutants out of state which eventually impact Maine.

The Greenhouse Effect: Beyond the immediate impact of externally-generated air pollution on Maine is the related problem of the Greenhouse Effect, which describes the cumulative impact of air emissions -- in particular, Carbon Dioxide -- as trapping increasing levels of solar radiation within the global atmosphere. Three effects -- global warming, changing patterns of cloud cover and precipitation, and rising sea levels -- are believed to be the potential outcomes of this atmospheric retention of heat.

Solid evidence exists for the first of these effects -- the mean global temperature has increased by about one degree Centigrade since 1850, a date approximately associated with the rapid acceleration of the industrial use of fossil fuels in the Northern Hemisphere. There is also evidence associating a one centimeter rise in ocean levels during the same period with the global temperature increase. This rise in sea levels has been attributed to glacial melt-off induced by the higher temperatures. The projected meteorological changes are based on competing mathematical models, which, as yet, are not sufficiently precise to provide useful estimates of the future pattern of cloud cover and precipitation in Maine.

While the Greenhouse impacts have been limited to date, the continued reliance of the industrialized nations on fossil fuels and the expansion of industrialization to nations of the Southern Hemisphere and the Pacific Rim suggests that global warming, at least, is about to accelerate. The range of estimates is substantial, from a low of 1.5 degrees C to a high of 4.5 degrees C through the year 2050. At the upper end of this range, the

Greenhouse fluctuation would match the total range of natural temperature variation during the past 11,000 years, or since the last Ice Age. Nevertheless, this rise begins from a base period -- the so called "Little Ice Age" between 1590 and 1850 -- that was the coldest in the 11,000 year period of natural variation.

To put these ranges into context, then, the following scheme has been proposed in the literature of climatic history.

- Between 15,000 and 55,000 years ago, during the coldest period of the last Ice Age, the temperature may have dropped to as much as 10 degrees colder than it is today.

- Between that time and the end of the Ice Age, about 9000 BC, the temperature was 4- to- 5- degrees colder than it is today.

- Between about 7000 BC and 2000 BC, the global climate warmed considerably, to between 2 - and- 3- degrees warmer that it is today. In Maine, the climate was both warmer and drier, and a mixed oak forest, today more typical of the Middle Atlantic - Carolina region, covered the state, extending as far north as Newfoundland and Labrador. This warm period peaked around 3000 BC.

- By about 1500 BC, the temperature had dropped to about one degree colder than the present period and was followed by a series of small fluctuations within that one degree range through the next thousand years. During the period of the Little Ice Age, from 1590 to 1850, it was again about one degree colder than the present period. Since 1850, the temperature has regained that one degree.

The projected rise in ocean levels associated with the acceleration of global warming falls in a range of 4.7 to 7.1 feet through the year 2100. These projections are subject to considerable uncertainty, however, and to a number of challenges. The rise in sea level is based on the assumption that melting glaciers and polar ice would increase the volume of water in the worlds oceans. The one centimeter increase associated with the one degree rise

in temperature since 1850 supports this assumption, as does the measured retreat of alpine glaciers during the period through most of the world.

Pack ice in the north polar region, however, is already floating in the Arctic Ocean and, in melting, would actually occupy a smaller volume than it does presently. South polar ice, however, is located on the Antarctic land mass to depths of up to two miles. If this ice melts, radical increases in sea levels worldwide would be inevitable. Worse, an initial period of gradual melting would be followed by the rapid collapse of the West Antarctic Ice Shelf into the ocean and an almost instantaneous jump in sea levels by as much as 11 feet. The one place in the world, however, where glacial melting has not been discovered is in Patagonia, at the extreme tip of South America across from Antarctica.

The effect of rising sea levels on the Maine coast was examined in a 1984 study associated with a then-proposed tidal power project in the Bay of Fundy. That study identified an annual one centimeter rise in the level of the Gulf of Maine off the Downeast coast, which was associated, however, with the isostatic depression of the coastal lands themselves as they continue to adjust, after 11,000 years, to the aftereffects of glaciation. Within the "enclosed sea" of the Gulf, however, the study found that the effects of higher water levels would be considerably magnified, particularly in even higher ranges of the already huge tides. Coastal aquifers, harbors, wetlands and infrastructure would be threatened or destroyed and fisheries would be radically changed.

Imported Waste: A final, although perhaps indirect problem associated with imported pollution, is the potential use of Maine by other states as a relatively unpopulated location for solid, hazardous and nuclear waste dumps. This threat has already prompted massive public reaction in the 1980s in response, first, to a proposal to locate an interstate waste dump in York County, which prompted a Legislative moratorium on landfills which remains in effect, and secondly, to consideration by the U.S. Department of Energy of two Maine sites for a nuclear waste dump in the eastern part of the nation. While popular sentiment in Maine strongly opposes any use of the state for imported wastes, the state's large, unpopulated land base, the increasing need for waste disposal elsewhere in the eastern U.S. and our willingness as a state to export our own waste to other states all suggest that new proposals, and perhaps even Federal coercion, are not unlikely scenarios for the 21st Century.

3.3 Groundwater

Maine's total stock of groundwater is not yet fully known. Surface mapping of the state's sand and gravel aquifers has progressed in the ten years since it was mandated by the Legislature, but such maps provide only a two-dimensional picture of a three-dimensional resource. Less productive bedrock aquifers are also being mapped, but these low-yield resources may be so extensive as to underlay virtually all parts of the state.

The more important statistical measure of groundwater, however, is not the resource stock, which ought not to be depleted or "mined," in any event. Rather the flow measure, or recharge rate, is the relevant statistic, which describes the renewable portion of the total resource. Maine's groundwater recharges at the rate of 3.5 trillion gallons per year, of which only one percent is drawn down by private, municipal, commercial, agricultural and industrial wells.

Despite this huge reserve, Maine people and businesses use relatively little water -- less than half the national average. From all surface and subsurface sources, Mainers consume only 756 gallons of water per capita per day compared to the 2,000 gallons per capita per day consumed nationwide. The wide gap between Maine's considerable supply of water and its limited demand has led many observers, including the first Commission on Maine's Future, to project that the state may become a major exporter of water in the coming decades. Prompted by this possibility, the Maine Legislature has established controls on water exports in order to protect the resource from unregulated exploitation and possible depletion. And, indeed, in 1988, officials in water-rich Washington County fielded approximately 50 inquiries related to water extraction or export, including one proposed project encompassing 1,000 eight-inch wells to supply clean water to a major national soup manufacturer.

From the one percent of the state's groundwater recharge capacity that is consumed, nearly sixty percent of the population draw their drinking water. Twelve percent of public water systems tap groundwater for municipal supplies. Nearly 98 percent of Maine's rural population depends on groundwater to supply private wells. Because the level of dependence is so high and the commodity is so essential to human life, groundwater can arguably be considered Maine's most valuable natural resource.

Any threat to the quality of this resource, therefore, must be taken seriously -- all the more so, in fact, because groundwater contamination removes not only the small percentage of recharge capacity that is actually consumed from the supply of available drinking water, but removes the entire aquifer. And, once contaminated, an aquifer may take decades or centuries to cleanse itself of pollution.

In this context, it is highly significant that nearly 300 square miles of Maine land are underlain by contaminated aquifers representing about one percent of the groundwater supply. Virtually all of this contamination, however, occurs in the 11 percent of Maine that is unforested -- the same 11 percent that actually draws down the resource for drinking water supplies. As a result, the effective groundwater contamination rate in Maine rises to eight percent of the practical total. Aroostook County has the largest contaminated land area; Cumberland, Androscoggin, York and Kennebec counties, in that order, the highest percentages of contaminated land.

Toxins account for a relatively small proportion of groundwater pollution, estimated at only 1.4 percent of the total area of contamination. Toxic contamination is associated with 42 hazardous waste dumps in Maine, seven of which are Federally-designated Superfund sites. Cumberland and York counties are the areas most heavily affected by this extremely dangerous type of groundwater pollution. An additional 2.2 percent of contaminated groundwater can be traced to active and abandoned municipal landfills -- most of which are not monitored for leachates. A variety commercial and household chemicals have been introduced into Maine's groundwater by leachate from these sites, which therefore represent an additional source of toxic groundwater contamination. Sagadahoc, Oxford, York, Washington and Cumberland counties have the greatest extent of landfill-induced groundwater pollution.

A more significant threat to Maine's groundwater stems from leaking underground tanks used to store gasoline and other petroleum products. The chemical components of and additives to gasoline can rival in toxicity the materials associated with hazardous waste dumps and are, additionally, highly water soluble. This combination means that a single gallon of gasoline has the potential to contaminate one million gallons of groundwater. An estimated 17.5 percent of Maine's total groundwater area has been affected by leaking underground storage tanks; the affected areas are more or less evenly distributed throughout the whole state. The Department of Environmental Protection estimates that up to 6,500 sites are affected by the problem, while only 1,000 of these sites have been

identified. DEP has an aggressive program in place to remove or upgrade obsolete tanks and requires new tanks to be constructed of materials capable of resisting corrosion. A small, thriving industry which builds and installs fiberglass tanks has emerged in Maine in recent years in response to this requirement. Because of the extent of the area of contamination and the toxicity of the pollutants, leaking underground storage tanks can be said to represent Maine's most critical source of groundwater contamination.

A less dangerous but equally extensive source of groundwater pollution is associated with Maine's system of roads and their maintenance. Runoff containing roadsalt and the residues of vehicle emissions accounts for an estimated 14.1 percent of groundwater contamination and uncovered sand-salt storage piles contribute an additional 3.8 percent. This problem is also distributed fairly evenly throughout the state. While salt contamination is considerably less toxic than the chemical pollutants noted above, waters affected are still rendered unfit for human consumption.

Agricultural chemicals are the source of an estimated 29 percent of groundwater pollution in Maine. The problem is particularly severe in Aroostook County. While a variety of hazardous pesticides have been and continue to be used by Maine farmers, improvements in these chemicals and their application procedures appear to have limited their impact on groundwater. Nitrates, originating in organic and synthetic fertilizers, represent the key agricultural contaminant of groundwater, although some aquifers remain threatened by obsolete chemicals and former practices. Nitrates are relatively harmless in themselves, but are converted in the human intestinal tract to nitrites, which pose the threat of stomach cancer in adults and Blue Baby Syndrome in infants.

The single most extensive source of groundwater pollution in Maine can be traced to the state's estimated 230,000 private residential septic systems. While the zone of contamination associated with septic systems typically extends only 30- to- 50 feet from the average leach field, the large number of these systems generates an estimated 31.3 percent of the state's total groundwater contamination. State codes have minimized the problem, however, by requiring private wells to be located at least 100 feet from adjacent leach fields. The problem is most severe, therefore, in unsewered villages and developments where high densities or clustered systems saturate the soil with septic waste. As is the case with agricultural sources, the pollutants associated with septic system contamination are nitrates. Septic contamination of private wells appears to be on the rise in Sagadahoc and

York counties where the combination of circumstances that gives rise to this type of pollution is most severe.

For the present, actual clean up of contaminated sites appears to be beyond our technological and financial capabilities and reliance on the decades or centuries long process of natural discharge and recharge appears to be the only option. State groundwater strategy, therefore, emphasizes the containment of pollutants on or near contaminated sites, and preventative measures -- storage tank improvement, roadside ditching, salt-sand pile enclosure, landfill closures -- designed to eliminate new sources of pollution. While contamination affects only an estimated one percent of Maine's groundwater, the concentration of this contamination -- and of the additional one percent drawdown that is actually used -- in the 11 percent of the state that is settled represents an important challenge for the equitable management of the resource.

Maine's groundwater is not distributed evenly throughout the state. Coastal areas subject to the highest rate of population growth and therefore to the most rapidly-increasing need for potable water tend to be water-poor, particularly east of the Kennebec River where low-yield bedrock aquifers predominate. Where the population is lowest, in the unorganized forestlands and particularly in Washington County, vast reserves of groundwater are locked up in sand and gravel aquifers that yield the highest flows.

In the past, Maine's groundwater policy has emphasized the identification, mapping and protection of the resource, activities that will continue to be of crucial importance. But in the future, state policy must also be prepared to establish the basic principles and the practical mechanisms by which this resource is to be shared.

3.4 Vulnerable Lakes

Numbering nearly 6,000 and covering nearly a million surface acres of area, Maine's lakes and ponds are among the state's most characteristic resources. They are also among the most vulnerable. But they are vulnerable less to the risk of contamination that threatens Maine's other water resources than to the introduction from their shores and watersheds of excessive levels of phosphorous, a key nutrient whose availability or scarcity regulates the population of aquatic plants.

When sufficient concentrations of phosphorous are present in lake waters, algae populations can explode in algal blooms that reduce the attractiveness of the waters for drinking or recreation and can rob them of essential oxygen on which other aquatic wildlife depend. While algal blooms do not represent a health risk to humans, they can be devastating to cold water fisheries, although warm water fisheries are often improved by the nutrient-rich conditions that promote algal growth.

Agricultural activities and the removal of forest cover in lake watersheds and runoff from the roofs, lawns, driveways and roads associated with residential development on or near lakes all promote the "phosphorous loading" and potential eutrophication of lakes and ponds. While none of these activities is incompatible with maintaining a healthy nutrient balance in lake waters, extreme care must be used to control, channel and filter runoff that carries phosphorous into lake waters.

Thirty one lakes currently experience algal blooms and five more have deteriorating water quality that will place them at risk of such blooms in the near future. Another 53 lakes are classified as extremely vulnerable to bloom conditions within ten years. This total of 89 high risk lakes represents about five percent of the total lake surface acreage in the state. Another 11 percent of the total acreage comprising about 300 lakes and ponds is classified as highly vulnerable to bloom conditions within fifty years. None of the state's lakes fail to meet bacteriological standards of safety, while two -- Annabessacook Lake and Crawford Pond -- have been contaminated by toxins leached from two Superfund sites.

3.5 The Land Boom

The 1980s have been a time of unusual and often unsettling activity in Maine's land markets that has left virtually no part of the state untouched. Subdivisions and housing developments have placed pressure on farmland and open recreational space in the suburbanizing south. Condominiums have crowded working waterfronts and lakeshores near urban and tourist centers. Timberland has changed hands in thousand and hundred-thousand acre blocks. Recreational development has reached the islands, the northern forests and remote lakes. Coastal property values -- not only in Kennebunkport and Rockport, but in Searsport, Jonesport, Machiasport and Eastport as well -- have soared, while inland towns two and three tiers back from the coast face increasing pressure. Along the river valleys of central Maine, suburban development has begun to spread outward

from Bangor, Augusta, Lewiston and Auburn. Newport sprouts parking lots like an outpost of the Maine Mall. A new land marketing industry, heavily capitalized and linked with out of state markets, has become prominent across the state.

Despite the visibility of Maine's land market and the wealth of anecdotes that describe its boom, the statistical information needed to measure the scope, pace and trends in statewide development is spotty, uneven and incomplete. While a definitive picture of land use in Maine continues to elude state policymakers, a number of partial studies during the 1980s have begun to reveal the outlines.

TABLE 3

MAINE'S LAND BASE

Area and Use in Square Miles

Total Land	30,995	Total Land and Water	33,505
Forested	27,512	Inland Waters	2,510
Public Lands	1,352	Lakes, Ponds	1,554
Prime Agricultural	5,781	Swamps, Bogs	1,171
Farmed	2,242	Public Wetlands	75
Open Space	2,343	Marine Waters	3,600
Other Rural	1,208	Near Shore	1,850
Developed	861	Off Shore	1,750

Source: The State of the Environment (Draft), State Planning Office, Oct. 1988; Governor's Committee on Rural Development, 1988 Annual Report, April, 1989; 1980-87 Changes in Minor Civil Division Housing Stock, 1988

The basic geographical organization of the state provides the appropriate context to place this partial information in scale and perspective. Thus, Maine's total land area makes it the third-largest state in the northeastern U.S., behind Pennsylvania and New York, and the largest state in New England. Forests cover 88.8 percent of the total land area; developed cities, suburbs and roads cover 2.8 percent. More than seven percent of the land is actively farmed and a similar amount is held fallow as farmland reserve. Only 4.4 percent of the state's land area is in public ownership -- the lowest percentage in the northeast -- but the actual area held in public trust -- more than 850,000 acres -- is the third-highest in the northeast, again behind New York and Pennsylvania. When the publicly-owned lakes and ponds are added to that figure, the total area in public ownership rises to the neighborhood of 1.8 million acres. (The square mile figures given in Table 3 can be converted to acres by multiplying by 640.)

The land boom adds a dynamic element to the static picture of land use outlined in Table 3, but the multi-year data needed to identify the trends that capture that moving target are among the least available of statistics. Of particular interest is information describing the rate at which land is being converted from farm, forestry and fisheries-support uses to housing and recreational development.

TABLE 4

MAINE FARMS AND FARMLAND

Measure	1969	1979	1982	1983	1984	1985	1988
Number of Farms	7,971	6,775	7,003	8,100	8,000	7,800	7,076
Acres Farmed (000)	1,760	1,500	1,470	1,560	1,560	1,520	1,435
Average Acreage	221	221	210	193	195	195	203
Percent of Land Base	8.9	7.6	7.4	7.9	7.9	7.7	7.2

Source: The State of the Environment (Draft), State Planning Office, Oct. 1988; Governor's Committee on Rural Development, 1988 Annual Report, April, 1989;

Farming peaked in Maine in the 1880s and began a period of long term decline after 1910. Acres farmed in Maine fell by half between 1910 and 1950, halved again between 1950 and 1959, and yet again between 1959 and 1969. Table 4 shows the pattern through the past 20 years has been one of much slower decline than in the first part of the century and the possibility exists that farm land may have begun to stabilize at about one fifth of the peak acreage of a century ago. In fact, in all counties but heavily-farmed Aroostook, cropland acreage has increased since 1969. Pasture land, in the absence of draft animals, has declined.

In the past, land was most often lost to agriculture through farm abandonment and the reversion of cropland and pasture to forest and scrub. While reversion remains a principal source of loss in the 1980s, the apparent stabilization of farm acreage suggests that conversion to housing may become the greater threat in the future. The ease with which farmland can be converted to residential use often makes it a prime target for development. Yet the increase in total acreage used for crops, even in southern and coastal counties in the direct path of the land boom, may suggest that even the threat of subdivision may be limited.

In contrast to land in farms, the amount of forested land in Maine has been increasing through the past two decades, from 16.9 million acres in 1971 to 17.1 million acres in 1982 and 17.6 million acres in 1987. As a later section of this report outlines, however, changes in the timber stock and in harvesting practices and asset management by the forest industry are substantially different today than they were 20 years ago. And despite the increase in total acreage under forest cover, a considerable amount of land has been removed from the forest inventory in the 1980s and converted to recreational use.

A March, 1989 study by the Land Use Regulation Commission identified a partial list of 704 lots of 40 or more acres that were subdivided from forestland in the unorganized territories between January, 1985 and April, 1988, and another 331 lots subdivided between April and December, 1988. All of the activity occurred in only 45 subdivisions and the total acreage involved is estimated at approximately 51,000 acres. The acceleration in activity after April, 1988 is believed to be a one-time occurrence related to the race by developers to complete subdivision plans before the Legislature could remove the exemption previously granted lots of 40 or more acres from LURC review. Another 7,500 acres of forestland were identified in a March 1989 Wilderness Society report as on the verge of subdivision in two development projects. And a major block of 61,000 acres, formerly controlled by Diamond Occidental and sold as having a "higher and better use" than timber land, is under review by its new owner, with an estimated 35,000 acres of primarily shorelands considered to be likely candidates for recreational conversion. Overall, at least 100,000 acres of Maine's 17 million acre forest have been caught up in the land boom, a figure that may well increase as additional subdivisions come to light and new subdivisions are created.

While the subdivision of wildlands removes acreage from the timber inventory and represents the potential for the conversion of forestlands to other uses, the rate at which these subdivisions are actually built-out provides a better indicator of the real pace of recreational conversion. The classic studies of recreational build-out were conducted during the 1970s on western U.S. forest lands following the recreational boom of the 1960s and 1970s in that part of the country. These studies revealed that, after ten to twenty years, between 25 and 33 percent of forest subdivisions were actually built upon, while another 25 to 33 percent were never sold by the original developer. Closer to Maine, fewer than two dozen of the hundreds of lots subdivided on Campobello Island in the early 1980s had been built upon by 1989.

TABLE 5

YEAR ROUND AND RECREATIONAL HOUSING

History, Estimates and Projections

Home Type or Location	1960	1980	1987	1990
All Housing Statewide	368,000	501,100	559,200	583,400
Year Round	303,000	421,700	477,000	499,000
Seasonal	65,000	79,400	82,200	84,400
Coastal Counties	42,000	48,000	49,400	50,000
Inland Counties	23,000	32,000	33,400	34,000

Source: The State of the Environment (Draft), State Planning Office, Oct. 1988; University of Southern Maine Center for Real Estate Education; 1980-87 Changes in Minor Civil Division Housing Stock, 1988

Seasonal housing accounted for only about 16 percent of Maine's housing stock in the 1980 Census and appears to be growing at only about one quarter of the rate experienced by year round housing during the decade. But while good data allow annual additions to the year round housing stock to be tracked throughout the decade, an annual database for seasonal housing was only begun in 1985. Thus, Table 5 reflects a number of estimates and assumptions about the volume, growth and location of seasonal housing in Maine, extrapolated from the 1980 Census figure and from new data for 1985, 1986 and 1987. Fortunately, these were among the peak years of the land boom, between the recessions of the early 1980s and the softening real estate markets of the late decade.

Between 1985 and 1987, 1204 new seasonal homes were built in Maine, 523 of them in 1987. The average growth rate of 400 seasonal homes a year during this period compares to the average rate of 720 seasonal homes a year between 1960 and 1980. While the 1985-87 period probably reflects the strongest seasonal growth during the decade, Table 5 assumes a constant annual growth rate of 400 seasonal homes a year throughout the 1980s. The location of seasonal construction through the 1980s is assumed to be evenly divided between coastal and inland counties. Because seasonal homes can be located on as little as a quarter acre of lakefront or as much as a 40+ acre lot in the wildlands, no combination of partial data and assumptions allows the land area consumed by these 4,000 new seasonal homes to be estimated.

It may be possible, however, to estimate the pace and land use impact of the broader development phenomenon as it relates to all types of housing statewide. And since subdivision activity in year round housing markets is much more closely attuned to the current demand for housing than is the case in the more speculative recreational markets, an estimate of development activity is likely to closely parallel subdivision activity as well.

One perspective on subdivision activity might be drawn from the number of permits issued by the DEP under the Site Location of Development Act, which more than doubled between 1980 and 1986. Nearly 6,700 subdivision permits were issued by the department under the law during the seven year period, a figure that does not include subdivisions that resulted in lots of 40 acres or larger.

TABLE 6

SUBDIVISIONS AND SALES IN 3 FAST GROWTH TOWNS

1980 - 1987

Sample drawn from within 5 miles of fresh or salt water

Town	Sample Size	40 + A Lots	Sales	Subdivisions	40 + A Subdivided
Lyman	435	41	170	22	2
Manchester	274	8	104	10	1
So.Bristol	221	0	64	7	0
Total	930	49	338	39	3
Percent	100	5.3	36.3	4.2	-

Source: Registry of Deeds Samples conducted July-September, 1988

While the conclusions that can be drawn from the small sample size are limited, research conducted for the Commission may suggest that the parcelization of large tracts of land may be more problematic in the undeveloped than in the developed parts of the state. A sample of 930 property transfers taken from a zone within five miles of all fresh and salt water shorefront in three fast growth towns in the southerly part of the state -- Lyman, Manchester and South Bristol -- identified parcelization on only six percent of all large (40+ acres) lots between 1980 and 1988.

Similarly limited by the small sample size, a 1986 study of the cumulative impact of development on nine towns in York County, identified 62 subdivisions approved in those towns by the DEP between 1970 and 1985, and another 335 subdivisions that had been approved by local planning boards during the same period but that had not required DEP approval. A related 1986 study of 30 coastal towns along the entire coastline found the land in development in these towns to have doubled since 1960.

TABLE 7

LAND AREA IN DEVELOPMENT

Estimated Area in Square Miles

Category	1971	1982	1987
All non farm or forest	1650	1961	2195
Rural except transportation	850	1208	-
Developed	634	754	861

NOTE: Estimates constructed for trend identification only and do not constitute a reliable measure of land under development for any year except 1982

Rather than applying partial measures to the entire state or adjusting highly selective measures to differing regional circumstances, a statewide average can be constructed based on the unit density and growth of the housing stock. Total housing stock additions are reasonably known and were presented in Table 5. The average size of a houselot in Maine, or the unit density, is not known and the range of houselot sizes can vary considerably. But a number of proxies for this key statistic are available, ranging from the average statewide population density (38.5 persons per square mile) to county or regional population densities (209 persons per square mile in southern Maine; 0.8 persons per square mile in the unorganized territories) to the average population density within the I-95 corridor (54 persons per square mile).

The estimates generated by these possible proxies cover an extremely broad range. Because more than half of the state is virtually uninhabited, use of the statewide density results in an unrealistic average houselot of 20 acres and an estimate of a million acres of new development through the 1980s. Using the southern Maine density, under the assumption that most new subdivision and housing construction is likely to be similar to the economic pattern established in this most developed part of the state, the average house lot would be about 1.2 acres in size and the total land area absorbed by development during

the 1980s would be 60,000 acres. Using the I-95 corridor density, under the assumption that the presence of 70 percent of the state's population and almost all of its growth within this area reflects the best average, the average houselot becomes about 4.6 acres and the total of new development in the 1980s would be 230,000 acres. Finally, a regionally-weighted estimate based on the county level density for the three southern counties and the I-95 density for the rest of the state generates an average houselot of 3.6 acres and 176,000 acres of new development.

A better measure of housing density, however, does not use population densities at all, but rather the ratio of housing units to the total acreage of "built up" land. The U.S. Soil Conservation Service reported the latter number for Maine in 1982 when 333,000 acres were described as "urban and built-up" and "small built-up areas" excluding farmsteads, rural roads and other rural uses included in the "developed" total in Tables 3 and 7. Using this ratio of *housing density per developed acre*, Maine's average houselot in 1982 was 1.4 acres. When this average is applied to the roughly 49,000 new units constructed from 1980 to 1987, estimated new development through the 1980s is about 69,000 acres representing an increase of about 14 percent in the developed area of the state. Since residential subdivisions tend to occur about two years ahead of actual development, an additional 27,000 acres could reasonable be added to the developed total, with the combined total suggesting that just under 100,000 acres may have been absorbed by the housing boom through the 1980s.

3.6 The New Forest

Despite the relatively small zone of human habitation in Maine, the state retains very little of what might be accurately described as wilderness, yet it retains a natural character virtually unparalleled in the eastern United States.. Beyond the settled 11 percent of the state, three successive forests have grown and been harvested through time, setting the stage for a fourth to take shape. The emergence of this New Forest -- planted, groomed, cultivated and commercially harvested on a substantial scale -- may well represent the most significant change in Maine's physical character into the next century.

Under historic forest practices -- natural regeneration, long harvest cycles and relatively little sylviculture -- much of the Maine forest has retained a natural character somewhere between wilderness and working woodlot, best described by the term

wildlands. Within the wildlands, both public and private purposes have been accommodated -- most significantly on the public side, the management of wildlife and freshwater resources, and on the private side, the extraction of timber through harvesting techniques that range from selective to clear cutting.

The result of traditional industry harvesting practices, however, has been the slow accumulation of a low-grade hardwood inventory that lacked commercial value in the past and remains a distant second to softwood value. By the mid-1980s, up to 30 percent of forest acreage was in hardwood and more than 40 percent of the hardwoods in Maine were dead, rotten or cull trees. Exacerbating the effects of hardwood accumulation, the budworm infestation of the late 1970s and early 1980s devastated commercially valuable spruce-fir inventories, leaving stands of mature trees dead or dying. Historical harvesting practices have also left a concentration of timber stock in the 30 to 40 year old range as the supply of accessible older trees was removed and the introduction of young trees was left to natural regeneration. By the mid-1980s, the unbalanced age of the Maine forest had slowed the regenerating growth of young trees on which the future of the spruce-fir harvest depends. With the removal of the budworm kill and the introduction of intensive sylviculture on new stands, however, regenerative growth is believed to be accelerating toward more normal rates in the late 1980s.

In response both to the destruction of standing timber by the budworm infestation and to predictions of lumber supply shortfalls in the early 21st Century, the 1980s have been a period of intensive activity in the Maine forest. A substantial salvage effort, which removed the budworm kill while it still retained commercial value, occurred on a scale that has economically justified both the increasing use of clearcut harvests and the introduction of whole-tree harvesting technology. This effort, which resulted in exceptionally high harvest levels, is only now concluding. Meanwhile paper manufacturers accelerated the introduction of new hardwood pulp technologies, which reduce their dependence on the spruce-fir resource. The development of biomass fueled electrical generating facilities has, at the same time, created commercial markets for previously unsalable hardwoods on a scale that can economically justify their removal through mechanized clearcut and chipping operations.

Other changes in the 1980s have been at work on the forest as well, but at long distance, through the financial environment in which forest management decisions are made. The elimination of the capital gains rate on timber and the reduction of investment

credits for reforestation in the 1986 federal tax reform package, together with the federal estate tax burden on family-held lands, may have seriously eroded the potential investment returns available through long-term timber management. At the same time, the wave of corporate restructuring and attendant mergers and acquisitions that have been integral to the Wall Street bull market of the 1980s have forced corporate forest managers to pay considerably closer attention to the non-timber values of their land assets, particularly the potential liquidation values in recreational markets, or risk the attention of corporate raiders.

The net effect of these changes in forest management in the 1980s has been considerable. In the short term, the forest is being cut harder than perhaps at any time since the 19th Century. While the total inventory of standing trees is substantially higher than it was 30 years ago and remains comfortably within the 20-22 million cubic foot range that has prevailed for the past twenty years, average annual growth eroded severely during the mid-1980s and average harvest increased. The ratio of growth to removals, one measure of sustainable yield, dropped from 1.74 in 1971 to 1.35 in 1982 to 0.35 in 1986. Balanced sustainable yield would require a ratio of at least 1.00. While the annual growth has begun to return to more normal rates as young, post-budworm trees emerge, the mid-1980s harvest reached 94 percent of the pre-budworm 1971 average growth.

In the long term, the introduction of intensive sylviculture practices can triple the rate of natural growth and considerably reduce the length of the harvest cycle. These practices are already controversial, however, and include clearcutting to prepare large tracts for replanting of more valuable species and the chemical suppression of low value species in emerging stands, as well as less dramatic practices such as hand thinning of young stands and replanting cut over areas.

By 1986, intensive sylviculture was used on more than 143,000 acres of industrial forest with additions of about 34,000 acres per year, less than half the annual acreage required to overcome projected spruce-fir shortfalls in the 21st Century. But in 1987, 50,000 new acres were brought under intensive management, followed by another 80,000 in 1988 -- the two-year gain nearly doubling the total acreage in sylviculture. Preliminary data for 1989 suggest that the 1988 pace has continued. At this level, the softwood shortfalls projected in the mid-1980s are unlikely to occur. For less valuable hardwood stands, 140,000 acres per year will need to be brought under intensive management if projected supply shortages are to be avoided.

The net outcome of intensive management on this scale -- up to 3,600 square miles by the year 2000 -- may be a radical move toward monoculture in Maine's wildlands and a changing pattern of wildlife habitat, watershed hydrology and recreational quality. Yet without this level of sylviculture, supplies of timber could have fallen short of demand by up to 1.4 million cords per year, about 20 percent of the annual sustainable yield of the New Forest after the year 2000. Under shortage conditions, prices tend to increase and with them the incentive to forest owners to supply increasing levels of product. Harvests above the balanced sustainable yield level, however, would almost certainly have even greater impact on wildlife habitat, recreation and watersheds than would an intensive management regime. Once cut, moreover, some parcels of forest land may well have greater value in alternative uses and some owners may prefer to invest profits in alternative vehicles less costly than replanting trees that cannot be harvested for up to a generation.

The technical objectives of maintaining wildlife diversity and watershed quality are not incompatible with intensive forest management, particularly under LURC oversight, and may well be reached more effectively under greater rather than less management. Conflict emerges on the basis of uses for which clear standards of public interest have not yet been defined.

The impact of intensive sylviculture on a probable maximum of 15 percent of Maine's commercial forest is unlikely to wreak ecological havoc. Yet the location of these intensively managed lands will almost certainly lie adjacent to the network of forest roads that already provide increasing levels of recreational access to remote areas of Maine. Insofar as recreational users seek out remote areas in pursuit of experiences that at least approximate those available from wilderness, those users are likely to be disappointed and to perceive that the wildlands are under wholesale conversion to plantations. The demand for increased public land acquisition is likely to become substantial in the future under these conditions.

In view of the changing technological and financial conditions under which the Maine forest resource is managed, it seems clear that we have reached a critical decision point in our history as the nation's most heavily forested state. Preservation of the traditional character and scale of the forest environment has become a compelling challenge that requires the cooperation of the industry -- whose continued presence permits the very existence of vast tracts of wildlands in Maine, -- the state and the environmental,

preservationist and recreational constituencies that increasingly tap the common wealth generated on these privately held lands. The key objective is the continuance of forest management for multiple uses -- harvesting, recreation, wildlife habitat and water quality -- without eroding the profitability of the forest industry through the creation of tax, harvesting and land use regulations that leave Maine timberland owners open to hostile takeover. The challenge is to protect the public interest while remaining sufficiently flexible to pursue every opportunity for leverage through public/private negotiation and trade-offs.

Public and private interests in the forest are not mutually exclusive, but they may increasingly be placed in conflict if the different groups of forest users pursue adversarial objectives or insist on exclusive rights. Passage of the 1989 Maine Forest Practices Act in an atmosphere of mutual cooperation by environmental, recreational and industrial forest constituencies suggests that the willingness and capacity exists today in Maine to forge responsible solutions to the emerging problems of the New Forest that can serve the public interest for years to come.

We believe an unprecedented opportunity exists to ensure multiple use of Maine's wildlands for the next generation, through cooperative efforts by the state and the forest industry, supplemented by an integrated program of carefully targeted purchases of significant public lands. Key areas for cooperative effort include the creation of a major and sustained effort to negotiate long-term preservation easements with major landowners, which allow timber to remain in inventory but do not allow the underlying land to be liquidated for development. Long-term negotiated management plans for significant wilderness, lakeshore and recreational parcels, in return for favorable tax, investment or regulatory treatment, should also be included in the cooperative effort. Finally, state oversight of intensive management practices should be integrated within clearly defined *bioregions* determined by ecological, rather than township or ownership boundaries. The starting point for inaugurating this bioregional approach must be the establishment of watershed-level limits on the total acreage available for clearcutting.

3.7 Maine Outdoors

Maine's outdoor tradition -- part recreation, part employment on working landscapes, part remote natural beauty and the challenge of self reliance -- depends

fundamentally on unhindered access to publicly-owned resources. Wildlife, great ponds and submerged lands are all held in public trust in Maine and it is access to these resources, much more than the possession of large holdings of public land, that has sustained this tradition and justified informal use of private property in the exercise of access rights.

The economic benefits of the right to hunt, fish, place weirs, set traps, launch watercraft and to tap the entrepreneurial and subsistence potential of wild resources weighed heavily in the development of a free access tradition under the historical conditions of the resource-based economy. Extension of free access to less tangible resources -- solitude, scenic beauty, settings of natural harmony -- has been generally accommodated through the 20th Century within the pattern of informal use.

TABLE 8

FORMAL PUBLIC ACCESS IN MAINE'S OUTDOORS

Capacity

Measure	1977	1987	Change	Measure	1977	1987	% Change
Public Acres	360,000	730,000	103 %	Trail Miles	10,800	12,000	11 %
Picnic Tables	8,300	6,300	-24 %	Hiking	1,100	2,100	91 %
Launch Pkg.	2,000	7,800	290 %	XC Ski	900	1,000	11 %
Campsites	22,000	26,000	18 %	Snowmobile	8,800	8,900	1 %

Use

Swim and Picnic	750,000	1,200,000	60 %	Historic Site Visits	200,000	400,000	100 %
Trail Use	450,000	450,000	0 %	Camping	200,000	200,000	0 %

Source: The State of the Environment (Draft), State Planning Office, Oct. 1988

Probable trends toward increasing use of the outdoors and toward increase in the relative value of natural resources worldwide can be expected to place considerable pressure on the viability of informal use in the next century, increasing the importance of public lands in the process and calling into question the purpose and limits of the free access tradition. In the 1988 decision *Moody Beach Property Owners Association v.*

Town of Wells, the Law Court decided not to extend colonial rights to fish and fowl in the intertidal zone to cover recreational beach use or to formalize a recreational pattern of informal use that may date from the 19th Century.

Although population growth and the related problems of posted land, shorefront and open space development, and congestion of major recreational attractions contribute importantly to the gathering pressure on free access and informal use, a more fundamental difficulty can be traced to a long term trend toward increasing accessibility of the outdoors.

TABLE 9

VISITORS AT NORTH MAINE WOODS GATES

Purpose	1977	1987	Avg.	Purpose	1977	1987	Avg.
Total	50,889	75,806	63,572	Canoeing	21,627	19,638	22,366
Camping	10,720	19,391	13,205	St. John	2,408	861	2,017
Fishing	39,710	38,086	42,898	Allagash	9,278	12,125	11,600
Hunting	37,584	58,916	53,262	Guiding	300	565	323
Hiking	115	203	111	Visiting *	28,735	28,274	29,366
Picnicing	3,864	3,199	2,638	Other	3,552	10,167	6,603

Source: North Maine Woods, Inc.

* Includes Camp Owners

In the remote northwestern quarter of Maine, North Maine Woods, Inc., a private consortium of industrial forest owners established in the 1970s, tracks a key sample of visitors through gated logging roads, who seek the recreational opportunities of the Allagash and St. John waterways, game harvesting and sport fishing, and remote hiking, camping and day use. While local use and use by camp owners remained virtually constant between 1977 and 1987, overall use was up by nearly 22 percent through the period and a miscellaneous category which includes off-road recreation nearly doubled.

All of Maine was once remote, externally from the rest of New England and internally from region to region, town to country, coast to island and settlement to wilderness. Particularly, movement into the woods -- to trout and salmon streams, alpine meadows, wild rivers and remote lakes -- required a substantial investment of physical effort. Technology and infrastructure investment have changed these traditional conditions.

The Interstate and other highway systems, improved and more available maps, four-wheel drive vehicles, ATVs, snowmobiles, jetskis and pleasure boats have brought Maine's forests, islands, lakes, rural landscapes, and seasonal camps and cottages within reach of a casual weekend diversion, not only for the stabilizing population within the state, but also for millions of North Americans living within a one day drive of a Maine destination. The state's adjacent travel region currently includes 65- to- 70-million people living within a rough arc between Philadelphia and Montreal, and expands with each improvement in the speed of transportation.

The increasing accessibility of the outdoors can be expected to generate continuing pressure to limit overuse and congestion both from users themselves and from public interest advocates, and more intensive use of prime recreational resources can be expected to generate parallel pressure from adjoining property owners to further restrict use levels. Countervailing pressure for increased access, improved infrastructure and expanded capacity can also be expected to intensify, in part under continued regional population growth and in part as informal opportunities for access erode through greater levels of posted land and greater restriction on hunting, off-road vehicles and other forms of recreation within town limits.

A succession of examples through the 1980s suggests an outline of the coming challenge. While the Moody Beach case will probably represent the most significant event in the long run, other examples include: the Land for Maine's Future bond; the Portland waterfront referendum; the Mainewatch challenge to widening the Maine Turnpike; proposals to limit visitors and ferry trips to Monhegan Island; actual restrictions on visitors, pets and recreational equipment at Baxter Park; riverblocks on the Saco River; demands for traffic control on Sebago Lake; national proposals for the creation of new federal parks around Cobscook Bay and Baxter state parks. Public access to and informal use of the outdoors will become increasingly difficult to manage and public land acquisition will gain importance as a public policy option.

3.8 The Natural Resource Industries

Maine's traditional natural resource industries are declining in relative importance to the overall Maine economy as a more modernized, diversified and developed economy emerges in the state. In some cases, the decline is not just relative, but absolute. The paper

industry is the exception to this generalization, but even paper, which remains Maine's highest-paying employer and highest-value producer, will most likely employ fewer people in the future than it did in the past. Some of the share lost by farming, fishing and forestry, however, will be replaced by service industries that also depend on the natural resource base, including tourism and recreation.

While the traditional natural resource industries represent a small and shrinking share of economic activity in the state, their role in perpetuating the size, condition and quality of the resource base far exceeds their economic importance. These industries are the entire foundation for the state's characteristic working landscapes -- its fishing harbors, salmon pens, lobster pounds, shellfish flats, cargo ports, farms and woodlots -- that make an increasingly recognized contribution to the vitality of the broader economy and to the overall quality of life in the state.

TABLE 10

ECONOMIC INDICATORS IN FIVE NATURAL RESOURCE INDUSTRIES

(Excluded Tourism and Recreation)

History and Projections

EMPLOYMENT

	1970	1985	2000
Five NR Industries	68,163	67,524	61,785
State Total	336,641	489,395	790,069
Resource Industry Share	20.3 %	13.8 %	7.8 %

VALUE ADDED

Billions of 1977 Dollars

	1970	1985	2000
Five NR Industries	1.1	1.4	1.9
State Total	6.0	9.5	15.2
Resource Industry Share	18.4 %	15.1 %	12.3 %

Source: Maine Forecasting and Simulation Model

The traditional natural resource industries also play an irreplaceable role in the continuing survival of a disappearing way of life. They represent one of the most basic sources of opportunity for small entrepreneurs to launch businesses that depend as much on hard work as on invested capital. They underwrite the preservation of personal choice in employment for individuals who prefer to work outdoors, who prefer non-standardized approaches to educational attainment or who simply enjoy the social continuity of performing traditional work in traditional communities.

But the preservation of these industries will be a difficult challenge. Indeed, there may be relatively little the state can do in the face of national and global economic forces that are driving the decline of this sector.

Maine's natural resource industries operate in mature markets, producing standardized products according to well-understood production techniques. Growth in these markets tends to expand slowly and only with expanding populations. Competition from other states and other nations tends to be extreme, since price is often the only distinguishing characteristic of natural resource products.

Maine producers have taken a number of different responses to these market conditions. Agricultural producers have diversified crops, imposed quality controls on commodity crops and searched out fresh market and specialty niches for produce, prepared and semi-prepared foods. Marine harvesters have also diversified, some by rigging boats for different species during different seasons of the year. Lobster boats for example are rigged to shrimp during winter and often to gill net when particularly valuable species are running near shore. Other seafood producers have turned to aquaculture and to harvesting previously undervalued species like sea urchins, squid, eels and dogfish for international markets. Forest harvesters have turned to technology investment to regain cost advantages that no longer accrue to Maine's once low-wage labor force, as well as to the development of entirely new markets like biomass fuels that did not exist a decade ago.

Despite these adaptive responses, Maine's natural resource industries do not face the same structural growth prospects that are projected for the expanding service and technology-based industries in the state. While the resource sector is projected to increase output by nearly 31 percent by the year 2000, nevertheless it will shrink as a share of the much more rapidly growing state economy. But to an increasing extent, this expansion

will come at the expense of employment as the resource sector invests in new technology and reduces labor costs.

From a more regional perspective, however, the traditional resource industries are and will probably continue to be important and even principal components of local economies. Yet if these industries are to prosper, many traditional ways of doing business are likely to be abandoned.

In agriculture and the fishery, there is perhaps no more fundamental trend than the introduction of a marketing orientation to replace the traditional pattern of commodity sales. The identification of niche markets for "trash" fish, for cultured seafood, for fresh and exotic vegetables, herbs, fruits and prepared foods are among the individual developments of the recent past that have revitalized small but important segments of Maine's food harvesting and processing industry. The establishment and enforcement of quality-oriented market orders has extended this trend to commodity foods as well. Food processing, a heavily marketing-dependent industry, remains one of the bright lights on Maine's industry horizon, which may both provide markets for farm and boat output and add value to these products within the state. Maine's vast reserves of fresh water may prove to be key to the expansion of food processing in the state by providing the basic and increasingly scarce material for products ranging from soups to beverages.

Yet Maine's food harvesters face severe limits on their ability to expand toward these in-state and national markets in the future. Depleted fish stocks and rising levels of fishing effort, elevated farmland prices and emerging shortages of labor in the farm sector all contribute to these limits.

A new regional marketing orientation in cooperation with Canadian resource producers may offer a route out from under the constraints now limiting Maine's resource industries. The same 60-70 million person regional market that contributes to the pressure noted earlier on Maine's outdoor resources also represents the most immediate market for Maine food products. Yet, in the potato industry, for example, the share of the eastern U.S. market held by both Maine and Atlantic Canadian producers *together* has suffered severe erosion since the 1960s to western U.S. producers. Joint marketing emphasizing Maine-Canadian cooperation to recapture a stable market rather than competition over a shrinking market may represent the most productive long-term option. Similarly, Maine's dairy and livestock producers may benefit from the adoption by Aroostook County farmers

of new Canadian wheat and barley varieties which would provide both crop rotation alternatives and a cheaper, in-state grain supply. In the Gulf of Maine, joint Maine-Canadian management and marketing of the international fishery resource may allow the fishing industry to stabilize and to pursue cooperatively national and international seafood markets.

But if Maine's resource industries are to take advantage of these opportunities for long term stabilization, they must first survive the pressures of short term decline. State actions could make a significant difference in several areas:

- In economic development policy, the state ought not abandon the natural resource sector as strategies are expanded and refocused on the more robust sectors of the future economy. The small relative share of Gross State Product generated from natural resources may already be leading state strategists to disregard the broader importance of this sector.

- In resource allocation policy, the state must act quickly to preserve a basic level of access to natural resources by the traditional harvesting industries. The problem of access has become acute in farming, where land prices often preclude the opportunity for new agricultural enterprises to be established, and in fishing, where commercial and residential development and recreational boating compete for harborside land and slip space needed both for commercial boats and for offloading facilities and other marine infrastructure that provide essential support for a viable fishing industry.

- Finally, the state should work to turn around the widespread perception that natural resource industries are dying, which makes investors reluctant to commit capital and labor reluctant to commit to careers in this sector. At the least, school guidance counsellors should be fully informed of the persistence of resource-based job opportunities and should not discourage students from exploring careers in the sector. Secondly, a judicious use of seed capital or tax advantages may improve

the investment climate in the resource industries through the short term, allowing the private sector to regain confidence in the long term prospects for natural resource industries.

4.0 Conclusion

This examination of the principal pressure points affecting Maine's environment and natural resource base suggests that fundamental forces for change are at work in the state today. Some of these forces may be temporary or transitional. The solid waste crisis, the land boom and the intensity of pressure from rapid population growth probably fall into this category. Others are likely to be fundamental, affecting the appearance, the character and the very culture of our state. The likelihood that our free access tradition is dying, the decline of our traditional natural resource industries and the working landscapes and way of life they represent, and the emergence of the New Forest hold within themselves the prospect of a 21st Century Maine that will be radically changed from what we have known and continue to know today. And the Greenhouse Effect represents a wild card that could change not only the face of Maine but the balance of life for the entire planet.

Yet in other ways, Maine is unlikely to change for the worse. Our environment is clean and heavily protected by the state and the people alike. In the future we can expect to continue to enjoy one of the healthiest environments in the nation. Our population is small compared with our endowment of land and, even through the growth period of the past twenty years, we have not grown as fast as the nation or even as our New England neighbors. Our natural land and seascapes are an exceptional backdrop to our daily lives and one that has inculcated in us an obvious respect and even reverence for the land and the natural world.

STRATEGIES AND RECOMMENDATIONS

5. Growth

5.1 Strengthen growth management by accelerating the funding schedule for second and third tier "slow growth" towns. Fully fund all local planning assistance by 1992.

5.2 Provide the statutory authority to allow the consideration of non-environmental impacts of developments on communities and on regions, during normal project review.. Key impacts include carrying capacities of water, waste and transportation systems. Consideration should also be given to the availability of local recreation, to the visual impairment of local and regional landscapes and to the social coherence of established communities and institutions.

6. Environmental Quality

6.1 Develop mechanisms to inform individuals of their contributions to environmental degradation in Maine. The identification of the impact of state school aid on local property tax bills is a possible model of such mechanisms.

7. Policy Coherence

7.1 Clarify legislatively Maine's environmental policy objectives, priorities and the principles on which they are based.

7.2 Unify environmental policymaking along functional and resource lines. Eliminate the opportunity for regulatory staff to pre-empt policy functions by separating policymaking and regulatory/enforcement functions in distinct agencies. Separate planning and permit review functions in state agencies and local planning boards.

7.3 Improve the collection, assembly and distribution of information relating to natural resources and environmental trends and require this information function to be a priority agency task.

8. Waste Management

8.1 Treat waste disposal operations as regulated utilities to eliminate unequal pricing practices.

8.2 Develop an incremental state plan and timetable establishing the basis for advancing solid waste policy from incineration and ash landfilling to incineration and ash solidification to comprehensive recycling. Identify sufficient landfill capacity in advance to accommodate this plan.

8.3 Forge regional solutions with other New England states to the interstate export of solid waste, to the formation of regional recycling markets for solid waste products and to the ultimate siting of solid waste disposal facilities. Establish mandatory recycling or waste stream reduction thresholds as a minimum requirement for entry into regional recycling and disposal compact.

8.4 Reserve sufficient state bonding capacity by 1990 to permit capital assistance to municipalities in meeting wastewater treatment and sewer upgrading requirements.

8.5 Identify feasible control program for concentrated residuals by waste stream element before requiring recycling of those elements.

9. Imported Pollution

9.1 Continue to pursue legal remedies and Federal legislation to control the impact of interstate air pollution drift. Explore options for cooperative arrangements with upwind states to reduce pollution levels at the source.

Explore opportunities to develop leverage over these states and provinces through devices like education and publicity campaigns, sales taxes on products originating in polluting regions and impact fees on tourists and seasonal property owners who reside in those states and provinces.

9.2 Identify potential impacts and establish policy prohibiting the futile "fortification" of coastline areas against sea level rise. Identify key infrastructure likely to be at risk and plan for replacement. Adjust 100-year flood plain parameters to reflect representative levels within the range of possible sea level increases. Monitor trend development and prepare contingency plans for future adjustments in land use.

9.3 Establish contingency plan, sites and standards to minimize impact of any nationally-imposed waste disposal solution that would require Maine to landfill imported wastes or to cease exporting its own.

10. Groundwater

10.1 Identify priority uses by aquifer for Maine's groundwater resource, including uses for local consumption, in-state redistribution and export.

10.2 Investigate cost-benefit basis for controlling non-point introduction of nitrates into groundwater (which represents 60-percent of total groundwater pollution) as compared with use of well-head filtration to cleanse affected drinking water.

10.3 Monitor technological developments that would permit cost effective clean up of contaminated aquifers at a more rapid pace than allowed by natural processes. Investigate the feasibility of developing such technologies in Maine.

11. Vulnerable Lakes

11.1 Promote low cost and self help approaches to runoff control for farmers and homeowners within lake watersheds. Investigate incentives such as reserved or priority lake access for backland property owners within watersheds to enhance runoff management.

11.2 Reserve sufficient land from lakeshore development to permit siting of constructed wetlands to receive and buffer runoff channeled from residential development. Consider including runoff management and wetland construction as conditions on significant subdivisions or on lakes identified to be at high risk of eutrophication. Consider extending the Moosehead Lake approach of comprehensive management and transferable development rights markets to all lakes statewide.

12. The Land Boom

12.1 Aggressively pursue negotiated settlements with large forestland owners to assure the perpetuation of the scale and character of Maine's traditional forest base.. Acquire development rights to be held in public trust where appropriate in preference to outright acquisition of public land. Explore alternative negotiated solutions that would lock up development rights, for multi-decade terms or in perpetuity, as appropriate, in return for state actions desired by forest owners, such as reasonable regulatory concessions that affect harvesting practices.

12.2 Evaluate the effect of inheritance tax policies on creating incentives for farm and forestland owners to sell off part or all of a land legacy.

12.3 Identify the extent of "paper subdivisions" in Maine and evaluate their ability to interfere with effective comprehensive planning. Consider the creation of a state fund that would purchase such unbuilt developments and resell them without the grandfathered development rights, or would simply purchase the development rights outright and resell them to

enable alternative developments in more socially acceptable locations.

12.4 Investigate mechanisms whereby the visual or landscape values created for local communities by the owners of working landscapes might be used to generate annual revenue that could enhance the economic viability natural resource industries.

12.5 Improve the collection, analysis and distribution of information about land markets, uses and conversions. Remove statutory restrictions on the State Bureau of Taxation that blocks the anonymous, statistical use of land sales data for purposes other than municipal valuation studies.

13. The New Forest

13.1 Establish feasible limits on total clearcut areas by watershed to maintain the quality of lakes and streams, prevent water warming and its negative impact on aquatic wildlife and to avoid excessive siltation.

13.2 Clarify the limits of public interest in wilderness preservation and species diversity in Maine and the scale of public land acquisition required to meet these objectives.

13.2 Reinstate the State Forestry Assistance Program to aid small woodlot owners in improving resource management and contributing to the reduction of wood shortages in the next century.

14. Maine Outdoors

14.1 Clarify by statute or Constitutional Amendment the limits of private and public rights of access to and control of land, wildlife and surface water resources.

14.2 Provide incentives to landowners, through tax abatements, indemnification or other means, to avoid posting undeveloped land that has been used

traditionally by the people of local communities. Support these incentives with a substantial public education initiative which emphasizes the importance of unhindered public access to Maine traditions and cultural values.

15. The Natural Resource Industries

15.1 Establish a distinct economic development strategy and staff for the natural resource industries separate from the overall economic development initiatives of the state.

15.2 Maintain or increase state efforts in marketing assistance, technology transfer and capital assistance to traditional natural resource industries.

15.3 Inaugurate a major state effort to promote the development of a modernized food processing industry in Maine. Emphasize marketing and multiple use facilities development capable of maintaining sufficient year-round processing volume by tapping crop, fruit and fishery supplies of raw product.

15.4 Control entry to the commercial fishing industry by reserving harborside land, moorings and slip space for the industry only in amounts compatible with long term sustainable yields of the resource.

15.5 Increase the collection, analysis and distribution of biological information describing fish stocks and habitats in the Gulf of Maine.

A Bioregional Approach to the Conservation and Management of Maine's Natural Resources

A CONCEPT PAPER

Prepared for
The Commission on Maine's Future

By Dr. John H. Fitch
Mainewatch Institute

February, 1989

EXECUTIVE SUMMARY

Maine's natural resources, biodiversity, and environmental quality are key to its present and future economic and social progress. Increasingly complex environmental problems such as water pollution, solid and toxic waste, and air pollution threaten Maine's environmental and economic future. Many of these problems transcend town, county, state, and national boundaries, occurring instead within such bioregional areas as mountain ranges, river basins, watersheds, and coastal zones.

Bioregions are geographical areas defined by natural climatic, geological, and ecological boundaries, and the human cultures adapted to live and work within them. The bioregional approach to complex environmental problems addresses causes and effects within the impacted bioregional area.

Maine is centered in the Gulf of Maine bioregion, bounded to the north by the St. Lawrence River, to the west by the Appalachians, to the south by Cape Cod, and to the east by the Atlantic Ocean. Its bioregional subdivisions include river basins, watersheds, large lakes and islands, and coastal estuaries. This bioregion and its subdivisions overlap rather than falling within the political boundaries of a single town, county, state, or province.

Successful bioregional approaches require the following elements: (1) an integrated ecological and economic understanding of the problem, its causes, effects, and solutions; (2) a definition of the bioregional area in which the causes and effects of the problem are observed; (3) a practical and sound plan to resolve the problem; (4) endorsement and cooperation of the government agencies, nongovernmental organizations, and interested private citizens of the bioregional area; (5) public information and education efforts; (6) and continuing monitoring of the problem and efforts to resolve it. In most cases, subdivisions of bioregions at the watershed, river basin, mountain range, or coastal zone level are most effective.

There are excellent examples of bioregional cooperation within Maine and on a transboundary level, between Maine and Canadian provinces. At the same time, there are numerous examples of present and emerging problems requiring a bioregional approach.

Organizational gaps in the abilities of government agencies create serious barriers to a bioregional approach. An organizational audit and an investigation of organizational models are needed in order to develop more effective bioregional approaches in Maine.

I
INTRODUCTION

Maine's natural resource base, natural diversity, and environmental quality are increasingly threatened by complex problems. Air and water pollution, solid and hazardous wastes, overharvest of natural resources, haphazard growth, and cumulative development threaten Maine's present and future environmental and economic health (State Planning Office, 1987). Emerging problems of global warming, ozone depletion, and the degradation of natural ecosystems and their resources further imperil Maine's future and that of the earth's biosphere (McNeely, 1988).

Many of these contemporary and emerging problems are difficult for governments to solve by traditional means, for two reasons. First, problems such as acid rain, groundwater pollution, ozone depletion, and global warming impact the natural environment and people of watershed, aquifer, and coastal gulf "natural units" that frequently cut across the traditional political boundaries of municipalities, counties, states, and even nations. Second, government institutions, established to address earlier, less complex problems, have difficulty resolving highly complex contemporary and emerging problems--problems having scientific/technical, social, and economic dimensions-- even if they happen to fall within specific political boundaries.

An interdisciplinary and holistic *bioregional* approach focusing on impacted natural ecosystems is needed to address many contemporary and emerging environmental problems. The bioregional approach is especially useful in Maine because of its geographical location and the high value it places on its natural resources and environmental quality.

Scope of Concept Paper

The Commission on Maine's Future contracted with Dr. John H. Fitch, Mainewatch Institute's executive director and senior researcher, in early January 1989 to produce a short

concept paper describing a bioregional approach to conserving and maintaining Maine's natural resource base, natural diversity, and environmental quality. The scope of this paper includes defining bioregional concepts, presenting examples of bioregional problems and solutions, and recommending ways in which the state of Maine can use a bioregional approach to address Maine's environmental problems--both now and in the future. Environmental problems of global dimensions such as global warming and ozone depletion will have increasing impacts on the Gulf of Maine bioregion. These problems are mentioned in passing in this paper only because other papers will cover them in detail.

II

BIOREGIONAL CONCEPTS

What Is a Bioregion?

Based on its Greek and Latin roots, a *bioregion* is defined as a "life territory." A more complete definition is given by McGean (1986):

> **"Bioregion: a geographical area whose rough boundaries are set by nature...flora, fauna, water, climate, rocks, soils, landforms, and the human settlements and cultures these characteristics have given rise to."**

Bioregions include such areas as river basins, watersheds, mountain ranges, and marine gulfs--all of whose boundaries can be defined by a common set of climatic, geological, geographical, and ecological features. In addition, bioregions contain interacting species and natural ecosystems that are dependent on one another and on key resources of the area. The Gulf of Maine bioregion, for example, contains interdependent estuaries, rocky shores, and coastal shelf ecosystems interconnected by tides and currents . This bioregion is a natural unit that is likely to be directly impacted by such problems as watershed and river basin pollution, fisheries declines due to overharvesting, potential impacts of oil and other hazardous chemical spills, air pollution and acid deposition, and by ocean level rise due to global warming.

Ecologists and biogeographers have developed hierarchical classifications of natural ecosystems (Clapham, 1983). Bioregions fit into that classification system as a useful category (see Table 1).

The bioregion concept is useful in dealing with natural resource and environmental problems because it is at this level that cause-and-effect relationships can be defined and that solutions, relevant to both natural systems and people, can be developed. Like biomes or ecosystems, bioregions can be defined by common climatic, geological, geographical, and ecological characteristics and by ecological processes that interconnect their parts into a

TABLE 1

Hierarchical levels of natural ecosystems and biodiversity.

LEVEL	DEFINITION	EXAMPLES
Biosphere	Zone of life on the planet Earth	Earth's atmosphere, surface, and oceans
Continent/Ocean	Geological / geographic subdivision of biosphere	American continent Atlantic Ocean
Biome	Geographic and climatic region supporting similar ecosystem types	Northern Boreal Forest Biome
Bioregion	Geographical/geological subdivision of a biome supporting interacting ecosystems	Gulf of Maine
Ecosystem	Community of interacting animals and plants and the surrounding climatic, physical, and chemical environment	Spruce/fir forest

unified whole. Thus, bioregions are ecological units whose parts can be defined and even modeled in order to predict the consequences of environmental changes. People living in bioregions often have common cultural characteristics and social values appropriate to their regional environmental setting.

In contrast, "political regions" defined by town, county, state, and national boundaries only rarely correspond to bioregions; instead, they frequently bisect important bioregions. Many political areas, for example, are defined by rivers, which means that part of the watershed is in one political jurisdiction and part is in another. Lakes, rivers, and other sensitive bioregions frequently bisected by political boundaries become part of what Garrett Hardin has termed the "tragedy of the commons" because neither political entity feels full responsibility for conserving their natural resources or environmental quality.

What is Bioregionalism?

Growing awareness that bioregions are usually more relevant to natural resource and environmental problems than are political boundaries has led to a bioregional movement.

"Bioregionalism" recognizes that the natural systems of bioregions are significant not only in their own right, but also as providers of resources and services essential to human survival and quality of life. These natural systems, including "communities" of plants and animals and their interacting physical and chemical environments, are known as "ecosystems." The environmental characteristics of many bioregions and their ecosystems also affect the activities, professions, and even the beliefs of the people who have settled there. Thus, the term "bioregion" has ecological, cultural, and philosophical dimensions referring to "...both a geographical terrain and to a terrain of consciousness" (Berg, 1975).

An important goal of bioregionalism is to develop patterns of sustainable natural resource use in bioregions. The current interest in Maine's scenic values may indicate a growing recognition in the state of the many interrelated ecological, economic, and aesthetic values associated with bioregions and natural ecosystems.

What is Maine's Bioregion?

Maine is centered within the Gulf of Maine bioregion bounded on the north by the St. Lawrence River, on the west by the Appalachians, on the south by Cape Cod, and on the east by the Atlantic Ocean . This bioregion is interconnected by strong geological, climatic, geographical, ecological, cultural, historical, and economic ties (McGean, 1986). Ancient collisions of land masses and periodic mountain upthrusts combined with more recent extensive glaciation have defined its rugged and "drowned coast" with bays, islands, and submerged offshore shelves. In addition, the Gulf of Maine is a distinct "boreal" biogeographical region with species limited in their distribution by colder temperatures to the north and warmer temperatures to the south. The land is characterized by luxuriant conifer and hardwood forests. The climate of the region is greatly influenced by the colder Labrador Current and the warmer Gulf Stream; these currents supply and circulate nutrients that support one of the earth's richest marine ecosystems. Native American peoples of this bioregion relied on the productivity of marine and terrestrial ecosystems, as did early immigrants from France and England. A dependency on natural resources continues to connect the environmental, economic, and cultural concerns of this bioregion.

Despite the biogeographic, climatic, ecological, cultural, and economic connections of the Gulf of Maine bioregion, full resource maps of the entire bioregion do not exist, and

information concerning the bioregion and laws regulating its natural resources is often isolated by political borders.

TABLE 2

THE NATURAL REGIONS AND SUBREGIONS OF MAINE

1. Coastal Region
   - 1A. Sandy Beach
   - 1B. Transition
   - 1C. Greater Penobscot Bay
   - 1D. Eastern
   - 1E. Cobscook Bay

2. Uplands Region
   - 2A. Oak Forest
   - 2B. Pine Forest
   - 2C. Belgrade-Cobbossee Lakes
   - 2D. Foothills

3. Norumbega Hills Region

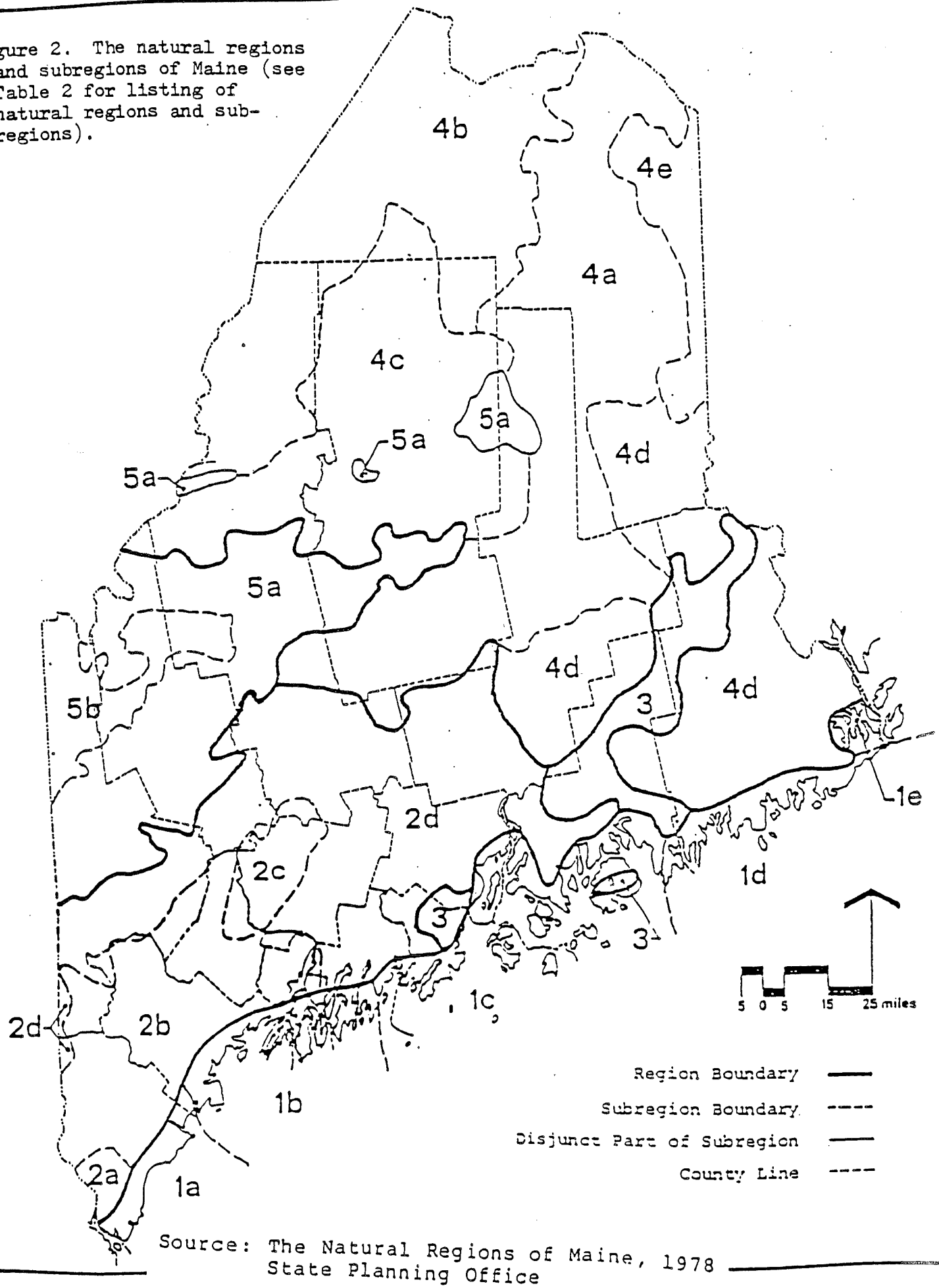
4. Northern Forest Region
   - 4A. Northern Lowlands
   - 4B. Allagash-St.John River
   - 4C. Moosehead-Churchill Lakes
   - 4D. Eastern Bogs
   - 4E. Aroostook Limestone

5. Mountains Region
   - 5A. Alpine
   - 5B. Rangeley Lakes

Subdivisions of the Gulf of Maine Bioregion Within Maine

Adamus (1978) reviewed a variety of physiographic, climatic, and ecological divisions before describing the five natural regions of Maine as a geographical context for the Maine Critical Areas Program (see Figure 1). These categories may be regarded as bioregional subdivisions within a state border and are as follows: (1) Coastal, (2) Uplands, (3) Norumbega Hills, (4) Northern Forest, and (5) Mountains. These natural regions can be defined by north-south gradients in temperature and other climatic features as well as landform and ecological characteristics; their subregions are listed in Table 2. They are currently being reviewed by Ms. Janet McMann at the University of Maine at Orono under a grant from the Maine State Planning Office.

Figure 2. The natural regions and subregions of Maine (see Table 2 for listing of natural regions and subregions).



Source: The Natural Regions of Maine, 1978
State Planning Office

III

BIOREGIONAL APPROACH IN MAINE

Examples of Innovative Efforts

Complex and seemingly insoluble environmental problems are being effectively addressed by bioregional approaches in Maine. The following are some examples of such innovative efforts in central, western, northern, and eastern Maine.

Fisheries Restoration: Atlantic salmon have historically spawned in many of Maine's major rivers including the Penobscot. By the late 1950s, however, salmon had almost vanished from the Penobscot for two reasons: lack of fishways around dams, and water pollution. Water quality was so poor that a 12-mile stretch of river between Bangor and Bucksport contained almost no oxygen, effectively blocking any salmon migrations. Only 20 years later, salmon have been re-established on the Penobscot River. How did this happen? Three major actions had to be accomplished in order to reintroduce salmon to the Penobscot: (1) the river had to be cleaned up; (2) fish ways had to be installed; and (3) new stocks of salmon had to be obtained, raised, and released in the river. These actions were beyond the scope of community and county governments along the Penobscot, without the cooperation of the state, federal, and Canadian governments. The Atlantic Salmon Commission was formed to coordinate the reintroduction effort. River cleanup was accomplished through legislation, and fishways were built after negotiations with dam owners. Salmon fry were acquired from New Brunswick and raised in hatcheries provided by the U. S. Fish and Wildlife Service. The project would have been impossible without the cooperation of communities along the Penobscot, conservation and fishing organizations, federal and state agencies, and the Maine Legislature.

Balanced Growth: The Western Mountains area of Maine has experienced tremendous growth, especially in tourism, in the last decade. Land values and development pressures have been increasing in the area, sometimes more quickly than local communities can respond. At risk are natural resources, environmental quality, and scenic values that originally encouraged development and expanding tourist and recreation industries. Several important initiatives promoting balanced growth are now underway in this area. First, the

Moosehead Lake Advisory Committee, in cooperation with the Maine State Planning Office, is developing a plan for balanced growth along the shoreline of Moosehead Lake. This committee includes representatives of most of the lake interests, including development, recreation, forestry, landowners, and LURC. The town of Greenville is working closely with the committee so that its comprehensive plan and ordinances will be compatible with the Moosehead Lake Advisory Committee plan. It is hoped that the Moosehead Lake plan will be a useful model for other large lake balanced growth planning in the region, such as that in the Rangeley Lakes region.

Second, Mainewatch Institute (1987) surveyed the Western Mountains resource and economic base in its report: "The Western Mountains of Maine: Toward Balanced Growth." Interest in the report and its recommendations has led to the founding of a new nonprofit "grass roots" organization--the Western Mountains Alliance-- to foster balanced growth and better communication among environmental, development, industrial, recreational, business, and landowner interests. Its plans include providing the Western Mountains region with information on issues of regional significance such as the Hydro-Quebec Project, identifying natural resources of regional significance, and encouraging towns to work together on natural resource and balanced growth problems of mutual concern.

Watershed Restoration: Lake pollution from agricultural runoff, road ditch runoff, sewage, and wastewater threatens water quality and the ecological life of lakes in the St. John River Valley. Sedimentation from runoff and nutrients from agricultural fertilizers, sewage, and waste water accelerate eutrophication, and toxic chemicals from pesticides and road runoff endanger aquatic organisms and water quality. Of special concern is Fish River Lakes watershed. Pollution in this and many other areas impacts lakes, connecting streams, and groundwater in watersheds extending across town and county jurisdictions, thus making it difficult for any one political entity to take effective action. In this case, however, a unique organization-- the St. John Aroostook Resource, Conservation, and Development Steering Committee-- has been able to take action. This organization is part of a national RC&D Program administered by the USDA Soil Conservation Service. The SCS provides a technical person, secretary, and some funding; but priorities and projects are defined by a local steering committee of citizens. The major goal of the RC&D programs is to help local organizations develop the capacity to resolve problems affecting resource, conservation, and development issues in watersheds and soil conservation districts. The St. John RC&D helped to establish the Fish River Lakes Water Quality Association and to design a project

addressing the overall problem of watershed pollution. Project elements include water quality monitoring, flood prevention, artificial wetlands to catch nutrients and sediments, road ditch erosion control, and public assistance and education on sewage and wastewater disposal. A lake coordinator has been hired; much of the support comes from local communities and camps located on or nearby the seven principal lakes in the watershed. Close working relationships have been developed with communities, with the Maine Department of Environmental Protection, and with the Northern Maine Regional Planning Commission. This project, just 2 years old, has been extremely productive, road ditch erosion control and sediment/nutrient pond projects are already in place, and it has received recognition as national recipient of the "Take Pride in America Award."

Transboundary Cooperation: In the Passamaquoddy Bay area, transboundary cooperation is expanding to include environmental quality, tourism, recreation, business, and balanced growth issues. The St. Croix International Waterway Commission has been formed to improve water quality on the St. Croix River, and a pilot project is underway to develop an international recycling program. The Quoddy Bay/Fundy Isles Tourism Association has been established to provide information on Passamaquoddy Bay as a tourist and recreational region and to promote both sides of the border. Calais, Maine and St. Stephen, New Brunswick are sister cities that share a long history of cooperation in business, health care, fire protection, law enforcement, and water issues. Calais currently buys its water from St. Stephen and has even been loaned a fire engine by its sister city in the past. In addition, planning and business survey information are exchanged and balanced growth issues are discussed regularly by representatives of the two communities. Transboundary cooperation in the Passamaquoddy Bay area is facilitated by its relative isolation from large cities in either Maine or New Brunswick, by a common history, by a common bioregion subdivision, and by common natural resource and tourism opportunities. On the Maine side of the border, Calais and five other communities have been designated by the state as a single job opportunity zone, which has led to increased levels of communication and cooperation.

Examples of Unresolved Problems Affecting Maine

Examples of New England bioregional problems are discussed in Appendix 2. The following are examples of specific problems confronting Maine that can and should be addressed through a bioregional approach.

Watershed/aquifer/bay contamination: Nutrient, bacteria, sediment, and toxic chemical pollution are threatening a number of watersheds, aquifers, and bays in Maine and the Gulf of Maine bioregion. Pollution in areas such as Casco Bay and China Lake can be cleaned up by vigorous programs on whole watershed or equivalent levels using such approaches as public education, enforcement of current regulations, development of town ordinances, and mitigative actions to reduce road ditch erosion, agricultural runoff, and sewage contamination.

Unbalanced growth: In southern Maine, "spill over" growth from New Hampshire is occurring with rapid increases in land values, increased demands for town services, and poorly planned development. Aggressive development often overwhelms town and county governments leading to regional increases in traffic congestion, solid waste, crime, and strip development, with accompanying declines in the quality of life. More interstate cooperation and substate regional comprehensive planning are needed to address these problems.

Fisheries disputes: A difference in legal lobster sizes between Maine and New Hampshire is but one of many fisheries disputes in the Gulf of Maine. International, interstate, and even substate differences in fisheries regulations, methods of harvest, and management approaches threaten the sustainable future of some Gulf of Maine fisheries. Better harvest and population data and standardized data collection methods are needed to establish equitable and sustainable harvest levels throughout the bioregion.

Wilderness preservation: Wilderness in Maine and the Gulf of Maine bioregion is disappearing at a rapid rate with associated losses of natural ecosystems and biodiversity. Creation of additional protected areas like Baxter State Park would help preserve samples of natural ecosystems and biodiversity. Furthermore, such areas should be large enough to sustain their own levels of biodiversity with little outside management.

IV
CONCLUSION

As described in this paper, the bioregional approach can be extremely effective in addressing complex multidimensional, transboundary environmental problems. It is sensitive to the critical ecological requirements of natural ecosystems as well as the concerns of people of the bioregion. Because of its central location in the Gulf of Maine and the high value it places on its environmental quality and natural resources, Maine is in a unique position to provide leadership in formulating innovative bioregional solutions to such problems.

Effective bioregional approaches are already being applied in Maine but they are being applied in spite of rather than because of the current organizational framework. On a substate level, important organizational gaps in institutions are barriers to bioregional initiatives; these barriers can be overcome only by strong local efforts that are both visionary and well organized. Beyondthe town government level, there are water, soil conservation, and solid waste districts, and county governments. These entities often do not correspond to important bioregional units and frequently lack the authority and resources necessary to attack important environmental problems. An "organizational audit" is needed to develop recommendations for improved organizational frameworks that should include bioregional districts. As a general strategy, interlinkages between governments, private citizens, universities, and nongovernmental organizations need to be explored and expanded. General recommendations for the goals and needs, organizational framework, and implementation process of a bioregional approach are outlined in Appendix 1.

In order to mobilize the resources necessary to address environmental problems on a bioregional basis, criteria must be developed by which to evaluate and address such problems on anticipatory as well as a reactive bases. Watershed-wide efforts to reduce road ditch erosion and agricultural runoff, for example, are most effective when they are done on a preventive basis in antiicipations of problems rather than as an emergency. Such "damage control" criteria should include critical environmental thresholds above which the sustainable environmental quality and natural resources of a bioregion or its subunits will be jeopardized.

In Holland, where land productivity and conservation must be maximized, the country is divided into bioregional units with the organizational framework and expertise to address complex environmental problems. The Holland model and others should be evaluated in order to develop ways of encouraging and expanding successful bioregional approaches in the Gulf of Maine bioregion.

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APPENDIX 1:
RECOMMENDATIONS FOR A BIOREGIONAL APPROACH

Recommendations are briefly summarized here and can be considerably expanded in future papers. They include outlines of the goals and needs as well as a recommended organizational framework and implementation process for a bioregional approach. Formulating an effective bioregional approach requires two critical steps: (1) developing the organizational framework to implement a resource conservation and management process within and across the bioregion's political boundaries; and (2) developing a process to define the bioregion and its resources and to conserve and manage its natural resources in a sustainable way.

Goals and Needs

Recommended goals for a bioregional approach are to maintain the biodiversity, environmental quality, and natural resources of the Gulf of Maine bioregion by:

1. Conserving essential ecological processes and life support systems,
2. Protecting genetic diversity of native species, and
3. Managing natural resources for optimal sustainable use.

Fundamental needs for a bioregional approach include establishing educational, research, regulatory, and management efforts that are bioregional in scope.

Organizational Framework

Developing the organizational framework to implement an effective bioregional approach across the bioregion's political boundaries is as critical as the process itself. It is essential that organizational frameworks, either formal or informal, be developed to address emerging problems holistically in transboundary settings. A United States-Canada bioregional advisory and planning commission should be created to develop a Gulf of Maine Conservation Strategy and to advise the New England Governors' Permanent Standing

Committee on the Environment. Nongovernmental organizations (NGOs) have an important role to play in these efforts because they have the institutional flexibility to work with universities, government agencies at any level, business, and industry to develop bioregional approaches.

An organizational framework for addressing bioregional problems should be developed as follows:

1. Define the critical bioregional area and its major subdivisions.

2. Identify agencies, NGOs, and experts having major interest in and responsibility for natural resources/environmental quality in the bioregion and its major subdivisions. In the Gulf of Maine, examples include but are not limited to the following:
   a. regional level: New England Governors' and Eastern Canadian Premiers' Conference, New England Governors' Conference, and NGOs
   b. federal level: U. S. Department of the Interior, U. S. Environmental Protection Agency, U. S. Department of Agriculture, Environment Canada, Canadian Wildlife Service, and NGOs
   c. state/province level: Maine Department of Inland Fisheries and Wildlife, Maine Department of Conservation, Maine Department of Environmental Protection and Canadian provincial equivalents, and NGOs
   d. intrastate level: regional economic development agencies, municipal planning boards, conservation commissions, and NGOs

3. Develop transboundary task forces appropriate to the bioregion and subdivisions representing specific interests and concerns. The Gulf of Maine bioregion task force, for example, would include government agencies, NGOs, and individuals with interests and expertise at the regional, federal, and state/province level. The Western Mountains subdivision of the Gulf of Maine bioregion, for example, would include agencies, organizations, and individual representatives with interests at the federal, state/province, and intrastate levels.

4. Empower the task forces with appropriate international, interstate, and intrastate agreements to implement the process as outlined below to conserve and manage natural resources of the bioregion and its subdivisions.

Implementation Process

The following process should be implemented once the organizational framework has been developed:

1. Identify the bioregional area, its resources, and culture in terms of its major features.

2. Identify the agencies and organizations that have regulatory authority, expertise, and special concerns regarding the environmental quality, natural diversity, and natural resources of the bioregion (see organizational steps).

3. Identify the primary factors affecting the bioregion's environmental quality, natural diversity, and natural resources.

4. Inventory critical resources and define critical environmental quality and resource thresholds for the bioregion.

5. Develop qualitative and/or quantitative models/paradigms by which to monitor, conserve, and/or manage the bioregion's critical natural resources.

6. Develop strategies by which the bioregion's resources will be conserved and managed on sustainable bases.

7. Monitor critical resources and environmental quality thresholds to be certain that they are within sustainable and planned levels.

APPENDIX 2:
EXAMPLES OF NEW ENGLAND BIOREGIONAL PROBLEMS

Many critical problems in New England must be addressed from a bioregional perspective in order to be resolved. Acid rain, Boston Harbor pollution, and diminishing supplies of freshwater on Cape Cod are examples of such problems.

Acid Rain: Wet and dry deposition from anthropogenic sulfur and nitrogen oxide emissions are impacting aquatic and forest ecosystems, and agricultural lands in areas with poor natural buffering capacity, as well as sensitive statues, bridges, and buildings--especially in New England and eastern Canada. Major anthropogenic emissions originate from stationary sources in the midwestern states and central provinces and from mobile sources in the Boston-Washington, D. C. transportation corridor. Although there is agreement that emissions reductions are necessary and that the technologies to accomplish such reductions are available, lack of interstate cooperation between the Midwest and New England and lack of transboundary efforts between the United States and Canada have continued to delay action on this important problem.

Boston Harbor: The harbor and rivers flowing into it form a large and potentially important estuary/bay that is becoming increasingly polluted with industrial and sewage waste from the some 43 communities whose sewers eventually run into the harbor. The Boston Harbor bioregion therefore includes not only the estuary and bay but also the watersheds of the rivers flowing into the harbor. Cleanup is possible if responsibilities, information, and resources can be shared among the federal government, state government, and the town governments in this bioregion.

Cape Cod: On Cape Cod, freshwater is a finite resource that is easily polluted because the entire Cape is a single-source aquifer. The diminishing quality and quantity of freshwater on Cape Cod is but one indication that the Cape Cod bioregion has been developed beyond its carrying capacity. Such development has occurred incrementally among town jurisdictions on Cape Cod, producing not only increased water demands but also wastes that threaten water quality in the aquifer.

Greenhouse Effect: Ocean levels in the Gulf of Maine are predicted to rise at least several feet in the next 25 years due to global warming from the Greenhouse Effect. Such changes will have major impacts on the Gulf of Maine's coastal bioregion and elements including its topography, climate, fisheries, water supplies, and land use patterns. Transboundary coastal inventory, monitoring, and planning task forces should be established to identify the impacts and to recommend measures that can be taken.

MAINE'S FUTURE HAS NO BOUNDARIES

THE REPORT OF THE
SUB COMMITTEE ON GLOBAL ISSUES
TO THE COMMISSION ON MAINE'S FUTURE

March, 1989

INTRODUCTION

The sub committee on Global Issues wrote three reports based on three questions the committee developed at its inception. The questions were:

1. What do Maine's business' need to know in order to compete effectively in a global economy ?

2. What do Maine citizens need to learn to become participating global citizens ?

3. What global environmental threats must Maine be prepared to deal with ?

This report is a synthesis of the other three reports.

TRENDS

1. Increasing social interaction and rapid change.

Tourism and business travel are increasingly bringing people from all parts of the world into contact with Maine citizens and vice versa. Demographic shifts, trade, and friendship programs also accomplish this. Besides the traditional mix of ethnic populations in Maine, a small, but growing number of people from the Pacific Rim nations, estimated at 2000, now live in the greater Portland area. Sister city and state programs have been established between Maine localities and the Soviet Union, Japan, Switzerland, Brazil, and soon China.

Meanwhile, television has long been a vehicle in linking Maine citizens with the global community. Ninety percent of Maine homes are able to view international events, such as the 1988 Summer Olympics, as they happen. Enhanced technologies also affect the pace of change. Certain fields, such as engineering, are experiencing a doubling of their knowledge bases every three years. On a more personal level, estimates are that people will face anywhere from five to nine career changes or job restructurings throughout their working lives. Rapid political and social changes underway in the Soviet Union, Eastern Europe, and China also reflect the rapid change seen in our world today.

2. Increasing globalization of the economy.

With enhanced technologies, the focus of the economy is shifting from local or national to global. During the 1970's, all Americans, including Maine people, felt the impact of the OPEC boycott. Over the past several years, certain Maine industries, forced to compete in a global marketplace, have lost hundreds of workers. On the other hand, nearly 700 Maine companies, 300-400 actively, now trade in that same

marketplace. Fifteen thousand Maine workers are currently involved in export related jobs, and it is estimated that the Maine economy includes
$1 billion worth of foreign trade. With the instant communication capability of the personal computer, fax machine, and telephone, increasing numbers of small businesses or professionals are based in Maine, conducting their business with customers and clients all over the world. In the future, the economic impact of the Canadian Free Trade Agreement and the European Economic Community awaits.

3. Increasing effects of global environmental patterns.

For many Maine people, the record heat of the summer of 1988 dramatized the effects of radical global climactic changes, possibly linked to the "greenhouse effect." With a predicted worldwide mean temperature rise of 1.5 to 4.5 degrees C between now and 2050 and an expected sea level rise of between 4.7 and 7.1 feet by the year 2010, Maine's climate and geography could be radically altered. Even more serious is the continuing depletion of the upper level ozone layer through natural and man-made processes, a situation that permits increased amounts of harmful ultraviolet light to reach the earth's surface. While the solid waste problem is straining local capabilities in Maine, it is rapidly becoming a worldwide problem.

4. Increasing public policy issues with a global connection and decreasing voter participation.

Maine's Congressional delegation, along with the U.S. Congress, and the President must deal not only with the issues and problems facing Maine and the country, but also a host of issues with an international connection. The United States long ago committed itself to participating in and providing leadership to the world. This commitment is evident in the public policies that are formed dealing with global issues in economics, human rights, the environment, scientific research, and national security. At the same time that we see more globally-oriented public policy issues, there has been a downward trend in voter turnout. In national elections over the past 20 years, voter participation has declined from over 60% in the 1960 to almost 50% in 1988. While Maine voters have participated in elections in higher numbers (65% in 1984, 62% in

1988), one must question the ability of many who did to grasp the complexities of the critical issues.

It is anticipated that these trends will continue over the next twenty years. Enhanced telecommunication networks, greater ease of travel, heightened international economic competition, continued environmental degradation, and growing third world population shifts will bring Maine ever more closely into the global community. By the 21st Century, Maine citizens will increasingly need to deal with rapid change in a global context, to more frequently communicate with people from other cultures, to actively compete in a global marketplace, and to consider ever more complex issues of public policy with global implications.

IMPLICATIONS

The inability of many Maine citizens to read, to communicate, to think critically, and to possess fundamental knowledge crucial to understanding public issues pose a number of threats to the valued quality of life in Maine. Locally, the lack of adequate job skills and the ability to learn new ones as economic conditions change threaten employee productivity, economic well-being, and Maine's capacity to compete in a global economy. Insufficient knowledge of global environmental connections and the lack of changes in behavior regarding waste disposal, fossil fuel burning, and general chemical use threaten human health. Another critical implication is the threat to the vitality of American democracy from the lack of informed citizen participation. Since the early development of our nation, two major themes have been prevalent in American life: a strong sense of individualism and a equally strong sense of community. It has been participation in the democratic process, exemplified by the New England town meeting, that has allowed citizens to determine the course of community life. Along with the freedoms and rights American citizens enjoy in a democracy come responsibilities: to protect the rights of others, to be knowledgeable of the issues, and to vote in elections.

With Maine becoming more involved with global community, these rights and responsibilities are set in a new context. To not exercise citizen responsibilities in a global context, Maine people run the risk of losing control over their valued quality of life. This is especially true given the increasing impact of decisions made and actions taken elsewhere in the world. Faulty construction techniques and inadequate human response caused the Chernobyl nuclear reactor to spread radiation throughout the world. Business and financial activities in Japan and other countries have an impact on our national and local economy. Along with fossil fuel burning in the world's industrialized nations, the destruction of the rain forests in Central and South America contributes to global warming. Oppressive political regimes and the lack of agricultural planning force thousands of people to leave their countries and emigrate to the United States.

In the future, Maine's citizens not only face threats to their way of life, but also may miss the opportunities to be gained by participating as active members of the global community. In thinking globally, Maine companies can discover new markets for their

products. Maine citizens can promote greater understanding among the peoples of the world and seek peaceful resolution of conflicts, thereby enhancing their own security. Finally, Maine citizens can contribute to the quality of life for all the world's citizens by slowing and halting the damage to the fragile natural environment. The future economic prosperity, political security, and environmental quality of Maine and the United States depend on how well people can adopt and act upon a new model of citizenship. Today there is a need to not only be active Maine citizens but also participating global citizens. As citizens of the global community, Maine people face more complex issues that affect themselves and the entire world. To face these issues requires a change in thinking, expanding the notion of community beyond one's immediate town, state, or nation, to understand the world as home, to "think globally and act locally."

RECOMMENDATIONS

1. Improve Maine's ability to to collect data, turn it into information and then into knowledge

There is no central place in Maine's institutional structure to collect and analyze data. Nor does there appear to be an agreed to approach to information management. To address this recommendation we suggest the following:

A. Create a Commission on Information Management, appointed by the Governor and Legislature, to develop a mission and strategy for information management. The Commission must deal with the issues of the value of information; the politics of information; turf wars created by squandering of information and the technologies and systems that will be needed now and in the future to manage and learn from information.

B. Create a state-wide issue scanning program that reports to the Governor and Legislature on a quarterly basis. The scanning program is to be modeled after the one created by Council of State Planning Agencies.

C. Create a Maine Council on Environmental Quality. The Council should be independent with multidisciplinary representation that reports directly to the Governor and Legislature. Its duties should include, but not be limited to:

a. Developing and promoting a State plan for sustainable resource management.
b. Improving the State's resource management data base.
c. Issuing an annual report to the public on the State of Maine's Environment, including appropriate policy recommendations.

d. Enhancing the State's contact with, and participation in regional, national and international activities directed at achieving sustainable resource management.

e. Conducting regular public forums on critical resource management issues bearing on long term resource adequacy for the State.

2. Rebuild our educational system to be responsive to the world we will live in in the 21st century.

As we enter the 21st century our citizens must be able to think globally and act locally. To this end we make the following recommendations:

A. Encourage the local development of a Maine vision for global citizenship. However noble the ideal of global citizenship, it will not be effectively developed unless it is locally understood and created. To accomplish this will require local leaders who can work in the community to help people see the need for and develop the concept of global citizenship. Input will be required from all segments of the community: teachers, parents, students, school board members, administrators, business people, employers, and other community members. It is essential that the vision be created at the community level, with outside assistance only if necessary, if the concept is to be effectively developed and pursued. Once a consensus model is created, it can become the standard for the community to follow. Such a process might be incorporated with the efforts of the Maine Aspirations Compact.

a. What does a global citizen know?

Including, but not limited to, the fundamental basics of world and United States geography and history, world religions and cultures; one or two foreign languages; economics; ecology; science and technology; environmental studies; the humanities, and most importantly, English and mathematics. Content matter in each subject is understood as interrelated, not separated.

b. What skills do they have?

Reading, writing, speaking, computing, and visual literacy; learning; thinking (critical, creative, holistic, analytical, conceptual); decision-making and problem

solving; relating; conflict resolution (negotiation and mediation); collaborating(alliance building, networking, working with others); adapting to change; creating change; creating stability; empowering self and others; leadership and followership; listening; advocacy; and "gentle" self-criticism.

c. What attitudes do they have?

Compassionate, empowered, excited about learning over the lifespan, risk taking, humorous, playful, curious, inquisitive, exploring, sense of hope and the possible, open-minded,stewardship, sharing, constructive, empathetic, passionate, and aspiring.

d. What values do they have?

Appreciation for diversity and differences, tolerance for other cultures, ecological and social interdependence, universal human rights, win-win solutions, responsibility for self and others, anticipatory democracy, parity, commitment to future generations, global human survival, esthetics, moral ethics, mutual trust, family and community, and a sense of place.

e. How does a global citizen act?

Safely disposes of waste, conserves natural resources by recycling trash, observing fuel-saving speed limits, limiting unnecessary electricity use, etc.; supports the implementation of such documents as the Universal Declaration of Human Rights; participates in elections and public discussions on important issues of local and global concern; buys and sells goods and services in the international marketplace, boycotting those goods in conflict with values; mediates peaceful resolution of conflict through win-win, long-term solutions; travels to places outside of local community, state, or country; speaks one or two foreign languages; contributes time, money, and effort on behalf of projects that help eradicate hunger and poverty and generally improve the quality of life for local and global people; and spends time with others as role model, particularly with youth.

In essence, the ideal global citizen is one who practices an attitude of lifelong learning and can learn independently to search for continued understanding of the issues

facing the global community. This citizen is one who sees the world's systems (environmental, economic, political) as interconnected and interdependent. Also, this citizen is empowered and future-oriented in developing a proactive stance to addressing problems. Finally, the ideal participating global citizen has a holistic vision of deep concern for all life on this planet.

B. Encourage the development and implementation of community-based global citizenship education.

To develop global citizens will require a change in the way we think about and structure the educational process. Our current system is patterned after the production line model of the Industrial Age. Students enter the pipeline at one end and emerge at the other some 12 or 16 years later, supposedly a unit ready to be a working cog in society. This model, characterized by a learner dependent on the teacher as the ultimate source of knowledge, may have sufficed when knowledge remained relatively static over a person's lifetime and communication was slow. With the coming of the Information or Communication Age, however, this model is outdated. Today, with technology-driven rapid change and instant communication, knowledge is growing at an exponential rate. We can no longer rely upon the teacher or professor as the only source of knowledge or knowledge remaining static. Nor can we allow the continued separation of subjects, or the learning process to cease upon graduation from high school or college. We must also bring ourselves more closely in contact with our natural environment. What is needed is nothing less than a philosophy of education based on new themes, structures, and context.

One model of education to help Maine citizens function as global citizens was created by the November group of educators. It is a community-based model that develops empowered, informed, and ecological global citizens who are adaptable to the rapid change, appreciate cultural diversity, and see the world and its systems as interdependent. To attain such a citizenry, a new global education system would feature:

a. An emphasis on learning to learn as the primary goal of all education.

Learning should be seen as a continuous process that occurs joyously over one's entire lifespan. Citizens must learn to take personal responsibility for their own lifelong learning, becoming self-directed in their learning projects. They should be able to learn

from reflection on their own experiences and to learn from others, not just teachers or professors. Discovering one's own learning style and understanding the contextual nature of knowledge are important steps in this process. To determine one's progress, dual emphasis should be placed on evaluation and measurement.

b. Understanding and relating to one's own culture and others.

Literacy in one's own language and society is a basic necessity, as is learning to speak a second language and to be knowledgeable of world geography and other cultures. Relating would include an appreciation of the unity of human species and diversity of cultures, the interdependence of human relationships, multiple loyalties, human rights, and cross-cultural awareness. At a personal and local level, learning to relate includes being able to work in small groups, cooperating with others and building teamwork on the job and in the community. Perhaps, it also means learning to relate to one's self as well.

c. The world as a series of interrelated systems.

Citizens should understand the vast interdependent nature of the world in terms of its physical, biological, economic, political, and communication and evaluative systems. This would mean an interdisciplinary and integrated curriculum that focused on themes as opposed to subjects separated into isolated units. Development of an ecological perspective on the world is essential.

d. Preparation of citizens for public and personal decision- making.

Participating in the democratic process, choosing a career, or solving community problems requires the ability to make decisions. This means thinking critically and creatively and clarifying one's values which underlie all decisions. To formulate appropriate solutions to problems, citizens also need the ability and skill to anticipate the long-term implications of decisions.

e. The development of modern civilization.

Citizens should have a basic knowledge of the history of the world, of the development of major world civilizations, including, knowledge of the United States as

one of history's great experiments with individual freedom and democracy. Citizens should also understand the geographical factors that have encouraged or hindered the development of civilization.

C.. Encourage and support learning environments that extend beyond the classroom to encompass the home, community, and world-at-large.

The learning process should contain an experiential component. As the Maine Development Foundation has stated, "From the early grades, we must teach with real-life situations. For example, Maine school children should learn about the dilemma of acid rain from the perspectives of social costs, science, and technology." One way to include the experiential is to remove the separation between our schools and the community at large, allowing students to learn from life's experiences or real issues. This might include more travel to local or foreign places, more opportunities for foreign exchanges and internships, or community service projects. It might mean holding the annual town meeting in the school, so that the entire community can observe and participate in the democratic process. It could also mean bringing more of the outside community into the schools.

People with a particular skill or expertise, such as local business people and Peace Corps volunteers who have traveled overseas and are fluent in the language and culture of another country, should be encouraged to become teacher resources or teachers for special topics. Through intergenerational learning, children, parents, and grandparents can learn from each other. By increasing the number of opportunities for "transboundary" activities, we can facilitate learning by placing people in new situations that lie beyond their normal realm of experience.

3. Tax and pay for the Maine we want not the Maine we have.

Due to the State's lack of foresight almost all of the State's resources are spent reacting to crisis and not to for paying for necessary changes government or the true costs of environmental degradation. In this context we recommend the following:

A. Establish a system of user fees on those activities which contribute to resource depletion and environmental degradation, and utilize the revenues generated thereby to mitigate the effect of those activities. For example, fossil fuel combustion contributes to global warming, acid deposition and other resource depleting trends. The State should impose a surtax on the purchase of vehicle and heating fuels. The revenues generated will be utilized to promote conservation and sustainable resource management. This could take the form of R& D for mass transit or planting of trees and/or the purchase of tropical rain forest to replenish oxygen. The goal of the tax would be to identify those activities that deplete or degrade resources, establish a cost for mitigating the damage and using the funds to repair or replace the resource that has been damaged.

B. The State should evaluate its purchasing options to promote sustainable resource management. This would include purchasing recycled paper products and the development of markets for recycled materials created by waste created by the State.

C. Recognize and support the development of the teacher as a professional planner, presenter, coach, facilitator, resource, model, mentor, and manger. Many of the existing global education activities and programs over the past several years in Maine are the result of the efforts of individual teachers. These individuals need to be recognized and supported. Many others will also need support and encouragement to face the new demands of global education. Instead of being transmitters of knowledge, teachers need to become facilitators of the learning process, empowering others to become self-directed learners. Likewise, more teachers will need to be interdisciplinary and multidisciplinary in their teaching. Subsequently, the need will exist to refocus the state's schools of education so that new teachers are trained in this new perspective. For those already in the classroom, we must provide the necessary support for their personal and professional development. This can be accomplished through existing programs, such as the Maine Studies Institute, which assists teachers in integrating global perspectives in their classroom. Ultimately, we must value teachers, allowing them to become learning leaders and to protecting their class time, while encouraging the redefinition of class time to include learning experiences outside of the classroom.

D. Identify and support "pockets of good practice" with respect to the above recommendations.

We have identified a number of programs that in some promote all of the above recommendations. These and other programs should be identified and recognized for their efforts. In addition they should receive priority for support. Changes will occur if communities have local models to learn from. By not supporting these programs and not allowing communities to anticipate future needs, we run the risk of mandating change in the future. We know from experience that this is the most difficult and painful way to bring about change.

MAINE IN THE GLOBAL BIOSPHERE:

ENTERING THE TWENTY-FIRST CENTURY

THE REPORT ON ENVIRONMENTAL TRENDS
OF THE SUBCOMMITTEE ON GLOBAL ISSUES
TO THE COMMISSION ON MAINE'S FUTURE

Prepared By
Frazer Kellogg

March, 1989

MAINE IN THE GLOBAL BIOSPHERE:

THE SETTING

As Maine prepares for life in the twenty-first century, its citizens and institutions face some disturbing trends. The Earth's carrying capacity -- the ability of its natural systems to support life in all forms -- is being severely stressed by human activity.

These stresses are reflected in:

- **Global Warming:**

  The Earth's mean temperature is rising. Estimates project increases in mean temperatures of between 1.5 degrees and 4.5 degrees C between now and 2050.

  The impact of this trend on Maine is not clear. It could mean longer growing seasons, a change in the mix of forest cover and other native vegetation, new insect species, changes in energy use patterns or changes in rainfall. Along the coast there could be increased occurence of fog.

- **Sea Level:**

  Projected to rise between 4.7 and 7.1 feet by 2100.

  With 3,500 miles of coast and many rivers which are tidal far inland, Maine would be severely impacted by rising sea levels. According to a 1984 study of the then-proposed Quoddy tidal power project, the mean sea level has been rising in excess of 1 cm. (0.4 inches) per year off the northeastern Maine coast as a result of the isostatic stress left on the area by the last glaciation. The Quoddy study, which evaluated the impact of a localized rise in sea levels of

about 6 feet, emphasizes the special closed character of the Gulf of Maine, which tends to amplify even small changes in sea levels.

If sea levels rise in conjunction with the trend toward global warming, tidal ranges off Maine's coast could increase dramatically and produce a variety of impacts -- including intrusion of sea water into fresh water aquifers which supply a number of coastal towns, changes in the makeup of fin and shell fish communities, and changes in local weather patterns. Some changes might enhance marine resources; others could be damaging.

- **Topsoil on Cropland:**

Global losses are estimated at 26 billion tons per year in excess of new soil formation.

A considerable amount of global agricultural topsoil loss is occurring in developing countries with rapidly growing populations. Those countries will be increasingly dependent on food imports, and this could have a positive impact on the future of Maine's food resource industries.

- **Forest Cover and Desertification:**

Biologically rich tropical forests are being cleared at the rate of 11 million hectares a year, while 31 million hectares of forests in industrial countries are being damaged by pollution and acid deposition. Deserts are spreading at the rate of 6 million hectares a year.

The clearing of tropical forests has been associated with the trend in global warming, and the declining ability of natural systems t absorb carbon dioxide. If a commitment were made to major reforestation programs, Maine could potentially play a role in supplying nursery

stock and forestry management assistance to countries in the developing world.

- **Water Supplies and Quality**

Underground water tables are falling in North America, China, India and Africa. Many biologically productive estuarial systems are being stressed by pollution and flooding. Ocean fisheries are subject to over harvesting and pollution from chemical and human waste discharges.

Maine's supply of clean fresh water, while exposed to threats from pollution and salt water intrusion, is relatively good compared with neighboring states to the south and many developing nations. There have been suggestions that Maine could become an exporter of water to other regions, as well as an exporter of technical assistance on water management and erosion control.

- **Solid and Toxic Waste:**

There have been many accounts in the media over the past year of attempts by industrialized nations to export toxic and medical wastes in developing nations and the resistance of those nations to accept them. Ocean dumping and burning of wastes produces risks to both air and marine environments.

Maine, despite its small size, has just embarked on the long-term process of averting an immediate crisis in solid waste management and has positioned itself as a leader among the states in the attempt to prevent the waste stream from reaching crisis proportions again. Maine's strategy combines the development of landfill capacity with attempts to control the amount and type of waste through recycling, materials controls, incentive packages, waste-market development and state-local partnerships. Many localities have or will develop

mandatory recycling programs to reduce the pressure on landfills.

At the same time, new technologies are emerging to employ recycled tires and glass in highway resurfacing materials. Maine's choice to emphasize state assistance in the creation and development of new markets for waste products may position the state in a leadership role in an emerging global industry. Recycling programs offer savings in energy and non renewable resource use as well. Recycling is also viewed as beneficial to local and global air quality.

- **Species Diversity:**

Several thousand species are disappearing each year due to habitat destruction. Estimates suggest that one fifth of all species may disappear over the next twenty years.

A number of Maine's bird species have winter nesting grounds in Latin American tropcal forests and are or could be threatened by habitat destruction associated with the clearing of tropical forests. These species also play a vital role as seed carriers in the normal process of tropical forest regeneration and in the protection of biological diversity in tropical regions.

- **Ozone Layer:**

The Earth's protective upper level ozone layer is deteriorating, permitting increased amounts of ultraviolet light to reach the Earth's surface.[1]

Maine recently became the fifth state to discontinue government purchase of CFC based styrofoam containers. However, this symbolic measure addresses only a small fraction of the uses of CFCs in the state. Given the threats posed by increased levels of ultraviolet light to human health and the functioning of natural

systems, ways could be explored to adopt new policies to limit the use if CFCs within the state.

These trends are, in large measure, the reflection of human activity. The global population has passed the 5 billion mark, and is growing at the rate of nearly a quarter of a million a day. This is the rough equivalent of four Portlands daily - or one Maine each five days. At this rate the global population will reach 6 billion before the turn of the century.

Although these trends are discrete measures and projections, the phenomena are interconnected in their impact on natural resource systems. For example, one anticipated outcome of rising sea levels for the Gulf of Maine is increased tidal turbulence and mixing of upper and lower water. This could, in turn increase the richness of plancton at surface levels, and thereby enrich the productivity of marine life. However, one of the expected impacts of greater surface levels of ultraviolet light (from stratospheric ozone depletion) is to destroy surface level plankton and other marine organisms. Beyond that, acid deposition -- both airborn and in freshwater runoff into the sea -- is thought to impair fin fish populations.

The issues posed by these trends are substantial, in both scale and potential impact. Simply put, the Earth's ability to provide the resources necessary to feed, house and clothe a rapidly growing population is under increased pressure. Moreover, it is an inescapable fact that people pollute. As Senator George Mitchell recently observed, the consequences of that pollution pose grave implications for human health.[2]

No useful purpose appears to be served by viewing these issues from a "good guys- bad guys" perspective. If the end result of human behavior is to reduce the quality of life, then all humans suffer the consequences. As Walter Truett Anderson states in the preface to his book *"To Govern Evolution: Further Adventures of the Political Animal"* --

> "...the time will come when governance and ecology are understood to be more or less the same thing -- but for ecology to be used with any meaning requires some idea of what the ecosystems we inhabit really are, how they work, and how they are changing. ... The environment is the base from which we think and act as political beings. The more accurate our understanding of it, the more effective our ideas and actions are likely to be; we have to know the territory. "[3]

Knowing the territory has several dimensions. For one matter, actions are shaped by how information is processed, and values have a large bearing on how information is utilized in decision making. Survey research indicates that Americans have a strong environmental ethic and there is ample evidence that they support policies to protect land, water and air resources. By the same token, however, the prevailing standard for success in the United States and much of the industrialized world is material well being; that more goods are better. It is a widely held notion that the United States, which makes up 5 percent of the Earth's human population, utilizes 25 percent or more of its physical resources.

Thus, there is an apparent contradiction in values: We want a "clean environment," but we also want material well-being as part of a sense of economic security. Nowhere is this contradiction more apparent than the daily media. News coverage describes holes in the ozone layer, medical and sewage pollution in oceans, health-threatening levels of ozone and other pollutants in the surface atmosphere, or floods caused in part by deforestation. The news is accompanied by editorials which demand that action be taken to correct environmental deterioration. Yet, side by side with this coverage and editorial articulation are advertisements which appeal to the demand for material well- being. This conflict is part of the setting in which Maine prepares to adjust global environmental trends and their implications for the future of the state.

The quest for material well being is a fundamental part of the way economies operate and the ways decisions are made to manage resources. A major recent contribution to " knowing the territory " is contained in "*Our Common Future*," the report of the World Commission on Environment and Development (WCED).

> "There has been a growing realization in national governments and multinational institutions that it is impossible to separate economic development issues from environmental issues; many forms of development erode the environmental resources upon which they must be based and environmental degradation can undermine economic development."[4]

What has begun to emerge from the apparent contradiction between environmental quality and economic progress is a concept of "sustainable development." That concept has been articulated in general as meeting the needs of the present without compromising the ability of future generations to meet their own needs.[5]

> "The concept of sustainable development does imply limits --- not absolute limits, but limitations imposed by the present state of technology and social organization on environmental resources and by the ability of the biosphere to absorb the effects of human activities."[6]

Inherent in the effort directed at creating a broad general definition of sustainable development, is coming to grips with the distinction between short term and long term objectives. Again, from the WCED report:

> " ... sustainable development is not a fixed state of harmony, but rather a process in which the exploitation of resources, the direction of investments, the orientation of technological development and institutional change are made consistent with future as well as present needs."[7]

The broad general concept of sustainable development is not new to Maine. The final report of the first Commission on Maine's Future recommended in 1977:

> "The State of Maine develop and annually update through its various departments and agencies concerned with natural resources, a natural resources management plan which will encompass all natural resources, recognize their interrelationships and interdependencies, and assure their proper management and utilization in perpetuity for the benefit of present and future generations of Maine people."[8]

While this recommendation never became mandated policy, it did reveal some sensitivity to the notion of sustainable development, even though the focus of the report was on Maine resources.

In the absence of a well articulated concept of sustainable development, and a comprehensive set of policies which would implement a plan to achieve it, there are bits and pieces of both official policy, private management decisions, and citizen actions which appear to be working toward the idea of sustainability. To cite a few:

- Maine's container deposit law results in some recycling of aluminum and glass, which reduces pressure on land fills and the energy required to produce new containers. Energy savings decrease reliance on fossil fuel consumption which contributes to acid deposition, global warming and attendant ocean level rises. It is a local action which helps in a small way to mitigate the impact of transboundary trends.

- Two major supermarket chains operating in Maine recently replaced petro based plastic bags with ones which use cornstarch as a base. The latter is biodegradable and utilizes a renewable resource while reducing the demand for petroleum based products. A smaller chain in Portland has forgone the use of large plastic bags altogether.

- Maine's largest utility company recently announced commitment to a five year research program to improve energy efficiency and conservation for industrial and residential users. Successful conservation efforts serve to reduce the demand on fossil and nuclear fueled generating capacity, with attendent benefits of preserving air, land and water quality. The utility also uses a single envelope to both bill and receive payment from customers, thereby reducing the pressure on forest products and the volume of solid waste.

- A leading Maine citizen serves on the board of a major international environmental organization, and on its committee which is operating and expanding programs to protect and manage tropical forests in Latin America. This is part of a larger effort to achieve tropical forest protection through "debt for nature" exchanges. Successful efforts to protect tropical forests help preserve the global store of biological diversity and the contribution of tropical species to medicine, food and fiber industries and other industrial uses. These programs also serve to help stabilize global climatic change.

- Monhegan lobstermen restrict their harvesting to winter months, which enhances the long-term productivity of a local fishery. Moreover, Maine recently increased the minimum size limit for taking lobsters, which is intended to increase the number of lobsters which reach reproductive maturity.

- Maine citizens recently approved a referendum to provide resources for additional acquisition of state protected lands, with benefit to habitat and species protection.

There are many more examples of activities in Maine which taken together represent an awareness and response to the concept of sustainable development, and the long term protection of the earth's carrying capacity. Beyond their immediate value, however, they provide a setting in which expanded levels of effort can be considered.

One global scale proposal to implement a concept of sustainable development is contained in the final chapter of *"State of the World 1988"*, prepared by the Worldwatch Institute of Washington D.C.. This proposal is based in turn on a redefinition of global security.

> "The whole notion of security as traditionallyunderstood -- in terms of political and military threats to national sovereignty -- must be expanded to include the growing impacts of environmental stress -- locally, nationally, regionally and globally. There are no military solutions to 'environmental insecurity'."[9]

The Worldwatch proposal takes annual global military expenditures at a present rate of $900 billion. These are outlays in accordance with the more limited military concept of global security. Starting in 1990, and under an expanded concept of security, defined in sustainable development terms, outlays for environmental security would rise from $46 billion per year to $150 billion per year by the end of the century.[10] Using the rationale that increased outlays for environmental security would also contribute to economic and political security, Worldwatch proposes corresponding reductions in global military expenditures. Thus, there would be no net change from present levels of security expenditures, but a marked change in their composition.

The major categories of environmental security, or sustainable development outlays would include:[11]

- **Protecting Topsoil on Cropland.** From $4 billion in 1990 to $24 billion in 1994 and each year thereafter through 2000.

- **Reforesting the Earth.** From $2 billion in 1990 to $7 billion in 1998 through 2000.

- **Slowing Population Growth.** From $13 billion in 1990 building to $33 billion in 2000.

- **Raising Energy Efficiency.** From $5 billion in 1990 and increasing by $5 billion per year through 2000.

- **Developing Renewable Energy.** From $2 billion in 1990 to $30 billion in 2000.

- **Retiring Third World Debt.** From $20 billion in 1990 to $40 billion in 1995 and declining to zero in 2000.

The Worldwatch proposal is distinguished by the fact that it is the first attempt to deal, both in scale and substance, with the budgetary requirements for restoring and maintaining the Earth's carrying capacity. It, along with the WCED report, in attempting to redefine global security, represents a dramatic departure from conventional ways of thinking about the future. This too, is part of the setting in which Maine prepares for the 21st Century.

MAINE IN THE GLOBAL BIOSPHERE:

MEETING THE CHALLENGE

The trends and issues described above portend change for Maine and its regional neighbors. While the direction and magnitude of the trends appear to be beyond the grasp and ability of subnational jurisdictions, there is an increasing awareness and concern about their impact at those levels.

In August 1986 the National Governors' Association unanimously passed a policy resolution directed at managing global resources. The significance of this measure is considerable because it reflected an awareness of global environmental trends which transcended the very parochial -- and none-the-less legitimate concerns, usually addressed by Governors. The preamble to the policy states " Humanity faces a huge challenge -- -many say a crisis -- in managing the earth's natural resources and environmental quality. The dynamic and interconnected character of the world's natural systems is well known but not fully understood. There is a growing body of evidence, however, that human activity can alter these systems on a global scale in ways which can affect the survival of humanity and other species."[12]

Acknowledgment of the seriousness of the trends, and the issues they pose, by an assembly of State governors is one matter. But beyond endorsing national and international policies to address them, what steps, if any, can Maine undertake?

In the context of the trends outlined above, and their term implications, several needs emerge if Maine is to enhance its capability to deal effectively with them.

(1.) For example, fossil fuel combustion contributes to global warming, acid deposition and other resource depleting trends. The State could impose a designated surtax on purchases of vehicle and heating fuels. Polls have indicated that citizens want improved environmental quality and are willing to pay for it. Accordingly, it should be made clear that revenues generated will be utilized to promote conservation and sustainable resource management.

In addition, the State should utilize its general public purchasing power to promote sustainable resource management practices, such as in the recent initiative to identify, create or support for recycled materials.

(2.) There is no central agency in Maine's institutional structure to collect and analyze the data which document resource utilization and impacts. Legislation should be enacted to create a Maine Council on Environmental Quality. The council should be an independent State Authority, with multidisciplinary representation, which reports directly to the Governor and Legislature. Its duties should include but not be limited to:

- o Developing and promoting a State plan for sustainable resource management.
- o Improving the State's resource management data base.
- o Issuing an annual report to the public on the State of Maine's Environment, including appropriate policy recommendations.
- o Enhancing the State's contact with, and participation in, regional and international activities directed at achieving sustainable resource management.
- o Conducting regular public forums on critical resource management issues bearing long term resource adequacy for the State.

The Council should be provided with a budget to adequately support these activities including a highly professional and multidisciplinary staff.

(3.) The State should play an active role in informing the public about global trends in population, the environment, resources and development, as well as their interconnections and interrelationships. As part of this campaign, "pockets of good practice," in the context of sustainable resource management, should be emphasized. Resources of the State's educational system, as well as the print and electronic media should be utilized as central parts of this campaign.

Taken together, implementation of these recommendations would substantially enhance the State's preparedness to meet the challenges of a rapidly changing global environment to present and future generations of Maine citizens. They would be first steps in a process which focuses continuing attention on the long term implications of resource management decisions, at a time when there appear to be few political and market incentives to do so. They would represent a State commitment to anticipatory, proactive resource management based on a strengthened knowledge capability.

END NOTES

1.These Trends are summarized in " Earth's Vital Signs ", by Lester R.Brown , Christopher Flavin, and Edward C. Wolf , 'July - August 1988.

2.Remarks delivered in a Keynote address to a conference on " The Value of the Gulf of Maine ", Portland, Maine, October 28, 1988.

3.Anderson, Walter Truett , " To Govern Evolution; Further Adventures of the Political Animal ", Harcourt, Brace, Jovanovich,New York, 1987 pages xii-xiii.

4." Our Common Future " Report of the World Commission on Environment and Development, Oxford University Press, Oxford/New York, 1987. page 3.

5.. page 86.

6., page 8

7.. page 9.

8., Augusta, Maine, December, 1977.

9." Our Common Future ", page 19.

10." State of the World ", Worldwatch Institute, Washington,D.C.,1988, page 186.

11. "State of the World ", page 183.

12. " Managing Global Resources ", National Governors' Association, Washington, D.C., August, 1986.

APPENDIX A

Highlights of December 12, 1988 Meeting on Global Environmental Trends

Underlying Causes of Trends

Population growth, fossil fuel consumption, life style of consumption - dependence on chemicals - industrial pollution impacts on air, land, water.

Separation from environment (education, shelter, workplace) acceptance of waste in industrial world. Overharvesting of renewable resources. Inappropriate uses of technology. Emphasis on competition. Urbanization.

Impacts

Deforestation, decline in air water, soil quality. Habitat destruction (decline in biological diversity) Impaired human health from pollution. Depletion of renewable resources. Climatic changes - shift in species and resource distribution. Change in coastal and estuarial configurations. Shift in human settlements, property destruction. Topsoil loss.

Recommendations

* Create state waste management agency operate waste disposal facilities
* Mandatory state recycling develop regional and world markets
* Establish individual fees for waste disposal (instead of part of property taxes)
* Develop source reduction incentives
* State authority (vs local) for waste disposal siting
* Identify and reward good practice
* Mandate environmental education
* Support demonstration projects
* Initiate/support appropriate federal legislation (acid rain, family planning, etc.)
* Improve data and information systems
* Involve state in international research activity
* Establish state entity for data collection and research agenda
* Ban plastics (or tax them heavily)
* Build environmental studies capability
* Evaluate state tax and regulatory system re: sustainability, waste disposal, transportation, land use. Develop incentives for good practice.
* Establish waste generation tax
* Clarify public interest in resource base
* Develop educational curriculum which emphasizes interconnections between society and natural world. Both in-school and adult programs.
* Promote concept of sustainability
* Improve research capability
* Develop public service campaign (media) to promote environmental consciousness
* Provide seed capital for environmentally conscious new business development.
* Develop policies and incentives to encourage conservation
* Assess taxes on damaging activity
* Exchange information/expertise.

APPENDIX B
Resource List:
Global Environment and Resource Management

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APPENDIX C

Addendum: Significant Recent Events March 1989

Since preparation of several versions of this paper, a new President has taken office and the 101st Congress has convened. Several significant initiatives and events have already taken place in 1989.

1. Legislation formulating comprehensive policies to deal with global warming have been introduced in both the U.S. Senate and House of Representatives. Separate Senate bills have been introduced by Senator Albert Gore and Senator Timothy Wirth. Similar legislation has been introduced in the Senate by Representative Claudine Schneider.

2. In early March, heads of environmental agencies from one hundred and twenty six nations met in London, U.K. to review the 1988 Montreal Protocol on Protecting the Stratospheric Ozone Layer. Many nations pledged to eliminate production of chloroflurocarbons entirely by the year 2000, instead of reducing production by 50 percent as called for in the original protocol.

3. The U.S. has proposed a new approach to more effective management of external debt owed by Latin American nations. Huge debt service requirements have forced most of the countries to impose domestic austerity programs, which include reduction of budgets for resource management programs. The new approach shifts emphasis from increased lending to debt reduction, thus freeing resources for application to serious domestic concerns.

4. A U.S.Congressional delegation visited Brazil to discuss policies which might be mutually adopted to facilitateprotection of tropical forests in the Amazon basin. The focus was to explore retirement of portions of Brazil's debt to U.S. commercial banks in exchange for protecting large tracts of the Amazon rain forest.

5. During his visit to the Far East, President George Bush urged Japan not to fund a highway linking the Amazon basin to the west coast of South America. Provision of this highway would dramatically increase destructive pressures on rain forests.

6. On February 2, 1989, Senator William Cohen cosponsored S-276, a bill to elevate the Environmental Protection Agency to Cabinet-level position in Government, in part to enhance the U.S. negotiating capability in international negotiations on global resource management issues.

7. On February 9, 1989, Representative Gus Yatron, Chairman of the House Foreign Affairs Subcommittee on Human Rights and International Organizations, sent a letter to the president requesting a White House sponsored international conference on global warming and other international environmental challenges. Thee letter was cosigned by 74 members of Congress.

MAINE IN THE GLOBAL ECONOMY

THE REPORT ON ECONOMIC TRENDS OF THE SUBCOMMITTEE ON GLOBAL ISSUES TO THE COMMISSION ON MAINE'S FUTURE

Prepared By
Neal Allen, Marc Levesque and William Seretta

April, 1989

I

> The American economy has died and been replaced by a world economy. There is no such thing as a national economy in the way we used to talk about it 20 or 30 years ago, because it is becoming fully integrated with the rest of the world.
>
> Economist Lester Thurow, 1986

A typical Maine couple is looking to buy land for their dream house. They tour the countryside in their Korean car, filling up with gas from a Canadian-owned gas station. The ideal house site is owned by a Dutch land company. They purchase it with a mortgage through a subsidiary of a Japanese bank. The next day, they celebrate at work -- a Swedish manufacturing company -- and dine out at a local restaurant owned by a Cambodian couple who have recently arrived in Maine.

This scenario is not set in the future. It is happening today. Consider the following statistics:

> More acres of Maine land are owned by foreign-owned companies than by companies in other states. In 1985, 2.5 million acres -- 12.5 percent of Maine's total acreage -- were under foreign ownership.
>
> Maine currently ranks sixth in the nation and first in New England in foreign affiliates per 1,000 population. Almost one Maine job in sixteen -- 21.000 altogether -- is in a foreign-owned business.
>
> More than 2,000 people from countries on the Pacific Rim currently live in the Greater Portland area and their numbers are growing rapidly.

The speed with which the global economy has penetrated Maine and the extent to which it has entered our daily lives is feared by many Maine people. But how serious is the perceived threat to our economic and social well-being?

Our concerns arise for several reasons. Some of us fear for our jobs or for the career opportunities our children will enjoy. As trade has grown, imports have displaced thousands of jobs from traditional industries, including textiles and shoes, that have been the core of Maine's manufacturing sector. What opportunities will replace those lost to imports?

A second source of fear is that the U.S. is failing to compete internationally -- that we are losing our technological leadership and our share of world markets. Can we develop new and competitive goods and services so that our incomes do not fall behind those of our more successful trade partners?

Third, we fear the loss of control that may result from the foreign ownership of our land and businesses. Will foreign owners have the same commitment to our communities and our values that we enjoy from domestically-owned businesses?

Fourth, we feel culturally threatened. Can newcomers be assimilated into our communities without undermining our traditional lifestyles?

Finally, we are becoming aware of environmental problems on a global scale -- from the Greenhouse Effect to ocean pollution -- that must be addressed through concerted international action. How do we place these issues into perspective?

II
HOW JUSTIFIED ARE OUR FEARS?

Can we gain through exports what we lose through imports?

No nation was ever ruined by trade.
Benjamin Franklin, 1768

Trade is disruptive. Since 1967, the Maine shoe industry -- then the nation's largest -- has shrunk from 28,000 jobs to fewer than 12,000 today. Textile jobs in Maine fell from 28,000 in 1948 to 6,700 in 1987. Competition with Canada has been blamed for jobs lost in fishing, agriculture and lumber. Nationwide, about one million people each year lose jobs because of growing imports. Incomes of relatively unskilled workers have been falling for a decade because jobs for which they are qualified are being performed overseas.

But trade has also created opportunities. It provided the foundation for economic expansion in Maine during the 19th Century. In fact, Maine has thrived socially and economically whenever it has been involved in the international economy and has slowed when it was not. The entrepreneurial energy harnessing Maine's resources -- fish canning, fur trading, lumbering, ice, granite and ship building -- created wealth and economic opportunity in the competitive 18th and 19th Centuries.

While the United States was still a colony of Great Britain, ships out of Blue Hill, Portland and Wells traded lumber for molasses in the West Indies, which was profitably refined by other Maine businesses into rum. After the Revolutionary War, Maine carpenters added value to the state's natural resources by pre-fabricating cargo boxes and houses fro export to the Caribbean. Cotton mills harnessed the abundant water power of Maine's rivers and Maine shipping companies traded throughout the world -- including, by 1840, Japan and China. In 1826, ten percent of the shipping tonnage entering Havana harbor hailed from Maine. Portland imported 5.7-million tons of molasses in 1860, second only to New York City, which imported 8.5-million tons.

Although the Port of Portland was in already decline during the early part of this century, it was the Great Depression and the devastation visited by World War II that painfully shrank the importance if international commerce.

Today, Maine has begun to reestablish its traditional international focus -- but trade revolves around different goods and services. While the state retains some of its old comparative advantages, its new advantages rest increasingly on the education and skill of its workforce.

While early 1980's data suggest that Maine exports played a lesser role in the state's economy compared to the role of exports in the national economy and in some of the other New England states, the past decade has seen trade expand more rapidly than at any time since the early 19th Century. Approximately one third of the state's exports are paper or paper related products. Most of Maine's exports are marketed in Canada, Western Europe and Japan. Although less than 1 percent of Maine's business enterprises, or about 700 firms, are involved in international trade, between 300 and 400 companies had become heavily involved by the late 1980s -- 40 of which are negotiating for trade relations with mainland China. Despite the disruptions that inevitably accompany an expansion in trade, "(T)he greatest meliorator in the world," as Ralph Waldo Emerson stated, "is selfish, huckstering trade."

III

CAN WE COMPETE?

> The world is growing smaller. Fiber optic networks span the continents. Billions of dollars move in seconds from Milan to Tokyo to New York. Goods move around the world in a single day. An individual product may contain parts manufactured in five different countries and be assembled in a sixth. New markets and opportunities emerge almost overnight. In this competitive and rapidly changing environment, success belongs to those who can anticipate, adapt and respond quickly.
>
> Gov. Gerald Baliles, VA, 1988

Over the past decade, we have become familiar with a litany of statistics that seem to show that the United States cannot compete in international markets. Twenty years ago, 7 of the world's 10 largest banks were American. By 1987, 7 of the top 10 banks were Japanese -- and the largest American bank had fallen to 17th place worldwide. Since 1950, labor productivity in the U.S. has grown at only half the pace set by Japan and Germany and even more slowly than the ailing British economy. The U.S. share of internationally traded consumer electronics fell from almost 100 percent in 1970 to 5 percent today. Between 1969 and 1982, the rate at which U.S. companies patented discoveries overseas fell by half. Foreign students account for nearly half of the enrollments in graduate engineering schools in the U.S. And the trade deficit on the nation's current account (the net flow of exports and imports in goods and services) remains well over $100-billion a year.

But these figures present a misleadingly bleak story. At any time in our history, some industries develop more rapidly and more competitively than others. Trade means losing market share -- the U.S. must cut back on the production of some goods and services (those we import) in order to expand our production of other products (those we export). These dynamics of trade occur because nations differ in the *relative* price of goods and services -- not because they are *absolutely* more productive than others.

The Congressional Office of Technology Assessment, for example, estimates that, by the mid-1980s, employment in low-wage manufacturing industries in the U.S. had fallen by 17 percent due to imports. At the same time, 16 percent of the jobs in high-wage

manufacturing industries depend on exports. Unfortunately for public policy-makers, those benefitting from the expansion of trade are not always the same people who have lost their jobs as a result of that same expansion.

The comparative advantage of the United States is in goods -- and less visibly in services -- that require highly-educated people. As a result, the U.S. is exporting financial services, scientific research, management services, high technology goods and other "human capital"-based products and is importing consumer electronics (often developed and designed in the U.S. or based on U.S. technology), textiles, apparel and automobiles. Low-skilled activities are growing overseas. Some major insurance firms, for example, ship claims forms overnight to the Caribbean to be keypunched by low wage labor.

Trade brings enormous benefits, including lower-cost inputs for domestic producers. It also brings new ideas that can lead the most directly-threatened industries to create new opportunities. Industries such as steel and textiles, that have been among the hardest hit by foreign competition, are recovering based on modern, labor-saving technologies, the development of specialized products and improvements in worker productivity. The average American worker still produces nearly twice as much for each hour worked as his or her Japanese rival.

IV

ARE WE LOSING CONTROL OF OUR ASSETS?

> In the westering hunger for land, America's pioneers conquered the wilderness, traversing the mountains and rivers to settle the frontier. Now their descendants are selling off that hard-won heritage to foreigners with fat purses. Americans, whose forebears cleared the wilderness, are trading their birthright for unprecedented profits. With each sale, they lose a little control of their destiny.
>
> Jack Anderson, April 1989

Since 1977, foreign direct investments in the U.S. -- including farms, factories, banks, businesses and other assets -- has quadrupled and now exceeds $1.5-trillion. Foreign firms control whole industries, such as cement and consumer electronics. Nearly one-fifth of all U.S. bank assets are foreign-owned and 3-million Americans work in foreign-owned businesses. In 1986, foreign-owned businesses and other assets in Maine were valued at $1.36-billion. Recently, a British company purchased the rights to over 250,000 American songs -- including *Somewhere Over The Rainbow*. American product names, such as Magnavox and Lipton now have Dutch owners.

Foreign ownership occurred because foreigners were willing to pay a higher price for American assets that are American buyers, or were willing to provide capital to local businesses on more favorable terms. Perhaps the product was more compatible with other goods and services they offer. Perhaps they take a more patient view of the U.S. economy. And perhaps potential American buyers were acquiring assets overseas. International trade leads to specialization and one of the signs of specialization is shifting patterns of international ownership.

An influx of foreign capital is not new to Maine. Since before the American Revolution, foreigners have owned large parts of Maine. The rapid westward expansion of the U.S. that Jack Anderson looks back on nostalgically was financed by massive stock and bond sales on European exchanges. The Bangor and Aroostook Railroad and the City of Portland borrowed heavily overseas during the 19th Century.

Foreign investment has always been, and will continue to be, vital to a healthy Maine economy because it brings not only money but also expertise and the willingness to take risks. For example, a Finnish company is currently funding a $200-million to $400-million expansion of its Madison Paper Co. mill; a Swedish firm is operating a successful show company in Richmond; Belgian investors are helping fund a joint electric generation operation in Newport.

How do we deal with our growing cultural heterogeneity?

The expansion of trade and manufacturing began in Maine during the 19th Century. Before much of North America was settled, Maine's fishing ports had attracted hetreogeneous communities of seafarers -- from Ireland, England and much of Scandinavia. Lumber was harvested by French and Canadian labor. By 1914, 22,000 workers were employed in the textile industry, many of them French Canadians.

But by the third quarter of the 20th Century, Maine was more inwardly focused. Its traditional export industries -- shipbuilding, wood products, textiles and shoes -- had shrunk. The pulp and paper industry -- headquartered out of state -- replaced locally owned sawmills. But today, trade is expanding and as businesses find it more and more difficult to fill job vacancies, people are moving into state from overseas.

Tourism, trade and inmigration are reweaving our social fabric. Maine people are coming into increasing contact with people from other nations. Maine has shown in the past that it can embrace the mixing of cultures and nationalities as it develops. Today, community initiatives encourage international communication. Social, cultural and business exchanges are promoted through the "sister state" relationship between the State of Maine and the State of Rio Grande do Norte in Brazil; between Greater Portland and Archangel in the Soviet Union; between Portland and Shinagowa in Japan; between Bangor and Basel in Switzerland.

Are we ready to participate in the global economy?

Despite our long international tradition, the speed with which we are being drawn into the global economy has caught many of us by surprise. In Jul;y, 1988, a Gallup Poll reported that Americans ranked in the bottom third among the industrialized nations in their knowledge of geography. Three-quarters of adult Americans could not find the Persian

Gulf; 45 percent could not identify Central America. Many workers do not have the basic skills -- reading, writing and math -- to make the transition to more sophisticated jobs.

Competitiveness is not only a matter of developing new products and raising productivity. If they are to succeed in selling their products abroad, Maine businesses must know what overseas customers want, understand the rules and regulations governing international markets and respect foreign cultures and traditions. This requires a wider awareness and broader education than Maine students now receive.

Lacking these skills prevents business people from appreciating and acting upon global opportunities. Ernest L. Boyer, president of the Carnegie Foundation for the Advancement of Teaching, states: "Schools must possess an intellectual understanding of the new global agenda." A global perspective must infuse all aspects of education.

V
THINKING AHEAD

> What we call foreign affairs is no longer foreign affairs. It's a local affair. Whatever happens in Indonesia is important in Indiana. Whatever happens in any corner of the world has some effect on the farmer in Dickinson County, Kansas, or on a worker in a factory.
>
> President Dwight D. Eisenhower, 1956

As Maine approaches the final decade of the 20th Century, it is being drawn inexorably, and at ever increasing speed, into the technologically-sophisticated and information-oriented global economy. Dramatic advances in computers and telecommunications are transforming how we do business and with whom we do business. At the same time, political, social and environmental changes create new threats to our well-being and out opportunities for advancement. The looming crisis of Third World debt, an emerging unified European Community and currency, the specter of food shortages and famine, ozone depletion, the U.S.-Canadian Free Trade pact, the emergence of world-training powers on the Pacific Rim, unrest in the Middle East and America's budget deficit are shaping a new and different world order.

In January, 1989, *The Wall Street Journal* analyzed the ability of the U.S. to retain or maintain its position of global leadership, and concluded with a quotation from a Japanese scientist: "The 20th Century was the American Century. And the 21st Century will be the American Century." Why? America's advantages are its flexible free-enterprise system, its ability to respond quickly to changing opportunities, its depth of human capital and its capacity for innovation. The future of Maine in the global economy also depends on exploiting these assets.

But distilling what broad international movements mean for Maine will not be easy. We will all be called upon to adapt -- as employees, managers, entrepreneurs, educators and elected officials. To adapt, we must find the answers to three questions:

> Does Maine need a policy regulating foreign investment and imported labor?

What support do Maine businesses need in developing export strategies and in dealing with foreign markets?

In light of the current debate about the failure of students to master basic skills, how do we respond to the demand for "global literacy," which entails expanding geography, foreign language proficiency and world affairs curricula.?

Our ability to participate in an increasingly interdependent world depends upon our being aware and informed -- otherwise we risk losing control over the quality of our lives.

APPENDIX
AN INFRASTRUCTURE FOR TRADE

While Maine in itself can not solve the larger global problems which obviously impact its future, state policy can be formulated to reflect an understanding of these problems and the ultimate effect which they have at the local level. Therefore, the ability to adapt and to compete successfully in this environment, requires a Maine that commits to policies and programs emphasizing education, global enlightenment and awareness, flexibility of decision making, and access to the most advanced communication and information systems available.

Consequently, *process and structure* are of critical importance to Maine's objective of competing successfully in a global economy and arguably may be of greater long term significance than the adoption of rigid development strategies that are often based on narrowly defined and unrealistically optimistic presumptions.

In response to the evolving and more sophisticated environment of international trade, two significant institutional developments have recently occurred; establishment of The Maine World Trade Association, and creation by the Maine legislature and the Governor of the International Commerce Division of the State Department of Economic and Community Development.

The Maine World Trade Association represents a private/public partnership designed to serve the needs of Maine firms conducting business internationally. A private sector organization, the MWTA relies on a state grant for 50% of its annual operating budget. According to its own materials, it operates on the premise that "most Maine businesses are too small to have their own international division, yet they are aware that to continue to grow they must compete globally. Therefore the MWTA structured itself as a fully operable international division that could supply through economies of scale, the basic services that Maine companies need to do business abroad."

Funded through a $600,000 appropriation from the Maine legislature, the International Commerce Division of the Department of Economic and Community

Development represents a deliberate public policy by the state to assume a more activist role in identifying potential markets for Maine, attracting foreign investment and developing closer cultural ties to other countries.

While these new Maine institutions -- one in the public and the other in the private sector -- address significant immediate needs of Maine's globalizing business community, a longer-term perspective is also needed. Such a perspective could be provided by a Global Affairs Institute of Maine, which would serve not only as as a resource for businesses, but would also provide language skill enhancement, cultural exchange programs, protocol awareness, seminars in international money and banking, import-export laws and a comprehensive data bank. It could also provide intelligence gathering and analysis services that would identify emerging trends and evaluate impacts of technological breakthroughs and political or economic changes and events. Under the auspices of the University of Maine, the Institute could have a steering committee drawn from government and private sector representatives.

To insure coordination between the MWTA, the State's International Commerce Division, and the proposed Global Affairs Institute of Maine, consideration should be given to the development of a World Trade Center of Maine. The Center would serve as the focal point of the state's international trade and cultural exchange programs. It would house the Global Affairs Institute and necessary technical and support materials, offer state of the art telecommunications systems and provide the organizational efficiency needed for Maine businesses to maintain a competitive edge.

As a step toward or an alternative to the establishment of a World Trade Center, consideration could be given to the establishment of a Maine Office in the World Trade Center of Boston, Massachusetts.

The most immediate opportunity facing Maine's international trading community, and the most reasonable first step in expanding the institutional support structure serving that community, arises in the recently completed U.S.-Canadian Free Trade Agreement, which, within five years, could result in a larger and more significant "common market" than that envisioned for an economically unified Europe in the 1990s. An immediate priority, therefore, should be the presentation of a series of state wide workshops for Maine businesses, educators, and civic leaders to promote a greater understanding of the Agreement and explore positive and productive strategies for Maine to pursue. Equally

important is the immediate exploration of the feasibility of linking, through a new highway and/or rail system, Maine to Canada. Such a link could enhance trade and tourism between the state and Canada. Additionally, air service between Canada and Maine should be examined in order to determine if service is at appropriate levels and if not how it could be expanded and what the impacts of such expansion might be.

EDUCATION FOR GLOBAL AWARENESS

THE REPORT ON EDUCATIONAL TRENDS OF THE SUBCOMMITTEE ON GLOBAL ISSUES TO THE COMMISSION ON MAINE'S FUTURE

Prepared By
Marc Levesque

January, 1989

ACKNOWLEDGMENTS

The ideas and recommendations contained in this report were based on current educational literature and the comments and insights gathered at a working meeting of over 25 individuals representing a number of state organizations involved with some facet of education, global perspective, or citizenship development. A listing of this group, which met on 18 November 1988 in Augusta, Maine, plus other resources is found in Appendix B. For the sake of simplicity, this group will be referred to as the November Group in this report. Their input contributed extensively to the final product and was greatly appreciated.

Acknowledgment must also be given to two groups and the findings of their reports on learning and education. These are the reports from New Horizons for Learning, "Lifespan Learning on Centerstage of the Future: A review of The Education Summit on Lifespan Learning," and the Study Commission on Global Education, "The United States Prepares for its Future: Global perspectives in education." A detailed explanation of each is found in Appendix A. These documents were immensely helpful and some of their recommendations are incorporated verbatim into strategy recommendation 2A, 2B, 2C, 2D, 2E, 3, 5, and 6. This was done because their recommendations were virtually similar to the November groups' and could not be better stated. We would like to extend our appreciation for their foresight.

Comments on this report should be directed to its principal author, Marc A. Levesque, staff member of the Global Issues Subcommittee, Commission on Maine's Future. His address and phone number are found in Appendix B under "Other Resources."

PREFACE

"Education that fails to acquaint students with their dependence on their fellow humans, or with the fragility of human life itself on a planet besieged with burgeoning population and dwindling resources, is not essential education; it may be largely irrelevant data exchange."

-- Ernest L. Boyer

OVERVIEW

As the year 2000 approaches, the ability of American and Maine citizens to actively participate in society has come under question. Nationally, some 27 million people lack the basic reading, writing, and math skills necessary to perform in today's increasingly complex job market. Another 40 million have only marginal literacy skills. Examples of this were found in a 1987 study by the National Assessment for Educational Programs (NAEP) which determined that four out of five young adults could not read a bus schedule and 43% could not read a map. In Maine, the most recent census figures estimated that 90,000 adults, one in three, were functionally illiterate. Despite Maine students ranking above national norms in national achievement scores for math, reading, and thinking skills, a Maine Sunday Telegram article on 9/18/88 reported that local companies have been forced to lower their acceptable standards for job applicants in order to fill vacant positions.

In other areas of literacy, the situation is similar. A 1986 NAEP survey indicated a lack of historical knowledge among students, showing, for example, that two-thirds of American 11th graders did not know that the Civil War took place between 1850 and 1900. The preliminary results of a 1988 survey sponsored by the National Science Foundation indicated that 93-95% of those interviewed "would have to be considered scientifically illiterate, or lacking fundamental knowledge of science." In the recently released results of the Test of Economic Literacy, a survey of 8000 high school students in 33 states reported that seniors answered correctly only 34% of the questions on the national economy and 36% on the international economy. Only 25% could define inflation, and less than 30% of all respondents recognized that the lack of labor market skills was a major cause of low income.

One of the more publicized recent studies concerned geographic literacy. In July, 1988, a Gallup Poll commissioned by the National Geographic Society reported that Americans ranked in the bottom third among industrialized nations of the world in an international test of geographic knowledge. Over ten thousand adults in Canada, France, Italy, Japan, Mexico, Sweden, the United Kingdom, the United states, and West Germany were surveyed. Of these, those Americans aged 18-24 ranked last among all groups, including older Americans. Seventy-five percent of adult Americans could not find the

Persian Gulf, and 45% did not know where Central America was. Fewer than half of the Americans were able to identify the United Kingdom, France, South Africa, and Japan. In releasing the results of this survey, National Geographic Society president, Gilbert M. Grosvenor, stated, "Our adult population, especially our young adults, do not understand the world at a time in our history when we face a critical economic need to understand foreign consumers, markets, customs, foreign strengths and weaknesses."

The possession of information and knowledge on certain subjects by itself does not necessarily create an informed citizen able to actively participate in society. Such knowledge, however, constitutes the foundation for understanding public issues, and it is the lack of such understanding that is often cited by people for not participating in elections. At the same time that citizen knowledge in important areas appears lacking, voter participation has reached its lowest point in decades. In the recent 1988 presidential election, less than 51% of eligible American citizens exercised their voting privilege. While Maine voters turned out in higher numbers, a sizable minority of people (38%) choose not to.

TRENDS

Set against this background, four major trends, with profound implications for life in Maine, are in process.

1. Increasing social interaction and rapid change.

Tourism and business travel are increasingly bringing people from all parts of the world into contact with Maine citizens and vice versa. Demographic shifts, trade, and friendship programs also accomplish this. Besides the traditional mix of ethnic populations in Maine, a small, but growing number of people from the Pacific Rim nations, estimated at 2000, now live in the greater Portland area. Sister city and state programs have been established between Maine localities and the Soviet Union, Japan, Switzerland, Brazil, and soon China.

Meanwhile, television has long been a vehicle in linking Maine citizens with the global community. Ninety percent of Maine homes are able to view international events, such as the 1988 Summer Olympics, as they happen. Enhanced technologies also affect the pace of change. Certain fields, such as engineering, are experiencing a doubling of their knowledge bases every three years. On a more personal level, estimates are that people will face anywhere from five to nine career changes or job restructurings throughout their working lives. Rapid political and social changes underway in the Soviet Union, Eastern Europe, and China also reflect the rapid change seen in our world today.

2. Increasing globalization of the economy.

With enhanced technologies, the focus of the economy is shifting from local or national to global. During the 1970's, all Americans, including Maine people, felt the impact of the OPEC boycott. Over the past several years, certain Maine industries, forced to compete in a global marketplace, have lost hundreds of workers. On the other hand, nearly 700 Maine companies, 300-400 actively, now trade in that same marketplace.

Fifteen thousand Maine workers are currently involved in export related jobs, and it is estimated that the Maine economy includes $1 billion worth of foreign trade. With the instant communication capability of the personal computer, fax machine, and telephone, increasing numbers of small businesses or professionals are based in Maine, conducting their business with customers and clients all over the world. In the future, the economic impact of the Canadian Free Trade Agreement and the European Economic Community awaits.

3. Increasing effects of global environmental patterns.

For many Maine people, the record heat of the summer of 1988 dramatized the effects of radical global climactic changes, possibly linked to the "greenhouse effect." With a predicted worldwide mean temperature rise of 1.5 to 4.5 degrees C between now and 2050 and an expected sea level rise of between 4.7 and 7.1 feet by the year 2100, Maine's climate and geography could be radically altered. Even more serious is the continuing depletion of the upper level ozone layer through natural and man-made processes, a situation that permits increased amounts of harmful ultraviolet light to reach the earth's surface. While the solid waste problem is straining local capabilities in Maine, it is rapidly becoming a worldwide problem.

4. Increasing public policy issues with a global connection and decreasing voter participation.

Maine's Congressional delegation, along with the U.S. Congress, and the President must deal not only with the issues and problems facing Maine and the country, but also a host of issues with an international connection. The United States long ago committed itself to participating in and providing leadership to the world. This commitment is evident in the public policies that are formed dealing with global issues in economics, human rights, the environment, scientific research, and national security. At the same time that we see more globally-oriented public policy issues, there has been a downward trend in voter turnout. In national elections over the past 20 years, voter participation has declined from over 60% in the 1960 to almost 50% in 1988. While Maine voters have participated in elections in higher numbers (65% in 1984, 62% in 1988), one must question the ability of many who did to grasp the complexities of the critical issues.

It is anticipated that these trends will continue over the next twenty years. Enhanced telecommunication networks, greater ease of travel, heightened international economic competition, continued environmental degradation, and growing third world population shifts will bring Maine ever more closely into the global community. By the 21st century, Maine citizens will increasingly need to deal with rapid change in a global context, to more frequently communicate with people from other cultures, to actively compete in a global marketplace, and to consider ever more complex issues of public policy with global implications.

IMPLICATIONS

The inability of many Maine citizens to read, to communicate, to think critically, and to possess fundamental knowledge crucial to understanding public issues pose a number of threats to the valued quality of life in Maine. Locally, the lack of adequate job skills and the ability to learn new ones as economic conditions change threaten employee productivity, economic well-being, and Maine's capacity to compete in a global economy. Insufficient knowledge of global environmental connections and the lack of changes in behavior regarding waste disposal, fossil fuel burning, and general chemical use threaten human health. Another critical implication is the threat to the vitality of American democracy from the lack of informed citizen participation. Since the early development of our nation, two major themes have been prevalent in American life: a strong sense of individualism and a equally strong sense of community. It has been participation in the democratic process, exemplified by the New England town meeting, that has allowed citizens to determine the course of community life. Along with the freedoms and rights American citizens enjoy in a democracy come responsibilities: to protect the rights of others, to be knowledgeable of the issues, and to vote in elections.

With Maine becoming more involved with global community, these rights and responsibilities are set in a new context. To not exercise citizen responsibilities in a global context, Maine people run the risk of losing control over their valued quality of life. This is especially true given the increasing impact of decisions made and actions taken elsewhere in the world. Faulty construction techniques and inadequate human response caused the Chernobyl nuclear reactor to spread radiation throughout the world. Business and financial activities in Japan and other countries have an impact on our national and local economy. Along with fossil fuel burning in the world's industrialized nations, the destruction of the rain forests in Central and South America contributes to global warming. Oppressive political regimes and the lack of agricultural planning force thousands of people to leave their countries and emigrate to the United States.

In the future, Maine's citizens not only face threats to their way of life, but also may miss the opportunities to be gained by participating as active members of the global community. In thinking globally, Maine companies can discover new markets for their

products. Maine citizens can promote greater understanding among the peoples of the world and seek peaceful resolution of conflicts, thereby enhancing their own security. Finally, Maine citizens can contribute to the quality of life for all the world's citizens by slowing and halting the damage to the fragile natural environment. The future economic prosperity, political security, and environmental quality of Maine and the United States depend on how well people can adopt and act upon a new model of citizenship. Today there is a need to not only be active Maine citizens but also participating global citizens. As citizens of the global community, Maine people face more complex issues that affect themselves and the entire world. To face these issues requires a change in thinking, expanding the notion of community beyond one's immediate town, state, or nation, to understand the world as home, to "think globally and act locally."

STRATEGIES

In its report from their 1988 Maine Economic Symposium, the Maine Development Foundation stated that, "Education is the key to solving problems. We will need an increasingly educated labor force and educated and involved citizens to reach a sense of common good, to resolve conflicts through persuasion rather than force and to achieve social harmony....All citizens are officeholders with important duties. Only with citizens well-educated and fully participating in the public's decision-making process can we hope to solve our most serious problems." If education is, indeed, seen as a solution to the problems of living in today's world, then it must be supported with a comprehensive strategic plan. Such a strategy for enabling Maine citizens to become participating global citizens contains six essential recommendations:

1. Encourage the local development of a Maine vision for global citizenship.

However noble the ideal of global citizenship, it will not be effectively developed unless it is locally understood and created. To accomplish this will require local leaders who can work in the community to help people see the need for and develop the concept of global citizenship. Input will be required from all segments of the community: teachers, parents, students, school board members, administrators, business people, employers, and other community members. It is essential that the vision be created at the community level, with outside assistance only if necessary, if the concept is to be effectively developed and pursued. Once a consensus model is created, it can become the standard for the community to follow. Such a process might be incorporated with the efforts of the Maine Aspirations Compact.

One model for an ideal global citizen was developed by the November group of educators (see Acknowledgments). It centers on the knowledge, skills, attitudes, values, and behavior that an ideal global citizen should possess.

A. What does a global citizen know?

Including, but not limited to, the fundamental basics of world and United States geography and history, world religions and cultures; one or two foreign languages; economics; ecology; science and technology; environmental studies; the humanities, and most importantly, English and mathematics. Content matter in each subject is understood as interrelated, not separated.

B. What skills do they have?

Reading, writing, speaking, computing, and visual literacy; learning; thinking (critical, creative, holistic, analytical, conceptual); decision-making and problem solving; relating; conflict resolution (negotiation and mediation); collaborating(alliance building, networking, working with others); adapting to change; creating change; creating stability; empowering self and others; leadership and followership; listening; advocacy; and "gentle" self-criticism.

C. What attitudes do they have?

Compassionate, empowered, excited about learning over the lifespan, risk taking, humorous, playful, curious, inquisitive, exploring, sense of hope and the possible, open-minded, stewardship, sharing, constructive, empathetic, passionate, and aspiring.

D. What values do they have?

Appreciation for diversity and differences, tolerance for other cultures, ecological and social interdependence, universal human rights, win-win solutions, responsibility for self and others, anticipatory democracy, parity, commitment to future generations, global human survival, aesthetics, moral ethics, mutual trust, family and community, and a sense of place.

E. How does a global citizen act?

Safely disposes of waste, conserves natural resources by recycling trash, observing fuel-saving speed limits, limiting unnecessary electricity use, etc.; supports the implementation of such documents as the Universal Declaration of Human Rights;

participates in elections and public discussions on important issues of local and global concern; buys and sells goods and services in the international marketplace, boycotting those goods in conflict with values; mediates peaceful resolution of conflict through win-win, long-term solutions; travels to places outside of local community, state, or country; speaks one or two foreign languages; contributes time, money, and effort on behalf of projects that help eradicate hunger and poverty and generally improve the quality of life for local and global people; and spends time with others as role model, particularly with youth.

In essence, the ideal global citizen is one who practices an attitude of lifelong learning and can learn independently to search for continued understanding of the issues facing the global community. This citizen is one who sees the world's systems (environmental, economic, political) as interconnected and interdependent. Also, this citizen is empowered and future-oriented in developing a pro-active stance to addressing problems. Finally, the ideal participating global citizen has a holistic vision of deep concern for all life on this planet.

2. Encourage the development and implementation of community-based global citizenship education.

To develop global citizens will require a change in the way we think about and structure the educational process. Our current system is patterned after the production line model of the Industrial Age. Students enter the pipeline at one end and emerge at the other some 12 or 16 years later, supposedly a unit ready to be a working cog in society. This model, characterized by a learner dependent on the teacher as the ultimate source of knowledge, may have sufficed when knowledge remained relatively static over a person's lifetime and communication was slow. With the coming of the Information or Communication Age, however, this model is outdated. Today, with technology-driven rapid change and instant communication, knowledge is growing at an exponential rate. We can no longer rely upon the teacher or professor as the only source of knowledge or knowledge remaining static. Nor can we allow the continued separation of subjects, or the learning process to cease upon graduation from high school or college. We must also bring ourselves more closely in contact with our natural environment. What is needed is nothing less than a philosophy of education based on new themes, structures, and context.

One model of education to help Maine citizens function as global citizens was created by the November group of educators. It is a community-based model that develops empowered, informed, and ecological global citizens who are adaptable to the rapid change, appreciate cultural diversity, and see the world and its systems as interdependent. To attain such a citizenry, a new global education system would feature:

A. An emphasis on learning to learn as the primary goal of all education.

Learning should be seen as a continuous process that occurs joyously over one's entire lifespan. Citizens must learn to take personal responsibility for their own lifelong learning, becoming self-directed in their learning projects. They should be able to learn from reflection on their own experiences and to learn from others, not just teachers or professors. Discovering one's own learning style and understanding the contextual nature of knowledge are important steps in this process. To determine one's progress, dual emphasis should be placed on evaluation and measurement.

B. Understanding and relating to one's own culture and others.

Literacy in one's own language and society is a basic necessity, as is learning to speak a second language and to be knowledgeable of world geography and other cultures. Relating would include an appreciation of the unity of human species and diversity of cultures, the interdependence of human relationships, multiple loyalties, human rights, and cross- cultural awareness. At a personal and local level, learning to relate includes being able to work in small groups, cooperating with others and building teamwork on the job and in the community. Perhaps, it also means learning to relate to one's self as well.

C. The world as a series of interrelated systems.

Citizens should understand the vast interdependent nature of the world in terms of its physical, biological, economic, political, and communication and evaluative systems. This would mean an interdisciplinary and integrated curriculum that focused on themes as opposed to subjects separated into isolated units. Development of an ecological perspective on the world is essential.

D. Preparation of citizens for public and personal decision-making.

Participating in the democratic process, choosing a career, or solving community problems requires the ability to make decisions. This means thinking critically and creatively and clarifying one's values which underlie all decisions. To formulate appropriate solutions to problems, citizens also need the ability and skill to anticipate the long-term implications of decisions.

E. The development of modern civilization.

Citizens should have a basic knowledge of the history of the world, of the development of major world civilizations, including, knowledge of the United States as one of history's great experiments with individual freedom and democracy. Citizens should also understand the geographical factors that have encouraged or hindered the development of civilization.

3. Encourage and support learning environments that extend beyond the classroom to encompass the home, community, and world-at-large.

The learning process should contain an experiential component. As the Maine Development Foundation has stated, "From the early grades, we must teach with real-life situations. For example, Maine school children should learn about the dilemma of acid rain from the perspectives of social costs, science, and technology." One way to include the experiential is to remove the separation between our schools and the community at large, allowing students to learn from life's experiences or real issues. This might include more travel to local or foreign places, more opportunities for foreign exchanges and internships, or community service projects. It might mean holding the annual town meeting in the school, so that the entire community can observe and participate in the democratic process. It could also mean bringing more of the outside community into the schools. People with a particular skill or expertise, such as local business people and Peace Corps volunteers who have traveled overseas and are fluent in the language and culture of another country, should be encouraged to become teacher resources or teachers for special topics. Through intergenerational learning, children, parents, and grandparents can learn from each other.

By increasing the number of opportunities for "transboundary" activities, we can facilitate learning by placing people in new situations that lie beyond their normal realm of experience.

4. Identify and support local models of global citizenship education.

The state should take the lead in identifying existing "pockets of good practice," those local educational programs that promote global citizenship, and establish a clearinghouse for information and resources (programs, speakers, money, etc.). The state should also develop reward systems for these programs by protecting their grants, providing funding, or encouraging others to develop similar programs. Beyond this, guidelines for implementing a global perspective in local schools, universities, or adult educational programs could be developed at the state level. Likewise, guidelines are needed for a self-evaluation process, so that local communities can easily identified measures of success of their global citizenship education programs.

Educators, parents/guardians, learners, members of the labor force, business, industry, the professions, and government must all work together as partners to develop policies that acknowledge, promote, and support the above concepts and encourage local autonomy. Local needs and plans must be the basis of state policies and strategies.

5. Recognize and support the development of the teacher as a:

professional planner, presenter, coach, facilitator, resource,

model, mentor, and manager.

Many of the existing global education activities and programs over the past several years in Maine are the result of the efforts of individual teachers. These individuals need to be recognized and supported. Many others will also need support and encouragement to face the new demands of global education. Instead of being the transmitters of knowledge, teachers need to become facilitators of the learning process, empowering others to become

self-directed learners. Likewise, more teachers will need to be interdisciplinary and multi-disciplinary in their teaching.

Subsequently, the need will exist to refocus the state's schools of education so that new teachers are trained in this new perspective. For those already in the classroom, we must provide the necessary support for their personal and professional development. This can be accomplished through existing programs, such as the Maine Studies Institute, which assist teachers in integrating global perspectives in their classroom. Ultimately, we must value teachers, allowing them to become learning leaders and to protecting their class time, while encouraging the redefinition of class time to include learning experiences outside of the classroom.

6. Incorporate all relevant learning research findings and appropriate educational technologies.

The latest research on human learning should be incorporated into all learning situations. These include the concepts of right brain-left brain learning, theory of multiple intelligences, learning styles, rates of learning, and others learning characteristics identified by research. Recognition should also be given to the use of technology as a central tool to the teaching/learning environment. Learning should become technology-centered to facilitate individual learning. The state's plan for "distance learning" through the statewide instructional television network is one such example.

CAPACITY

The answers to several questions will determine if Maine is capable of developing participating global citizens. The first question may well be, however, do Maine people understand the need to develop active Maine citizens? How well Maine people understand this basic need and become involved in changing the state's educational system will shape the course of Maine's future. Unfortunately, recent history indicates that important issues are determined by slightly more than a quarter of eligible voters. To the extent citizens have failed to participate in the election process, so have they failed to become involved in overseeing the development of what is perhaps Maine's most precious resource, its citizens. And if young people fail to encounter adults who are enthusiastically involved with their own world, how can they be expected to adopt a spirit of democratic involvement in their own lives? The second question is whether our current system is adequate to the task of developing global citizens. The evidence for our present system's failures to develop even Maine citizens, however, is glaring: high illiteracy rates, inadequately prepared workers, low voter turnout, short- term solutions to problems, and environmental degradation. Will enough people understand the problems to reach a consensus for a new vision of education and learning at the local and state level? Can we form partnerships of stakeholders between all the domains of the community - business, environment, social advocacy, educational, and others - to arrive at a consensus? It is only when a critical mass of people or those in leadership positions see the need for change that change will occur.

Other vital questions remain. Can agreement be reached at the local and state level on what it means to be a participating global citizen? Can the logical means for global citizenship education be developed? Will existing human, organizational, and financial resources be fully utilized to accomplish the ends of global citizenship education? Will the design of the new system allow for local control and flexibility in meeting the overall objectives of the system and adapting to needed changes? Will the process of developing a global education system allow for input and direction from all potentially affected groups? Will reasonably attainable goals and objectives be established for the timing and implementation of the system?

Several parameters and constraints currently exist that might hinder redesigning our educational system to develop global citizens. First and foremost is the lack of a common, shared vision by educators, administrators, legislators, parents, and state leaders. Many Maine people are parochial in their outlook, only seeing as important events or trends in their own town. Few might understand the need for global education at a time when illiteracy and low achievement test scores cause some to call for a return to a more conservative emphasis in our schools. Even fewer might see the wisdom of expanding our concept our learning to encompassing the entire lifespan. Other constraints exist with limited financial and material resources at the local and state levels and the continuing issue of state versus local control over school curricula. Perhaps one of the most serious obstacles to implementing a global perspective in education is the impact it would have on school budgets. How local communities and the state deal with the need for teacher retraining, new resources, and smaller class sizes for more individualized learning will greatly determine how quickly and how well a global education system is developed.

An important step to begin overcoming some of these obstacles involves the coordination of efforts around the state to harness existing resources. Fortunately, Maine is blessed with many programs, organizations, and people who are working towards global citizenship ends. An extensive listing of these are found in Appendix B. Several "pockets of good practice" for global citizenship education also exist to serve as working models and are described in Appendix C. Included in these are:

* the Union Elementary School's "International School" K-8 curriculum,

* Mt. Desert Island's growing system-wide emphasis on a global perspective,

* the Maine Studies Program aimed at providing global perspectives for teachers and students,

* the University of Maine System's recent commitment to begin internationalizing programs on all seven campuses,

* the Samantha Smith Foundation's exchange program to promote understanding with the Soviet Union,

* sister city and state programs between Maine and its cities and Japan, the Soviet Union, Switzerland, Brazil, and soon, China.

Maine is also fortunate to have another important resource to develop global citizenship. One of the most important vehicles for delivering educational programs, be they global or otherwise, is the University of Maine System's instructional television network which will eventually link 250 educational sites around the state. In a rural state such as Maine, the educational process can be well served by increasing the number and types of programs available to those communities that could not otherwise afford to provide them. Accessibility to educational programs is also a key component to furthering the development of local and global citizenship by linking Maine communities with each other and the world. For many people in the remote parts of Maine, the international travel of the ideal global citizen may well occur, and sufficiently so, through the eyes and mind.

CONCLUSION

It is the presence or absence of citizen vision which shapes a state's educational direction. If Maine citizens are to be active players in the local and global community, then all citizens should be involved in the design and support of an learning system that enables empowered, informed, and ecological citizens. All citizens are stakeholders in the future of a state and the planet with its environmental, economic, and political systems. While several obstacles exist in Maine to accomplish the goals of global citizenship development, the capacity does exist to do so. Perhaps one of the most important steps in this process will be to define what will tell us that we are successfully developing participating global citizens.

Statistically, some possibilities might include increased numbers of voters participating in elections, improved environmental quality indexes, increased numbers of people taking foreign language courses or travelling abroad, greater numbers of people participating in school decisions at the local level, more long- term solutions decided at local, state, and federal levels, more people involved in community building projects. Economically, it might be greater numbers of local companies doing business in the international marketplace. To ratify the success of developing global citizens, however, will require the affirmation of all involved in the process.

Efforts to develop global citizens in Maine have already begun, while much yet remains to do. Success will be depend on how well we can harness existing resources while emphasizing the need for lifelong learning in all citizens. We need global education opportunities for adults as well as children, for adults must act now if there is to be a prosperous and healthy future for our children. In the final analysis, however, our success may well rest on the moral development of citizens. It is not enough to be knowledgeable about the world, to speak a foreign language, or to be literate. Citizens must act in a manner that values all people and our natural habitat as our most precious resources. How well we promote this moral development of citizens in the educational process may ultimately determine the future success of Maine and the world.

APPENDIX A

Annotated bibliography of selected articles, books, and reports regarding global education and learning.

Bellah, R.N., Madsen, R., Sullivan, W.M., Swindler, A. & Tipton,S.M. (1985). Habits of the heart: Individualism and commitment in American life. New York, NY: Harper and Row.

Based on a five-year research study of American communities,the authors, professors of sociology, philosophy and theology,conclude that Americans, largely confined to a vocabulary of individualism, have lost the language needed to make moral sense of their lives. What is missing is a sense of commitment of oneself to others.

Bennett, W.J. (1988). James Madison Elementary School: A curriculum for American students. Washington, DC: U.S. Department of Education.

Bennett, W.J. (1987). James Madison High School: A curriculum for American students. Washington, DC: U.S. Department of Education.

The former Secretary of Education in the Reagan Administration outlines his ideas for a model curriculum for America's elementary and high schools. His ideas are offered as suggestions, not mandates, for improving the quality of education at the local level.

Botkin, J. W., Elmandjra, M. & Malitza, M. (1979). No limits to learning: Bridging the human gap. New York, NY: Pergamon Press.

This Club of Rome report asserts that learning and the individual human being, rather than material resources, are the key to the world's future. The traditional form of "maintenance learning" must be replaced by "innovative learning," the two chief features of which are anticipation and participation.

Boyer, E. L. (1977, August). Teacher renewal in a changing world.Speech delivered before the Annual Convention of the American Federation of Teachers, Boston, MA.

The former United States Commission of Education discusses abroad view of educational needs and ways in which society must begin to respond to them. Some of the key points are: the renewal of teachers, lifelong education and equal opportunity for all, the integration of school with social life, and education that strives to make people cognizant of global concerns by addressing environmental and population issues.

Centron, M.J., Luckins, R. & Rocha, W. (1988, July-August). Long-term trends affecting life in the United States. The Futurist.pp. 29-39.

Sixty-five long-term trends that will affect life in the United States in the early 21st century are described. Among these are trends in technology, education, labor and the workforce, management, values, family, and institutions.

Centron, M.J. (1988, November-December). Class of 2000. The Futurist. pp. 9-15.

The American education system must take important steps to restructure its schools for the future. Recommendations include lengthening the school day, reducing class size,computerizing instruction, developing individualized learning plans, and recruiting teachers from business.

Christensen, D. E. (1979). Hubris and Sophrosyne: Alternative perspectives on our relationship to the environment. Journal of Geography, 78 (6), 210-211.

A worldwide effort to educate people regarding their relationship to the earth should include concepts that all facets of the earth's natural and cultural environments function in one interrelated system, the earth's ecosystems are fragile, people should depend on renewable resources, and limiting population growth is crucial.

Commission on the Status of Education in Maine. (1984).Education: Maine's most important investment. Augusta, ME: Author.

The Commission's report to then-Governor Joseph Brennan lists 22 recommendations for enhancing the quality of education in Maine schools. Among these included establishing a statewide system for measuring student academic progress, increasing high school graduation requirements, and establishing minimal starting salaries for beginning teachers, among others.

Corson, W.H. (ed.) (1985). Citizen's guide to global issues.Washington, DC: Global Tomorrow Coalition.

This booklet, published by a non-profit alliance of over 100 organizations, provides the concerned lay reader with an overview of major global problems and some of their potential solutions.Topics covered include population growth, food and agriculture,Third World development and environment, marine and coastal resources, and others.

Edwards, F. E. (1988). Opening American minds to the world community. AGB Reports, 30 (2), 30-31.

The undergraduate curriculum must consider international and intercultural implications. The study of other cultures must be part of a liberal education, and graduates must have the skills and information to be informed citizen-workers in a world community.

Elmandjra, M. (1987, March-April). Learning needs in a changing world. The Futurist. p. 60.

The president of the International Association of Futuribles advocates an overhauling of our learning systems to make them socio culturally relevant and capable of facing the challenges that we face from the rapid change in our current and future society. A call for "innovative learning" instead of"maintenance learning" is central to this restructuring.

Feldman, R. (1979, July). The educated person in cross-cultural perspective: Implications for the post secondary education planner. Paper presented at the Annual Conference of the Society for College and University Planning, Hollywood, FL.

Five distinct images of the educated person are examined:the well-educated American (representing the Western world), the Indian suru or yogi, the Confucian scholar or Mandarin, the socialist comrade from the People's Republic of China, and the"new human being" (a futuristic view of the holistically educated person. These concepts are discussed

in the context of literature of the various cultures and implications for the post secondary education planner are noted.

Gagnon, P. (1988, November). Why study history? The Atlantic Monthly. pp. 43-66.

The author, a professor of history and former National Endowment for the Humanities historian-in-residence, explores the question of why the study of history in the nation's school sought to be an exercise in teaching democracy by example-preparation for the profession of citizenship. A critical review of leading high school history textbooks is included.

Gardner, W. E. (1985, July). American education: Implications for the information age. Paper presented at the World Assembly of the International Council on Education for Teaching, Vancouver,British Columbia, Canada.

This paper considers the needs of future educational systems in an age of information. Such systems would stress the big picture, be experimental, emphasize skills and tools of thought and action, and extend throughout life. Any and all information technologies would be used as creatively as possible to change the way people teach and learn.

Goodlad, J. I. (1983). A place called school: Prospects for the future. New York, NY: McGraw-Hill.

Based on one of the most comprehensive studies ever taken on education, this book takes a broad look at schooling in America today and contains many recommendations. Among these are that children should finish high school by 16, older students should teach younger ones, and grouping students by ability and attainment should be stopped.

Groennings, S. (1987). The global economy and higher education.Proceedings of the conference on Languages and Communication for World Business and the Professions.

Internationalizing the undergraduate curriculum has become a high priority for colleges and universities across the United States because it has become recognized that students today must understand the global economy. It is important now and in the future that students consider their role in developing their competencies and citizen understanding needed for American participation, prosperity, and leadership in the global economy.

Haffenden, I. G. (1987). Youth education and training in the context of lifelong learning and continuing education.International Journal of Lifelong Education, 6 (2), 153-166.

Criteria for analysis of youth education and training in the context of lifelong learning and continuing education should be democraticization, vertical articulation, and horizontal integration. Such an analysis should pay attention to the psychological development of youth and the meaning given to the criteria in specific national contexts.

Hickman, W. L. (1975). International dimensions of lifelong education in general and liberal studies: Lifelong and worldwide.Perspectives: A Journal of General and Liberal Studies, 6 (3),147-156.

General and liberal studies are in increasing demand among learners in lifelong education programs. The studies are needed,particularly by those whose previous education was

occupationally oriented. Further, the worldwide aspect of general studies in lifelong education in education is a necessity, not a luxury.

Hirsch, E.D., Jr. (1987). Cultural literacy: What every American needs to know. Boston, MA: Houghton Mifflin Company.

Cultural literacy-the background information that writers and speakers assume their readers and listeners already have-is the hidden key to effective education in America. With the decline in the shared knowledge American students possess, the author calls for a new emphasis on information in education in light of this recent trend.

Hugh-Weiner, G. (1988). An overview of international education in the schools. Education and Urban Society, 20 (2), 139-158.

A systems approach is used to identify four cultural domains of international education: global education, contemporary cultures education, international relations, and development studies. This article describes the key goals and central concepts of each and representative innovative projects.

Huyler, J. W. (1988). Life span Learning on Center stage of the Future: A review of the Education Summit on Life span Learning.Seattle, WA: New Horizons for Learning.

This is a summary and synthesis of the fifth in a series of annual conferences on learning and education sponsored by the publisher, a national educational organization. It presents the views of 44 leading-edge educators, scientist, and researchers of what is now possible in human development.

Joint Committee on Geographic Education of the National Council for Geographic Education and the Association of American Geographers. (1984). Guidelines for geographic education:Elementary and secondary schools. Washington, DC: Association of American Geographers and National Council for Geographic Education.

This set of curriculum guidelines identifies the need for enhancing geographic education in our schools. Training in geography is seen as an essential ingredient in the total process of educating informed citizens in an increasingly globalized world.

Kidder, R.M. (1987). An agenda for the 21st century. Cambridge,MA: MIT Press.

This collection of 22 interviews with a selected group of some of the world's most compelling thinkers, such as Mortimer Adler, Barbara Tuchman, Freeman Dyson, and Jimmy Carter, proposes an agenda for humanity to face in the new century. The most critical issues include the arms race, overpopulation, the environment, the North-South economic gap, education, and morality.

Klassen, F. H. (ed.) (1976). International perspectives in teacher education: Innovations and trends. Washington, DC:International Council on Education for Teaching.

This book reports on three International Council on Education for Teaching world assemblies held in Singapore,Berlin, and Washington. The collection of papers focus on teacher education policies, lifelong and non formal education,curriculum innovations, educational technology, in service education, and current trends in teacher education. It concludes with a world-wide perspective on teacher education.

Kniep, W. M. (1985). A critical review of the short history of global education: Preparing for new opportunities. New York, NY:Global Perspectives in Education, Inc.

A study of the literature of global education, with the intent of providing a critical review of that field, concludes that global education, while relatively new, has an extensive body of literature in existence. There is a need, however, for a new focus that builds upon its accomplishments in order to bring global education into the educational mainstream.

Libbee, M. (1988). World geography and international understanding. Journal of Geography, 87 (1), 5-12.

This article reports on ideas generated by Fostering International Understanding through World Geography, a group which advocates using the world geography course to increase international understanding. It describes two possible course goals, identifies teaching techniques appropriate for each goal,and discusses ways that participants attempted to accomplish these goals.

Maine Development Foundation. (1988). Maine Economic Symposium.Augusta, ME: Author.

This report summarizes speaker's remarks and group discussions at a two-day symposium sponsored by the Maine Development Foundation. Sixty-three leaders from business,government, and education met to explore four topics that were felt to be determinants of America's and Maine's future:demographics, education, technology, and governance.

Mische, P. M. (1987, Spring/Summer). Educating for what? Breakthrough. pp. 8-15.

"Global illiteracy" in our schools and society is threatening the ability of the learning process to transform our world into a more positive place. What is needed in our schools is a profound awareness and skills related to not only personal,local, and national needs, but also to the planet as a whole.

Muller, R. (1987, Spring/Summer). Excerpts from a world core curriculum. Breakthrough. pp. 16-17.

The Chancellor of the U. N. University for Peace and former Assistant Secretary-General of the United Nations outlines the key points of his curriculum for a world core curriculum. These include our planetary home, the human family, our place in time,and the miracle of individual life.

Rash, J. E. (1988). Practical perspectives on intercultural understanding. Education and Urban Society, 20 (2), 211-225.

With the world becoming more interrelated, people should become more aware of other cultures. By developing better techniques in international education, youth will gain the insights they need to develop a wider perspective about themselves and others.

Shane, H. G. with Tabler, M.B. (1981). Educating for a new millennium: Views of 132 International Scholars. Phi Delta Kappa Educational Foundation.

This volume identifies what experts in the natural and social sciences think are important for young people to understand if they are to survive the years ahead. These ideas for

curriculum development and survival education are provocative and as varied as the scholars interviewed.

Small, M. G. (1983). Education in crisis: Preparing students for the 21st century. Curriculum Review, 22 (4), 10, 14-17.

Advocates a curriculum based on knowledge of the past, the awareness of the fast-changing present, and the planning of alternative futures--enriched by a nonlinear system approach to knowledge and infused with a cross-cultural and global consciousness--to produce well-educated, well-adjusted,responsible, and mature students.

Spikes, F. (1979). The UNESCO recommendation on adult education:Implications for practice in the US. Lifelong Learning: The Adult Years, 2 (8), 4-7, 38-39.

The article describes the UNESCO Recommendation on the Development of Adult Education, the first worldwide standard-setting instrument in this field, and suggests why the provisions of this document are important to adult educators in the United States.

Study Commission on Global Education. (1987). The United States prepares for its future: Global perspectives in education. New York, NY: Author.

Headed by Clark Kerr, this commission examines the content of the curriculum in elementary and secondary schools in light of the increasing internationalization of the world and the increasing diversification of our nation's population along racial, ethnic, and cultural lines. The question of what knowledge and skills student should now additionally have as prospective citizens of a democratic nation in order to function in the global community is discussed.

Toffler, A. (1971). Future Shock. New York, NY: Bantam Books.

The noted futurist describes the characteristics of our future age (transience, novelty, and diversity) and their impact on people's lives. In this context, our educational system should focus on developing the skills of learning, relating, and deciding if citizens are to fully participate in society.

United Nations Educational, Scientific, and cultural Organization. (1976). Meeting of experts on the content of education in the context of lifelong education. Final report.Paris, France: Author.

A gathering of educators and researchers from around the world formulate a set of conceptual problems and proposals and a list of 10 topics for UNESCO action or encouragement. They conclude that lifelong education would mean changing the traditional character of school through a wide opening on the world of work, on the living culture, and on the moral and spiritual values of the world today.

APPENDIX B

Resource list of Maine people, programs, and organizations involved with global perspective, citizenship, or learning.

Boy Scouts of America, Pine Tree Council, 125 Auburn Street Portland, ME 04103 797-5252 Robert Denlinger, Executive Director

Provides programs to develop character and citizenship to help young people make ethical choices about the future. Offers outdoor programming, career introductions, camp facilities, and volunteer training.

Bureau of Labor Education, University of Maine, 128 College Avenue, Orono, ME 04473 581-4124, William Murphy, Assistant Director

Provides practical labor education and applied research for Maine workers and their organizations. Offers educational programs, workshops, and institutes for both organized and unorganized workers and future workers. Conducts non-credit educational programs and research on occupational health and safety, labor law, collective bargaining, labor relations, and leadership development.

Center for Vision and Policy, P.O. Box 16007, Portland, ME 04104 761-4638, Shirley Hager, Coordinator

Creates alliances among individuals and groups who normally do not have a voice in public policy. Introduces these voices to the public policy process. Develops long-range vision for Maine people based on ecologically-sound and socially and economically-just principles. Builds alliances between groups and conducts economic, social, and environmental research.

University of Maine, College of Business Administration, 4B South Stevens Hall, Orono, ME 04469, 581-1984, Guvenc Alpander, Nicholas Salgo Professor of Business Administration

Graduate and undergraduate education in business. Expertise in management, executive and professional development, and international business.

College of Education, University of Maine, 144 Shibles Hall, Orono, Maine 04469, 581-2448, Anne Pooler, Professor of Education

Graduate and undergraduate education programs for teachers. Expertise in social studies.

Cooperative Extension Service, University of Maine, 125 State Street, Augusta, Maine 04330, 622-7546, Ira Ellis, Extension Agent

Offers informal education programs to improve the quality of life for Maine people. Links resources and research to the needs of Maine people. Expertise in family life, agriculture, community, and environmental quality.

Human Services Development Institute, University of Southern Maine, 96 Falmouth Street, Portland, Maine 04103, 780-4430, Kathy Powers, Inter-Agency Coordinator

Conducts research in all areas of human service. Provides data and information to local, state, and federal agencies. Expertise in research design, policy analysis, grant writing, staff development design, training, educational and rehabilitative programs, health care finance, and social welfare.

Kennebec Girl Scout Council Inc., P.O. Box 206 CCB, Cape Elizabeth, ME 04107, 767-3317, Ingrid Ekdahl, Executive Director

Offers programs to maximize individual potential for roles as contributing members of society, including a focus on challenges facing youth, i.e. drug abuse, teen pregnancy, self- esteem, etc. Provides group experiences for girls and adults, camping programs that address environmental issues, and training programs. Other areas emphasized include human growth and development, decision making, career options, citizenship, individual responsibility, and leadership and followership.

Maine Association for Continuing Education, c/o University of Maine at Machias, 9 O'Brien Avenue, Machias, Maine 04654, 255-3313 x289, Jane Hinson, M.A.C.E President

Statewide organization designed to promote and encourage post-secondary education. Thirty-six post-secondary private, public, and proprietary institutions are represented. Expertise in the delivery of credit courses and non-credit courses, workshops, seminars, and conferences. Other areas of emphasis include summer sessions, distance education, and non-traditional students.

Maine Association of Public School, Adult Education, c/o MSAD #44, Telstar Regional High School, Rt.#1, Box 1220, Bethel, ME 04217, 824-2780, Cathy Newell, M.A.P.S.A.E. President

Promotes adult education programs. Expertise and programs in drop-out recruitment, external credit options, high school diploma evening courses, GED testing, vocational education, and general courses for personal enrichment.

Maine Audubon Society, 118 U.S. Route One, Falmouth, ME 04105, 781-2330, Maureen Oates, Director of Environmental Education

Conducts legislative advocacy on environmental issues. Offers environmental educational programs for adults, teachers, and schools groups, and international field trips. Conducts research and public policy analysis.

Maine Center for Educational Services, 223 Maine Street, Auburn, ME 04210, 783-0833, Robert Shafto, Executive Director

Stimulates and supports educational organizations in Maine by providing services not readily available elsewhere. Expertise in teacher training, consulting with schools and organizations, and linking schools with other resources, including successful model programs. Creates and sustains creative school improvement projects.

Maine Chamber of Commerce and Industry, 126 Sewall Street, Augusta, ME 04330, 623-4568, Jennifer Vachon, Vice President for Membership Services

Business advocacy organization, primarily dealing with governmental affairs. Represents business interests in the legislature. Offers educational programs, marketing advice, and communications for businesses.

Maine Congress of Parents and Teachers Associations, Route 1, Box 225, N. Whitefield, ME 04353, 549-7974, Brenda Dowst, President

Promotes development of parent and teacher associations.

Maine Council on Economic Education, 68 High Street, Portland, ME 04101, 874-6459, Robert Mitchell, Executive Director

Promotes the importance of economic education in elementary and secondary social studies curriculum. Sponsors teacher development workshops and seminars.

Maine Council for Social Studies, c/o Ernie Desrosiers, President, P.O. Box 1146, Waterville, Maine 04901, 872-2741

Represents social studies classroom teachers throughout the state. Informs membership of projects and programs in the social studies to facilitate participation and professional development. Fosters the development of classroom instructional materials. Publishes newsletter and sponsors annual conference.

Maine Humanities Council, P.O. Box 7202, Portland, ME 04112, 773-5051, Dorothy Schwartz, Executive Director

Promotes the study and appreciation of the humanities by Maine people. Develops networks with colleges, universities, schools, cultural organizations, and others interested in promoting education in the humanities. Offers grants for non- profit organizations for humanities projects, teacher institutes, film resources, and a travelling exhibition program.

Maine Peace Coalition, Thornhurst Road, Falmouth, ME 04105, 781-3947, Susan Shweppe, Coordinator

Promotes public education on the political process and national security issues. Empowers citizens to participate in the political process. Advocates national policies supportive for all people. Expertise in foreign policy and national security issues. Sponsors educational programs, congressional dialogues, and a newsletter.

Maine Public Broadcasting Network, 65 Texas Avenue, Bangor, ME 04401, 941-1010, Charles Halstead, Instructional Services Specialist

Provides public, educational, and general television programming. Expertise in interactive telecommunications and educational and instructive programming from pre-school to post- secondary.

Maine Studies Institute, University of Maine at Augusta, University Heights, Augusta, Maine 04330, 622-7131 x272, Thomas Andrews, Director

Assists elementary and secondary teachers in meeting the mandate for Maine Studies. Encourages a global perspective in classroom instruction. Offers residential summer institute for teachers, video pen pal project, and international student exchange.

Maine VTI System, 323 State Street, Augusta, ME 04330, 289-1070, Nancy Mullins, Assistant to the Executive Director

Provides technical training to meet the needs of business and industry in Maine through six campuses. Offers 30 programs, ranging from hospitality and health to welding, that lead to A.S. and A.A. degrees. Also offers customized, competency-based, technical training.

Mainewatch Institute, P.O. Box 209, Hallowell, Maine 04347, 622-7000, John Fitch, Executive Director

Conducts research and public education programs that facilitate the development of a shared vision based on the concept of a sustainable future for Maine and its regional neighbors. Conducts policy research, analysis, and public education programs and facilitates public dialog on issues.

Mt. Desert Island Schools, Superintendent's Office, Eagle Lake Road, Mt. Desert, Maine 04460, 288-5049, Judy Cox, Curriculum Director

Evaluates system-wide education curriculum to prepare students for the 21st century. Responsible for curriculum and teacher/staff development.

Office of International Programs, University of Southern Maine, 96 Falmouth Street, Portland, Maine 04103, 780-4550, Stephen Simonds, Director

Plans and coordinates international programs for USM, such as faculty and student foreign exchanges, linkages with foreign universities, and an international perspective in the curriculum.

Peace Corps, University of Maine, 205 Winslow Hall, Orono, ME 04469, 581-3209, Iver Loving, Representative

Promotes grassroots development in Third World countries and global understanding in the United States. Expertise in community and economic development programs, intercultural exchanges, and educational programs.

Samantha Smith Foundation, 9 Union Street, Hallowell, ME 04347, 626-3415, Jane Smith, Executive Director

Fosters international understanding through youth exchange program with the Soviet Union.

State of Maine, Department of Education and Cultural Services, State House Station #23, Augusta, Maine 04333, 289-5981, Connie Manter, social studies consultant

Assists and supports social studies curriculum development by providing material and human resources and staff development programs. Focuses on content issues and updating instructional approaches in the social studies, particularly in geography and related topics.

World Affairs Council of Maine, University of Southern Maine, 94 Falmouth Street, Portland, ME 04103, 780-4551, Basia Kulawiec, Program Director

Promotes the understanding of world affairs through educational and lecture programs.

Other Resources

Patricia Ames, 6 Crawford Drive, Bath, Maine 04530, 443-5479

Thomas Elwell, Executive Director, Maine Council of Churches, 15 Pleasant Avenue, Portland, Maine 04103, 772-1918

Scott Grant, University of Southern Maine, 408 Bailey Hall, Gorham, Maine 04038, 780-5074

Joanne Krawic, Union Elementary School, Union, Maine 04862, 785-4330

Marc Levesque, Member, Global Issues Subcommittee, Commission on Maine's Future, RR1, Box 889, Royal Road, Pownal, Maine 04069, 846-6248

Dan Marra, President, Maine World Trade Association, 77 Sewall Street, Augusta, Maine 04330, 622-0234

Bill Seretta, Member, Commission on Maine's Future, 74 Main Street, Yarmouth, Maine 04096, 846-9864 or 772-1156

Susan Vafiades-Diaz, International Programs Coordinator, Mt. Desert Island High School, P.O. Box 27, Southwest Harbor, Maine 04679, 244-5849

APPENDIX C

"Pockets of Good Practice"

The following represents current programs that help develop global citizenship education in the state of Maine. It is by no means complete. Other "pockets of good practice" probably exist but were not identified in time to be included in this report.

1. Union Elementary School

Building on the success of three annual "international nights," the Union Elementary School developed a theme for its new building. It was suggested by one of the social studies teachers, Joanne Krawic, that a comprehensive international curriculum for the K-8 school be developed. With grant assistance and school board support, a program was designed to develop cultural awareness in children and to bring a focus to the school. As a result, the Union Elementary School curriculum is known as the International School.

The International School program is planned by an interdisciplinary team which included teachers, staff, and school administrators. Its interdisciplinary approach, combined with a variety of activities and materials, expands upon the traditional social studies textbook curriculum. The essential element of the program is to focus on a different country in each grade for the entire year. The countries, chosen by the teachers according to the existing curricula and individual knowledge of the country, are: K-Japan, 1-Egypt, 2-China, 3-Nigeria, 4-France, 5-USA, 6-Mexico, 7-Soviet Union, 8-Greece.

Classroom activities which familiarize the students with a specific culture are combined with school-wide activities designed to share knowledge among students and their families. Classroom activities include language skills, foods, customs, geography, math and economics, science, literature, writing, history, architecture, religion, art, music, and physical education. School-based activities include a World Tour, passports, open house, lunches, posters, flags, simulations, speakers, library, international fair, and Olympic Games.

2. Mt. Desert Island School System

Through its curriculum coordinator, Judy Cox, the Mt. Desert Island school system is attempting to pursue a system-wide emphasis on a global perspective in learning activities. In September, 1988, Peace Day was observed in all elementary schools. Through small group activities, students learned how to relate to the rest of world. For the past three years, the focus in K-2 has been on a local-global theme. In kindergarten, students study their family and one in another culture. In grade one, students learn about their school and one in another country, and in grade three, students the focus is on their community and a foreign one. At the high school, global studies course electives are offered, with growing interest among the students. At noon, optional seminars on different global topics are featured. For the past six years, Mt. Desert Island schools have also hosted an international conference for all foreign exchange students in New England. This three day program expands the local students sense of world community through exchange students staying with local families. In past years, over 130 students have participated.

Community support for international programs is evident. The Arcady Chamber Music Group has performed a Russian program in the schools with Russian speakers, meals, and a slide show, all of which was open to the community at large. Another example of local support is the five women from the local community who offered to develop resource packets on individual countries for teachers. Support from the school board and administration is also present. In the future, the school system will attempt to do more integrated curriculum work, trying to cover reading, writing, and social studies goals all in one class, for example. The emphasis will also be on the importance of knowing one's own place and understanding the diversity within the community.

3. Maine Studies Institute

The creation of the Maine Studies Institute stems from the 1984 Maine Educational Reform Act which stipulated that all Maine schools must implement a Maine Studies Program in grades 6-12. It also stated that all students must have completed a course in Maine Studies to graduate. Maine Studies include course work in Maine's geography and environment, political systems, economics, social/cultural aspects, and international connections. The international aspects focus on how Maine relates to the world. Headed

by state Senator Tom Andrews and his assistant director, Debra Swinson, MSI has instituted several programs for teachers and students:

A. Video Pen Pal Program: Now in its second year of operation, this program links classrooms in Maine to schools throughout the world. MSI staff work directly with teachers and students to produce a twenty minute video tape depicting their community for a tape exchange with their foreign peers. Emphasis is placed on including some aspects of the region's geography and environment, government, economics, culture, and international relationship. The end product serves as a valuable educational tool, while the planning and production prove to be a highly motivating instructional process.

B. Summer Institute for teachers: "The Changing Face of Maine." This week-long program, held in June, 1988, for classroom teachers from Maine and Denmark and the Netherlands explored the five themes of environment, government, economy, culture, and Maine and the World. It was designed to provide information and help develop classroom strategies to teach these subjects. The institute will again be sponsored in June, 1989.

C. Close-Up Europe: In conjunction will an established program of this name, MSI will be involved with teacher and student travel to Europe in the summer of 1990. This program provides educational and cultural teacher and student travel through five European countries. Maine has been selected as one of five pilot states in the nation to host reciprocal European students.

Both the Video Pen Pals and Close Up Europe programs stress an interdisciplinary approach to curriculum. Foreign language educators involved in these programs are able to integrate social and cultural studies of international communities with an intense look at their own school's surroundings. MSI encourages schools to develop Video Pen Pal teams, comprising of teachers from the fields of social studies, language arts, foreign languages, and fine arts to work together with students to develop a fully integrated project.

MSI has worked with several schools to develop their Maine Studies Programs over past year: Portland's Jack Elementary school, Cumberland-North Yarmouth Memorial elementary school, and Brunswick junior high. Future plans include working with Lake Region High School in Bridgton, Katahdin High School in Sherman Mills, Morse High School in Bath, and the Fort Kent schools. Other MSI projects pending include a joint

application with the Small Business Development Center in Portland for a grant to develop an intercultural economics program.

4. Other schools that have programs of global awareness

- Boothbay Harbor elementary and high schools
- Camden-Rockport High School
- Maranacook High School, Readfield
- Morse High School, Bath
- Wiscasset pre-school program

5. University of Maine System

The University of Maine System has recently begun to increase its efforts at internationalizing the programs on all its seven campuses. The following mission statement, drafted but not yet approved, is an initial step towards this end.

University of Maine System Board of Trustees

Policy Statement on International Education

The University of Maine System Trustees recognizes the need for International Competence and Global Literacy. They are conscious of global interdependence and the need to prepare students to successfully compete, exercise leadership, and prosper in the global economy.

While the Trustees recognize the progress already made within the system toward an increased international perspective, the University of Maine System stills falls far behind most institutions of higher education.

It is the goal, therefore, of the University of Maine System to provide for every student:

A. an educational experience that recognizes the vital importance on international educational exchange in developing competence and global literacy;

B. a learning environment in which students see themselves as citizens of the world;

C. a recognition of the value of cultural diversity reflecting the heritage of the people of Maine, the nation, and the world.

As an expression of this mission statement, the University of Maine System Board of Trustees recently established the Council for International Programs, which is sanctioned by Chancellor's office and reports to the Vice Chancellor. All seven campuses are represented.

Council for International Programs

Mission statement

In accordance with the policy of the UMS Board of Trustees on International education, it shall be the mission of the UMS Council on International Programs to:

A. identify and disseminate information about the strengths and resources that already exist on the campuses;

B. assist and facilitate the utilization of these resources by others in the system;

C. provide a clearinghouse of information on international events, programs, foreign visitors, research, and other items of interest to students, faculty, and staff in the System;

D. continually monitor and report significant developments in international affairs in higher education;

E. identify problems and recommend solutions based on continuing analysis;

F. and recommend policies, standards, and specific objectives to further the goals of International Education. Recommendations should include, but not be limited to:

i. increasing the number of enrolled foreign students;

ii. encouraging and assisting more Maine students to study abroad;

iii. promoting and facilitating faculty and professional exchanges;

iv. developing university linkages;

v. incorporating the international dimension in courses at all levels;

vi. increasing intercultural learning opportunities and campus activities;

vii. and developing system-wide collaborative programs.

An example of the international activity within the University of Maine System is the University of Southern Maine's Office of International Programs (OIP). Directed by Steve Simonds, OIP's purpose is to coordinate international information, resources, and programs for students, faculty, and staff. In additional to developing a resource directory of faculty and staff with international experience or skills, OIP promotes foreign exchanges for students and faculty, develops linkages between USM and foreign universities, encourages foreign languages, and advocates the inclusion of a global perspective in university courses. Plans are also underway for establishment of an international resource center on campus that would provide training on international subjects, house a communications and language lab, and function as a student, faculty, and foreign visitor center. Overall, with support from its president, Patricia Plante, USM has embarked on developing an international awareness throughout all of its schools and programs. In the future, OIP will face new demands from outside USM, primarily from business people who are beginning to recognize that international aspects are for survival not just for fun.

6. Adult Education Programs

Numerous program exist around the state that provide global or international educational opportunities for adults. Among these are:

- China Maine Friendship Society, Portland

- Japan America Society of Maine, Portland

- Maine Asian Society, Augusta

- Maine Audubon Society, Falmouth
- Multi-Cultural Festival, Portland
- Refugee Resettlement Program, Portland
- Sister city/state programs with Shinagawa, Japan,

  Archangel, Soviet Union, and Rio Grande do Norte, Brazil.
- University of Maine Canadian American Center, Orono
- Maine World Trade Association, Augusta
- World Affairs Council of Maine, Portland

THE ENVIRONMENT FOR DECISIONMAKING

THE REPORT OF
THE SUBCOMMITTEE ON GOVERNMENT
TO THE
COMMISSION ON MAINE'S FUTURE

March 1989

INTRODUCTION

"Our transition into the 21st Century will be one of dramatic change for state governments. Think about the last 25 years. In 1961, most states had not been reapportioned according to a one-man-one-vote principle. The civil rights movement had scarcely taken hold. The expansion of federal programs (often provided through the states) had not begun. The women's movement was virtually non-existent. Ditto for the environmental movement. Television was playing shows like "Father Knows Best," and we were still close enough to an agrarian society to have lots of westerns on television and in the movies. Now the cowboys are in outer space."

-- Clement Bezold and Robert Bradley
The Future and State Governments
Journal of State Government
Vol. 59, No. 4; 1986

In the decade since the first federal Block Grant program was created in 1978, state governments have adjusted to a new era of autonomy, authority and responsibility. Their experience with this new era is now almost as long as with the 15 year period of federal expansion that came before -- the period that began a long term trend toward increasing size and the complexity of issues within state government and of increasing expectations and demands from those it serves. In the process, the states have become the crucibles of experimentation, adaptation and change in American public life -- Maine no less than states larger and wealthier than itself. Maine has been a leader in the nation in cleaning up rivers and lakes, in protecting children at risk, in comprehensive growth and solid waste management, in forging regional compacts to protect and manage natural resources, in energy conservation and cogeneration, in meeting the challenge of AIDS.

Like the other forty nine states, Maine faces and will continue to face an ever growing number of even more complex issues in the years to come -- from the ethics of biotechnology to the equity of Canadian free trade; from rebuilding public education to restoring access to housing and health care. The challenges facing Maine are especially daunting -- we are a relatively small and poor state without a tradition of strong government. Indeed, in many respects, our state government is ill-equipped to meet the first three challenges discussed below. Yet because of the fourth, Maine may well be in a

position to take a leading role nationwide in determining what successful government will be like in the next century.

1. Data Base

Data used in this report were drawn from a number of sources, including:

- o laws, reports, and other documents issued by the State of Maine since the first Commission on Maine's Future issued its report in 1977

- o other research carried out for the Commission and its staff in 1988 "secondary" literature on Maine, government in the American states in general, and studies of new forms of management and conflict resolution

- o questionnaires administered at the 1988 Maine Municipal Association convention in October, 1988

- o interviews with cabinet officers, their staff, legislative leaders, their staff, regional officials, and representatives of interest groups and consulting organizations in 46 state government and non-governmental organizations.

Normally, this kind of report is written with as much quantitative data as possible. In this case, the issues that could readily be quantified turned out not to be the most important ones. Statistical sources tend to measure past trends exceptionally well but do not do an especially good job of anticipating the kinds of new phenomena that are most important here.

Therefore, most of this report is drawn from a qualitative analysis of state publications and the open-ended interviews with state leaders from both the public and private sectors. In almost every case, the trends discussed below emerged as clear themes in the interviews unless otherwise noted.

EMERGING TRENDS

Over the next quarter century, we in Maine will have to make a number of tough choices. Of course, we cannot anticipate exactly what conditions will be like at the end of 1989 let alone 2009. Nonetheless, the broad outlines of what we will be dealing with are clear enough to show us two things. First, the more we can set coherent and reachable goals and the more we can anticipate what we will have to do to actually reach them, the better off we will be. Second, the longer we wait to make those choices, the harder it will be to do so.

Four specific trends lead to that conclusion:

1. Growing demands on government in Maine. The issues we in Maine are going to have to deal with in roughly the next quarter century are considerable. How are we going to deal with an older population? Uneven development among the various regions of the state? Industries that need a new kind of labor force? An increasingly global economy that leaves us less and less master of our destiny? An environment whose natural resources are increasingly menaced by pollution? A world in which education will have to extend far beyond the age of eighteen or even twenty one?

The question we face is not *whether* state government will play a major role in shaping Maine's future, but *what* that role should be. State government is the only institution in Maine that

- commands enough resources
- can bring together the various individuals and organizations and resources available in the state
- the people of the state look to for leadership.

In short, the government of the state will have to take the leading role in creating a state that meets the needs of the future -- a state in which

- continued but balanced economic growth can be fostered, through which the standard of living of all Mainers can be improved and a sustainable environment can be maintained

- all Maine families have adequate housing and access to health care

- all Maine children are provided an education that will give them the skills and the aspirations that will enable them to meet the demands of life in the 21st Century

- all Maine adults will have jobs that provide a decent income for themselves and their families

- all Maine senior citizens enjoy a life of comfort and dignity.

State government will be involved in meeting each of these needs. But state government cannot do it alone. In meeting these and other emerging priorities, the state will have to work together with the private sector, interest groups, the federal government, local and county governments and with individual Maine people to chart our course into the next century.

In each of the interviews conducted for this study, concern was expressed over the explosion of demands on the time and resources of government officials and volunteers. LURC, for example, processed 642 applications in 1980 and 1542 in 1987. In 1980, none of them dealt with solid waste. In 1988, that number had risen to 138.

And as the solid waste example suggests, the new issues are a lot more complex. It is rare that an issue falls clearly into the domain of a single state agency. Thirty years ago, the Department of Marine Resources did little more than regulate the fishing industry. Now it does that and much more: conserving the fish stock, developing aquaculture, and going beyond fishing to include the concerns of the tourist industries and those who would like to develop Maine's coastline.

As issues become more complex and interrelated, so must the response of the state. Economic and community development is no longer simply the creation of new jobs but a

delicate balancing of regional, environmental, and human resources as well. Education no longer consists simply of devising curricula and building schools for people under eighteen or twenty one. Now, education will have to be a lifetime enterprise whose goal will be to prepare Mainers to live in an ever-changing, global environment.

In Augusta as in Washington, one of our most cherished principles is the separation of powers. We want the executive and the legislature, the bureaucracy and the courts to have different and overlapping responsibilities so they can exert the famous "checks and balances" against each other. In trying to plan for a changing labor market, the Department of Labor has no choice but to share responsibilities and resources with Human Services, Community Services, Education, Economic and Community Development, the State Planning Office, and so on. Our court system is being forced to cope with an increasingly litigious society which not only puts more cases on the docket, but includes issues such as child abuse, environmental regulation, or the control of growth that affect much of the rest of government and society as well.

The new demands are not limited to the state government. In recent years, we have asked Maine's 461 municipalities to shoulder more and more responsibilities of an increasingly technical nature: comprehensive land use management, enforcement of energy efficient housing construction standards, and so on. There is virtual unanimity among local leaders that these are difficult burdens to bear.

More than ninety per cent of the respondents in our survey of Maine Municipal Association members agreed to the following statements. "The issues confronting local officials are growing increasingly technical and complex." "The work load confronting local officials is growing more and more demanding." "The current structures and/or responsibilities of local government will need to be altered if local government is to meet the challenges ahead." "'Local control' is being eroded by the complex and interdependent character of modern society." Barely half felt their town had the professional staff or expertise needed to do work effectively.

What's more, most local officials have to confront these new demands with a declining rate of participation by Maine citizens in local life. A study of a sample of twelve municipalities conducted for the Commission found that turnout rates in elections at all levels have dropped sharply in the last twenty years while turnover rates in local boards have risen. And ninety per cent or more of the MMA delegates agreed to the following

statements: "It is increasingly difficult to find qualified citizens to run for elective office or serve in appointed positions." The time demands of local office deter many qualified citizens from volunteering for office." "The hassles and controversial nature of local public service discourage many citizens from accepting responsibilities in local government.

The demands on counties and regional planning agencies may even be the most difficult. Increasingly, a single issue such as solid waste management, affects more than a single municipality or requires the resources of more than a single municipality in charting a response. However, we in Maine have never given either of these bodies the resources to become viable policy making bodies for those issues that cannot be handled by one town but do not need the attention of the government of the entire state.

2. The declining federal role The "Reagan revolution" has drastically added to the burden on state government. For good or ill, the federal government has done two things. First, it has decided to give the states more responsibility in dealing with health, housing, welfare, and social service issues in general. Second, at least for now, it has not provided relatively poor states like Maine with the funds to perform those functions the federal government has given up.

For example, the federal government has cut its expenditures for housing programs by as much as eighty per cent at precisely the moment that affordable housing has become an important issue in those parts of Maine that are growing most rapidly. Similarly, cuts in federal to the Office of Energy Resources for conservation (62.5%), weatherization assistance fo low income persons (18.8%), the energy extension service (68.3%), and conservation for institutional buildings (74.8%) have not been made up for by the state. Therefore, the Office is able to do less than it did a decade ago and is having increasing difficulty hiring and retaining trained professional employees. In the vast majority of state agencies, salaries are so low and working conditions so bad that the average professional employee stays on the job for less than five years. Similarly, the Division of Community Services has embarked on an ambitious program to help people become truly self sufficient and no longer dependent on social service programs, but is trying to do it at a time in which its funding is undergoing a sharp decline.

There is little question that states should be better able to provide services in response to problems that do vary considerably from state to state. Nonetheless, it is

equally clear that in the absence of substantially more money from the federal government, Maine will be hard pressed to do what we would like to do-- and know that we could do.

Several state leaders interviewed for this report referred to the NIMBY phenomenon: that trend for people to participate only when they do not want a project literally or figuratively built in their back yard. One interviewee mentioned NIMB-- not in my budget. NIMB seems to be fact of life for the indefinite future as long as we continue to face federal budget deficits and concerns about tax rates here in Maine. And, like the growing complexity and interdependence of the issues themselves, NIMB creates a major problem for us all.

3. **New policy making processes** In many ways, Maine does find itself ill equipped to deal with what amount to demands for us to provide more for our citizens with fewer and fewer resources. But in at least one respect, Maine may be leading the way nationwide. Students of public policy, business management, and organizational behavior in general have begun calling for new processes of running our institutions in the public as well as the private sector in a way that can produce more and better results during these times of declining resources. Characteristics of this approach which have come to be labeled "partnerships" in Maine include:

- **proactive government.** Historically, government and other institutions have acted "reactively." That is, we have waited until a problem emerged and normally became quite serious before we acted. Now, more attention is being given to anticipating trends that are likely to emerge, acting before issues become difficult problems, and trying to shape the future and not be shaped by it. The most common approach to "proactive" leadership is:

- **strategic planning.** Strategic planning involves three broad activities. First, especially in a time of limited resources, is the setting of priorities and goals for both the short and long term. Second is developing an action plan for reaching those goals. Third is the assessment of progress and then adapting one's action to meet both sets of goals. Strategic planning is most successful if the following conditions are met:

- **inclusive decision-making.** Every group or individual with a stake in the issue at hand should be involved in the planning process from the beginning. For

government, that means including people from all branches and levels and the entire private sector.

- **win/win solutions.** Instead of seeing governmental action as a compromise let alone a win-lose proposition, the goal is to devise solutions that benefit and have the active support of all involved. Increasingly, decision-making theorists are convinced that this is possible in just about any public policy setting

- **focus on process and principle, not specific details of institutions and structures.** If we can agree on the general principle to guide our actions, we can develop the specific policies or institutions from it as time goes on. Focusing on the specific before agreement on the principle makes the task all the more difficult. Ignoring the consensual and inclusive processes makes consensus-building and acceptance of the outcome all the more difficult.

- **make the processes ad hoc** There is no need to keep adding new offices and agencies and bureaucracies. In fact, to the degree that we do that, we add to the inertia that gives government its reputation for resisting change. Therefore, these theorists advocate having these organizations go out of existence as soon as their task is completed and to rely more heavily than is the case now on outside consultants and advocates who have skills not found in state government and who will not become part of those rigid and inflexible bureaucratic entities.

Maine does not have a strong or long history in any of these areas. But in the last decade, a number of steps in those directions were taken.

The report of the first Commission on Maine's Future, while by no means a strategic plan, did provide a glimpse into the future and a series of important goals, many of which were reached. In both the executive and legislature, there has been a tremendous growth in the number of study commissions and other investigations, many of which reflect an attempt to become more proactive. Finally, there have been a number of examples of people in Maine working together to find solutions to our problems: the establishment of FAME, specific industrial policies and broad areas of concern such as solid waste.

Recently, there has been a new commitment to moving in these directions. Almost half of the state departments, agencies, and offices studied for this report either have strategic plans in place or are in the process of developing them.

Even more significant, perhaps, are the attempts to marshall the resources of all the agencies, levels of government, and the private sector in dealing with these new interdependent problems. The Maine Human Resources Development Council, for example, included ten business leaders, the head of the AFL-CIO, three educators, seven local leaders, two legislators, three social service workers, and four members of the Governor's cabinet. The report lists ninety three Mainers from most walks of life who were included in the Commission's deliberations. And, finally, the Commission's report includes a series of long term goals for helping Maine's work force prepare itself for the challenges of the next century and a short term action plan of twenty nine proposals most of which could be achieved by the end of 1989.

In addition, a number of agencies have been reaching out into the community to bring an ever larger share of the concerned citizens into these decision-making processes. The Department of Mental Health and Retardation, for example, has consulted with over twelve hundred Mainers in an attempt to build agreement about what the goals of the Department should be for the next three to five years. Health and Human Services is but one of the agencies that has reached out to the public to fill and give meaning to advisory committees that have taken a leading role in defining state policy in such areas as dealing with AIDS. Labor has played an equally important role in bringing together a number of state agencies to share in the development and implementation of policies to help get the Maine labor force ready to deal with the labor market of the twenty first century. The new Departments of Administration and Finance have broken new ground in making the relationship between the executive and legislature cooperative rather than adversarial. Energy and Environmental Protection are working to do the same as municipalities are given new responsibilities for devising and implementing zoning, planning, code enforcement, and other policies. Economic and Community Development is trying to force public-private partnerships involving business leaders and local government as well as the state in helping set priorities for maximizing what it has come to call "the Maine advantage."

Finally, the members of the consulting and lobbying communities interviewed for this report all mentioned a growing attempt on their part to establish cooperative rather than

adversarial relations with state government and the emergence of a similar attitude among state officials.

It must, however, be stressed that these truly are **emerging** trends. No more than half of the agencies, departments, and commissions in the executive branch have had the resources to engage in serious strategic planning even though that is a goal shared widely in the administration. Despite an explosion in study commissions and a steady increase in professional staffing, the legislature has found it even more difficult to transcend the realities of a biennial budgetary and electoral cycle or the limits of a part time citizen legislature and engage in that kind of long term planning.

It is also harder for the legislature to participate in these new patterns of decision-making. We retain a part time legislature filled primarily with people with limited time and expertise to bring to bear on these increasingly complex and technical issues. Moreover, legislators are subject to the biennial pressures of budget and elections that make thinking in the longer term more difficult. Nonetheless, despite those difficulties, the legislature has become more proactive over the last decade. As one staffer put it, most legislators work "less part time." More and more members of the House and Senate take an active role in study commissions and, in general, helping the state devise policies to meet the long term pressures mentioned above.

Similarly, all the consultants and lobbyists interviewed noted that the commitment to these procedures is uneven. They are most firmly in place for those policy areas in which a) it is easiest to predict the demands we will face in the next decade or two, b) the agencies involved have something approaching an adequate staff, c) there is a history (normally dating back to the idea of maximum feasible participation from the War on Poverty) of reaching out into the community, and d) strong leadership committing the agency to these ways of thinking and acting. But even in those areas, there is substantial concern that reality has yet to match the rhetoric about partnerships.

And finally, we have not, as a state, made a conscious decision to adopt these new approaches to policy making. They remain themselves ad hoc, used for some issues but by no means all.

In sum, the commitment to the processes is too uneven and the decision to adopt them too recent to know for sure what kind of an impact they will have. Nonetheless,

where they have been adopted most fully, the signs are positive. Maine's AIDS policy is one of the most widely accepted in the nation. Despite a relatively late start, our policies for bringing all the resources of the state together to help an aging labor force get the skills for a new economy are also among the most forward looking.

STRATEGIC OPTIONS

1. The four main options. We are at one of those turning points in the history of the state at which an important decision is called for. That decision may be not to change-- that is one of our options. But we will be best served if we make that decision as clearly and consciously and cooperatively as possible. The four main options are:

- Maintain the status quo. It may be that either the magnitude of the danger or the ability of the state or any government to respond have been overestimated. If either is true, there would be no reason to change. Indeed, changing might turn out to be a dangerous mistake.

- Privatize state services. It is often argued that because of the efficiency of the profit motive, of markets, etc. the private sector can provide services now provided by the state more effectively.

- Strengthen state government. Others argue that precisely because markets cannot handle what the economists call "collective goods" like education, environmental protection, or welfare, government at the state or federal level has to fill the void. Therefore, we should, the argument goes, strengthen, not weaken central planning and policy making institutions in Augusta.

- Strengthen the newly emerging flexible planning systems. For most analysts who look to the future rather than the past, this is the our best option. They would advocate making what have been occasional efforts the rule rather than the exception. They would also advocate expanding the scope of the "partnerships" to include not just the business community but the rest of the private sector and other agencies of government as well. Finally, they would advocate building state wide agreement about the importance of consensual and mutually beneficial models of change.

2. Other issues. In addition to these broad options, there are a number of others we could pursue no matter which of the four we end up following.

- **Infrastructure.** Whichever of these options are chosen, state government has to be brought into the 1980s let alone the twenty first century. The infrastructure of

state government-- the physical facilities people are forced to work in and the equipment they are given to do their jobs from telephones to computers-- is woefully inadequate. It is rare, for example, to find a professional state employee with a computer and the software s/he needs to do the job. It is just as rare to find a professor at the University or at the private colleges who does not have that equipment. In the short run, improving working conditions will be expensive, but it would pay tremendous benefits in productivity and job satisfaction in the near future.

- **Build planning into state government.** Not every state department has a planning division. Moreover, the State Planning Office does not provide overall *strategic* planning for the state. Yet, in an era of ever accelerating rates of change and greater long term demands placed on state government, it might make sense for Maine to establish an office that would do on a permanent basis what the two Commissions on Maine's Future have done and more. That is, they could help identify and publicize new trends, new demands, and new options. And if designed itself as one of those flexible, inclusive, consensual bodies, it could model and build support for these new kinds of decision-making processes.

Maine also needs to strengthen its ability to anticipate and respond to "smaller" changes that can be handled within existing institutions. Over the past ten years, the executive branch and the Legislature have each dramatically increased the amount of research and planning that they do. What is needed today and in the future is to coordinate and prioritize the existing research and planning process in five key respects:

- Each executive department, commission, bureau or agency must support a long term planning division within its internal structure. That division would be responsible for gathering evidence about the direction and impact of long term trends within its agency's area of responsibility, and for identifying options for dealing with those trends.

- A new division within the State Planning Office should be organized, which would receive everything produced by the individual agency planning groups. SPO would then a) identify areas of common interest and concern among the planning groups and b) facilitate a coordinated, executive-branch-wide effort by all the departments concerned with the trend

- A similar division should be organized within the Legislature's Office of Policy and Legal Analysis and staffed with specialists in strategic planning, to help the Legislature and its committees identify the long term issues that most need attention. This OPLA division, like that envisioned for SPO, would annually analyze all the studies conducted by the Legislature and its committees to identify overlapping issues that call for cooperative responses by various parts of the Legislature.

- Executive and Legislative leaders should meet annually to review the products of the strategic planning process and to chart a joint response to the major issues that are identified, whenever possible.

• **Rationalize policy and regulation making** Virtually every agency that has both policy making and implementation responsibilities, the rule-making and rule-adjudicating functions come into conflict. State officials are both expected to bring the public into the making of policy and then enforce that policy, often against the wishes of much of that same public.

• **Redefine state-local relationships.** State government currently runs the risk of doing to municipalities, counties, and regions exactly what the Federal government is doing to Augusta: giving it responsibilities and not the resources to carry them out. If, as seems to be the case, more avenues will be sought to maximize citizen control over government by making it as decentralized as possible, the state will have to explore ways especially to help understaffed and underfunded municipalities and counties. Attention, too, should be given to the possibility of giving the regional councils of governments and the regional planning agencies more resources and more authority to tackle what have become regional rather than municipal or country level problems. It should, however, be noted that there is nothing approaching a consensus about what to do in this respect.

READY TO MAKE THE TOUGH CHOICES

PUBLIC PRIORITIES AND PUBLIC OPINION

Prepared For
The Commission on Maine's Future

INTRODUCTION

In early 1989, the Commission on Maine's Future completed a public opinion survey which suggests that Maine people are strongly committed to preserving the state's natural environment -- sometimes at the expense of higher taxes, better jobs and private investment decisions -- a dramatic change over Maine attitudes measured 10 years earlier.

The survey, conducted by Northeast Research Inc, was a conventional telephone public opinion poll of 700 Maine adults randomly selected throughout the state. *The People of Maine*, another Commission study released in early 1989, sought to identify the population's general values and underlying belief systems. The Northeast survey asked Maine people specific questions about current public policy issues to identify their present day priorities and to measure their willingness to make the necessary trade-offs and investments to achieve those priorities in the future.

In addition to clearly identifying preservation of Maine's natural heritage as a major public policy priority, the survey also showed strong support for education and care for the elderly.

The strongly pro-environment sentiment expressed by survey participants was echoed in the Commission's earlier values study. Both studies suggest that Maine people now believe it is possible to preserve our natural heritage and have a strong economy, but they recognize that maintaining that delicate balance will require both a collective and individual commitment to making some tough choices.

The following report summarizes the major findings of the Commission's survey and examines the differences as well as similarities between the opinions of Maine people of differing ages, regional location and length of residency in Maine. This report will also summarize and compare the results of two independent surveys of Maine legislators and high school seniors throughout the state who responded to a written questionnaire containing questions similar to those included in the Commission's telephone survey of the general population.

The Commission on Maine's Future hopes that Maine public policymakers use the information from this survey as well as the Commission's earlier values study as an information resource and guide, and not as an inflexible blueprint to creating a vision for Maine's future. We hope that the information lends depth of understanding to how Maine people stand on important issues and we urge that additional

research be conducted on an ongoing basis. This will assist policy makers in tracking and measuring the consistency of public opinion over time and in identifying changing opinions and attitudes which will affect major public policy questions facing the state in the future.

Annette Ross Anderson, Chair
Commission on Maine's Future

MAINE'S NATURAL HERITAGE: A CONSENSUS PRIORITY

In 1989, Mainers are overwhelmingly in favor of preserving their relatively unspoiled environment even at the cost of some economic opportunity. This apparent willingness "to pay the price" to preserve those qualities of Maine's special way of life was identified by survey participants' responses to several "tough choice" questions involving both economic and non-economic tradeoffs.

Jobs versus The Environment

Because Maine has historically been at the end of the line both geographically and in terms of economic advantage, public debate has often narrowly focused on the issue of jobs versus the environment or "payroll versus pickerel." In the Commission's 1989 Northeast survey, Mainers were asked if they would favor maintaining the quality of Maine's air and water even if it might prevent high paying businesses from expanding in Maine.

Eighty seven percent of the respondents said "yes" they would prefer environmental preservation over new jobs. Only 9% of the respondents said that they would choose expansion of businesses over the environment and approximately 5% offered no opinion.

Ten years earlier, Maine people were asked a similar question in a 1979 survey sponsored by the Maine Sunday Telegram. At that time, the 500 Maine people interviewed in a random telephone survey were asked:

> "If Maine had to choose between industrial development to provide more jobs and limited industrial development in order to preserve the natural environment, which do you think should be more important, creating more jobs or preserving the environment?"

Over one half of the respondents who had an opinion (56.6%) chose creating more jobs; less than half (43.3%) selected preserving the environment. Ten years later, an equivalent question on the Commission on Maine's Future survey found that nearly 9 out of 10 respondents favor preserving the environment over creating more jobs.

TABLE I

JOBS/ENVIRONMENT TRADEOFF
COMPARISON OF 1979 AND 1989 ATTITUDES

1979 Survey			1989 Survey		
Age Group	%Jobs	%Env.	Age Group (1979 Group 10 years later)	%Jobs	%Env.
			18-24	9.0	84.5
18-25	38.7	61.3	28-35	6.4	93.6
26-35	41.4	58.6	26-45	6.5	93.5
36-45	55.8	44.2	46-55	8.9	91.1
46-55	69.0	31.0	56-65	13.1	87.0
55-65	75.6	24.4	66-75	13.2	86.8
65 +	77.3	22.7	75 +	17.9	82.1
Statewide	56.6	43.3	Statewide	8.8	86.2

The Commission can only speculate about the reasons for the dramatic change in the public debate of jobs versus environment. We believe that the principal causes are the vastly improved economic conditions in the state over the past decade as well as the heightened awareness today of threats to the natural environment including recent public focus on acid rain, global warming and development pressures on land use.

The Commission's 1989 survey also showed that support for environmental protection over greater economic opportunities was consistent throughout Maine's population regardless of age, income or other demographic differences. Ten years earlier,there was a significant difference in support between the attitudes of younger Mainers who favored protection of the environment versus older respondents who strongly preferred job creation. The Commission's 1989 survey, however, shows an overwhelming "pro" environment majority in every age group. (See Table I)

TABLE II

JOBS/ENVIRONMENT TRADE OFF

BY REGION

Trade Economy Or Jobs For The Environment	The County	Down East	Central Maine	Western Maine	Mid-Coast	Southern Maine	State Wide
	%	%	%	%	%	%	%
Yes	81.2	92.0	84.1	85.8	84.9	87.7	84.9
No	15.1	4.0	9.4	6.8	10.5	8.3	8.8
Don't know	3.8	4.0	6.5	7.3	4.5	4.0	5.0

BY RESIDENCY

Trade Economy Or Jobs For The Environment	Inmigrants To Maine	Lifelong Mainers	State Wide
	%	%	%
Yes	85.3	87.1	86.2
No	10.1	8.2	8.8
Don't know	4.6	4.7	5.0

Strong support for the environment was apparent in all regions of the state surveyed and was shared equally by life-long residents and people "from away." Three quarters or more of the respondents in each region, age and length of residency category were willing to trade additional economic development and more jobs for the protection of Maine's air and water quality. Even residents in Aroostook County and Downeast Maine, the state's least prosperous regions, strongly expressed their support for the environment over greater economic opportunity.

In an independent written survey conducted by the Commission,Maine legislators and high school seniors in seven regions around the state were also asked whether they favored preserving the quality of Maine's air and water if it meant limiting business expansion in the state. Sixty-five percent of the 119 legislators responding favored maintaining environmental quality over economic opportunities. Seventy percent of the 429 responding high school seniors also chose Maine's environment over more higher paying jobs.

TABLE III

WOULD YOU FAVOR HAVING THE QUALITY OF MAINE'S AIR AND WATER AT LEAST AS HIGH AS IT IS NOW - EVEN IF THAT MEANT PREVENTING SOME HIGH-PAYING BUSINESSES FROM EXPANDING IN MAINE?

	General Public	State Legislators	High School Seniors
Yes	86.2%	65%	70%
No	8.8%	35%	30%
Don't know	5.0%	-	-

Who Will Pay?

Maine people's commitment to preserving the state's natural environment can be measured beyond the Commission's trade-off question of preserving air and water quality versus job expansion. In a separate question, the Commission asked the respondents to prioritize how their tax dollar should be spent. Participants clearly identified improving the state's air and water quality as the second most important funding priority, with 63% of the respondents agreeing that government should spend more money on air and water quality -- even at the expense of higher taxes. Sixty five percent of the legislators surveyed and 63% of the high school seniors agreed. (The No. 1 funding priority of the general population survey was more money for elementary and high school education.)

TABLE IV

SHOULD MAINE STATE AND LOCAL GOVERNMENT SPEND MORE THAN THEY ARE NOW ON THE FOLLOWING SERVICES - *EVEN IF IT MEANS RAISING TAXES*, OR, SPEND ABOUT THE SAME OR SPEND LESS THAN NOW?

	General Public			State Legislators			High School Seniors		
	More	Same	Less	More	Same	Less	More	Same	Less
	%	%	%	%	%	%	%	%	%
Improving air and water quality	**62.7**	32.5	2.7	**65**	33	2	**63**	35	2
Disposing of garbage and trash	49.0	42.9	3.8	**64**	32	4	**56**	43	1
Public parks and recreational areas	28.2	63.2	7.1	31	51	18	35	61	4

Recycling Trash

Beyond the issue of air and water quality, another significant environmental concern today is solid waste disposal. Wishing to measure the personal commitment of Maine people to resolve this problem, the Commission asked survey respondents the tradeoff question detailed in Table V.

Five of every six respondents chose compulsory recycling even at the cost and bother of sorting their own trash. The results of the Commission's survey are consistent with a 1988 poll released by the Natural Resources Council which reported that 63% of respondents favored mandatory municipal recycling and that 89% were either very likely or somewhat likely to sort their trash voluntarily. (An earlier 1988 statewide survey limited to registered voters sponsored by the Capitol News Service showed that 73.4% of the respondents would raise local taxes to pay for a recycling program but only a bare majority, 51.1%, thought that the state should require everyone to separate their trash as part of a recycling program.)

TABLE V

WOULD YOU FAVOR REQUIRING EVERY TOWN TO HAVE A PROGRAM TO RECYCLE TRASH - EVEN IF THAT MEANT *YOUR* HOUSEHOLD HAD TO SORT YOUR TRASH INTO TWO SEPARATE CONTAINERS?

	General Public	State Legislators	High School Seniors
Yes	89.4%	95%	76%
No	7.8%	5%	24%
Don't know	2.9%	-	-

Ninety-five percent of Maine legislators responding to the Commission's written questionnaire and 76% of high school seniors surveyed also favored mandatory recycling even with the requirement of individual household sorting.

Preserving Open Land

The Commission found the preservation of Maine's rural character and access to open, undeveloped land is clearly a priority for Maine people.

Historically, "zoning" has been a controversial concept in Maine. However, a decade of development pressures in Southern and Mid-Coast Maine has heightened the conflict over competing land uses resulting in several communities enacting temporary development moratoria and state legislation mandating comprehensive planning in Maine's cities and towns.

Commission survey participants were asked to weigh the benefits of preserving the rural, undeveloped character of Maine against the trade-off of limiting the ability of property owners to sell their land for its highest and best use:

More than two thirds of the survey respondents favored limiting development over the traditional rights of property owners.

TABLE VI

WOULD YOU FAVOR LIMITING THE DEVELOPMENT OF OPEN LAND WITHIN 25 MILES OF WHERE YOU LIVE - EVEN IF IT MEANT THAT MUCH OF THE OPEN LAND *COULD NOT BE* SOLD FOR DEVELOPMENT?

	General Public	State Legislators	High School Seniors
Yes	72.1%	76%	77%
No	21.3%	24%	23%
Don't know	6.7%	-	-

Seventy-six percent of the responding legislators and 77% of high school seniors surveyed also voted in favor of limiting the development of open land at the cost of freedom to sell land at its highest use value. The results are consistent with the Commission's earlier values research which showed that Mainers believe that the natural beauty of Maine should be preserved even if it means interfering with private investment decisions or spending more public money.

Landowner Rights

The conflict between the preservation of individual landowner rights to prevent trespassing and Maine's tradition of public access to rural and wilderness areas, private as well as public, has concerned public policy leaders for some time. Since the overwhelming majority of Maine's lands are privately owned, public access to private lands and the terms of that access is a controversial issue. It is also an issue about which public opinion is difficult to measure accurately because of the sometimes schizophrenic conflict between Maine people's desire for unfettered access and our historic support for private property rights.

That ongoing internal conflict is evident in responses to this survey and the Commission's earlier values study.

Participants in the Commission's public opinion survey were asked the following question:

"Would you favor greater protection of landowners' rights, even if that meant less public access to land for recreation and hunting?"

This specific issue was given particular poignancy during the survey interviewing period which followed the death of a suburban mother who was accidentally shot and killed by a deerhunter within 200 feet of her home.

TABLE VII

WOULD YOU FAVOR GREATER PROTECTION OF LANDOWNER'S RIGHTS - EVEN IF THAT MEANT *LESS PUBLIC ACCESS* TO LAND FOR RECREATION AND HUNTING?

	General Public	State Legislators	High School Seniors
Yes	67.5%	66%	55%
No	26.8%	34%	45%
Don't know	5.7%	-	-

A majority of the survey respondents said that they would favor the protection of individual rights even at the expense of less public access. Sixty-six percent of the responding legislators and 55% of the high school students surveyed agreed.

Participants' reaction to this question as well as responses of Maine people to other survey queries about public access indicate that, in addition to some significant ambivalence about the conflict between private property rights and public access, Maine people's attitudes may vary depending on the nature of the property and its ownership.

For example, 75% of respondents to the Commission's earlier values survey indicated that they believe that the people of Maine should have the continued right to use private wilderness and forest land at no cost. One could speculate that the respondent becomes more concerned about private property rights when they are his own and less concerned if the owner is a large, impersonal entity such as a paper company. Obviously additional research is necessary to help us better understand the inherent conflict and inconsistencies represented by these responses.

OTHER TRADE OFFS

Although questions dealing with environmental tradeoffs dominated the Commission's survey, participants were also asked to make additional "tough choices" in three other areas in order to identify and measure their priorities as well as willingness to achieve those priorities.

Higher Quality Education versus Increased Taxes

Virtually everyone wants "better schools." Conflict, however,arises over the definition of "better." Even more conflict emerges over how to accomplish this goal.

TABLE VIII

WOULD YOU WANT MAINE'S SCHOOLS TO RATE AMONG THE TOP TEN STATES IN THE COUNTRY - EVEN IF THAT MEANT A *SUBSTANTIAL* INCREASE IN MAINE'S STATE AND LOCAL TAXES?

	General Public	State Legislators	High School Seniors
Yes	70.5%	78%	79%
No	25.1%	22%	21%
Don't know	4.4%	-	-

The Commission's survey did not attempt to capture the public's opinion on ways to improve education but rather to measure their willingness to raise taxes in order to bring Maine schools up to a high, nationally-based quality standard. Specifically, participants were asked the question in Table VIII. A substantial majority of the respondents unequivocally said"yes" to better schools even at the cost of higher taxes. A closer analysis reveals that the willingness to increase taxes is considerably stronger with Maine's younger adults, especially those with children, than those who are older.

The willingness is significantly less in the Mid-Coast area which may reflect the high percentage of retiree residents there. The Mid-Coast area has also been a focus of recent heightened concern over property tax burdens.

TABLE IX

WILLINGNESS FOR EVERYONE TO PAY MORE FOR MEDICAL INSURANCE AND TO USE MEDICARE IN ORDER TO KEEP UP QUALITY OF MEDICAL CARE

BY AGE

Pay More to Keep Quality Medical Care	18-24	25-44	45-64	65 +	Statewide
	%	%	%	%	%
Yes	58.6	53.5	52.6	65.4	55.9
No	38.3	38.5	38.3	25.4	36.1
Don't know	3.1	8.0	9.0	9.2	8.1
Total	100.0	100.0	100.0	100.0	100.0

Paying for Medical Care

The cost of medical care -- to individuals directly and indirectly through third party payers -- continues to rise significantly and the question of affordable and available quality health care is a major Maine public policy issue. Participants in the Commission survey were asked to weigh the quality of care versus the cost with the following question:

> "Would you favor keeping up the quality of medical care in Maine, even if it meant everyone had to pay quite a bit more for medical insurance and for using Medicare?"

This was the only "tough choice" trade-off question that did not receive a majority of unequivocal support from respondents. Approximately 44% of the total said "yes" they favored paying more to retain quality care with another 12% giving a qualified "yes." Thirty-six percent either said "no"or a qualified "no."

o The oldest and the youngest respondents were more supportive of maintaining quality medical care at a higher cost than middle aged respondents. Maine's senior citizens are the most supportive: they favor paying more to maintain quality care (at least conditionally) by a 2.5 to 1 margin.

o In all three of the younger groups, those supporting the trade-off (at least conditionally) outnumber those opposing it by about a 1.5 to 1 margin.

o Nearly one half of the middle aged respondents either qualified their support or opposition and were not sure.

Interestingly, even within the age groups, those living in higher income households were not significantly more likely than those in lower income situations to be willing to pay more to maintain medical care quality.

TABLE X

WOULD YOU FAVOR KEEPING UP THE QUALITY OF MEDICAL CARE IN MAINE - EVEN IF IT MEANT EVERYONE HAD TO PAY QUITE A BIT MORE FOR MEDICAL INSURANCE AND FOR USING MEDICARE?

	General Public	State Legislators	High School Seniors
Yes	55.9%	73%	48%
No	36.1%	27%	52%
Don't know	8.1%	-	-

Seventy-three percent of the legislators responding but only 48% of the high school seniors surveyed agreed that the quality of medical care in Maine should be maintained even at the cost of higher medical insurance and Medicare bills.

Citizen Involvement

Individual citizen participation in community affairs is vital to Maine's future. The Commission wished to measure the value that Mainers place on influencing their community's affairs as well as their personal commitment to exercise that influence.

TABLE XI

WOULD YOU WANT TO HAVE A LOT MORE INFLUENCE OVER WHAT YOUR COMMUNITY WILL BE LIKE IN THE FUTURE - EVEN IF THAT MEANT YOU HAD TO SPEND SIX OR SEVEN MORE HOURS A WEEK GOING TO MEETINGS, TALKING WITH PEOPLE, AND READING ABOUT COMMUNITY PROBLEMS?

	General Public	State Legislators	High School Seniors
Yes	69.0%	74%	65%
No	28.3%	26%	35%
Don't know	2.7%	-	-

Specifically, participants were asked the following question:

"Would you want to have a lot more influence over what your community will be like in the future, even if it meant that you had to spend six or seven more hours a week going to meetings, talking with people and reading about community problems?"

More than two thirds of the respondents agreed that influencing their community's future was worth the personal investment of time. Support for voluntarism is particularly strong among the younger respondents and declines with age. It is also stronger among those who are already active in voluntary work or in politics.

Not surprisingly 74% of the legislators responding strongly endorsed personal involvement in community affairs while 65% of high school seniors also agreed that it was a good investment of personal time.

Are We Willing to Pay?

Respondents to the Commission's survey were clear in identifying their spending priorities for the future, indicating strong support for education, the environment and care of the elderly. Table XII shows how Maine people responded when asked if they thought Maine state and local government should spend more than they are now for a variety of services listed -- even if it meant raising taxes or if they preferred to spend about the same as they are currently spending or spend less.

TABLE XII

SHOULD MAINE STATE AND LOCAL GOVERNMENT SPEND MORE THAN THEY ARE NOW ON THE FOLLOWING SERVICES - *EVEN IF IT MEANS RAISING TAXES*, OR, SPEND ABOUT THE SAME OR SPEND LESS THAN NOW?

	General Public			State Legislators			High School Seniors		
	More	Same	Less	More	Same	Less	More	Same	Less
	%	%	%	%	%	%	%	%	%
Elementary and high schools	47.5	45.9	3.1	44	54	2	**59**	37	4
Improving air and water quality	**62.7**	32.5	2.7	**65**	33	2	**63**	35	2
Services and programs for the elderly	**53.0**	41.9	1.1	37	62	1	44	48	8
Disposing of garbage and trash	49.0	42.9	3.8	**64**	32	4	**56**	43	1
Increasing the supply of affordable housing	43.5	44.5	8.3	**60**	39	1	**52**	47	1
Care for people with physical and mental health problems	48.0	44.9	2.1	38	58	4	48	47	5
Roads, highways, and bridges	31.3	63.8	3.6	33	62	5	43	44	13
The University of Maine and VTI systems	35.3	52.3	7.3	26	56	18	40	56	4
Providing new and existing businesses with employee-training and other development services	32.6	50.9	12.4	31	49	20	47	48	5
Public parks and recreational areas	28.2	63.2	7.1	31	51	18	35	61	4

Which Pocket?

Having expressed a willingness to pay more for certain services even at the expense of higher taxes, respondents were then asked the preferred source of additional revenue in terms of state and local taxes.

Increased property taxes were the least favored method with 47% of the participants preferring increased user fees and 21% preferring a local sales tax in order to fund improved services. Both legislators and high school seniors preferred user fees over other sources of local taxes.

TABLE XIII

IF YOUR TOWN OR CITY GOVERNMENT DECIDED TO RAISE ADDITIONAL REVENUE TO HELP MEET COSTS AND IMPROVE SERVICES, WHICH ONE *LOCAL* TAX INCREASE WOULD YOU PREFER?

	General Public	State Legislators	High School Seniors
	%	%	%
Having a local sales tax	20.6	30	29
Having a local income tax	9.7	15	18
An increase in property tax	9.5	13	14
An increase in user fees for things like using local parks, swimming pools, parking, library use, garbage collection or dump fees, and ambulance service	46.7	42	39

Respondents were also asked which one state tax should be increased to help reduce local property taxes. Approximately two thirds favored increasing cigarette and liquor taxes overall other state taxes including the sales, income and fuel taxes and user fees.

TABLE XIV

IF STATE GOVERNMENT IN AUGUSTA DECIDED TO HELP REDUCE LOCAL PROPERTY TAXES BY RAISING STATE TAXES, WHICH ONE *STATE TAX* SHOULD BE INCREASED?

	General Public	State Legislators	High School Seniors
	%	%	%
The cigarette and liquor taxes	65.6	31	30
The general state sales tax	6.8	23	14
Gasoline and diesel fuel taxes	1.8	2	7
The state income tax	8.0	35	18
Increase user fees for things like the use of state parks, automobile registration, boating licenses, and turnpike tolls	11.5	9	31

Legislators and high school seniors were much more divided on the question. Only 31% of the legislators responding favored an increase in cigarette and liquor taxes with 35% preferring an increase in user fees. Less than an third of the high school seniors would increase cigarette and liquor taxes.

Near Consensus on Tough Choices

A decade ago, the people of Maine were deeply split on a trade-off crucial to the definition of the quality of life in Maine: industrial development to provide better paying jobs or limiting that development to preserve the natural environment. By a 57% to 43% margin they favored more jobs, although the younger respondents clearly disagreed with the majority.

Ten years later, there has been an important shift with nearly 90% of Maine people surveyed favoring the environment over jobs. Although older Mainers are still relatively more "pro jobs" than the younger respondents, older Mainers choose the environment over jobs by nearly a 5 to 1 margin. Thus, during the intervening decade, more than one half of those who were 45 years or older in 1979 have changed their minds about what is more important. This shift, quite obviously, has been heavily influenced by the increasing health of the state's economy and the perceived threats to the health of the state's natural environment.

Among the "tough choice" questions included in the Commission's survey, consensus is strongest on the trade-offs involving the natural environment -- and the consensus is obviously pro-environment.

Supported overwhelmingly are the recycling of trash -- at the cost and bother to householders of sorting their trash, and protection of air and water quality at the cost of more well paying jobs. Limiting development of land at the cost of some landowner rights is also supported although not as strongly: still, 66% favor, without qualification, the "environment side"of that issue.

In other issue areas, a majority of Mainers support trading off some increments of public access to privately held rural and wilderness areas in order to protect landowner rights. A strong majority will pay higher state and local taxes in order to place Maine's schools among the top ten in the country. Nearly two thirds of Mainers want to have more influence over the future of their communities even at the cost of six or seven more hours per week of their personal time.

Maintaining the quality of medical care available in the state at the cost of paying more for medical insurance and Medicare is the only trade-off on which there was no clear, *unqualified* majority position. Doubtless concerned about declining health and increased need for health care, senior citizens are most likely to support the quality care side of the trade-off.

Clearly the basic issues measured in the "tough choices" portion of the Commission's survey yield more consensus than disagreement. More importantly, however, respondents have clearly expressed a willingness to make the tough choices and to invest both personal and financial resources to support the public policy priorities they feel are most important to Maine's future.

PROSPECTS FOR CITIZEN PARTICIPATION IN MAINE IN THE FUTURE

Prepared For
The Commission On Maine's Future

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INTRODUCTION

The need for active participation by all citizens in the political, economic, and social spheres of life is one of the most fundamental tenets of democratic theory (Thompson 1970). Locke and Jefferson early stressed the importance of such participation for a vibrant democracy, and Tocqueville (1945) further noted its significance as a vehicle for political education and as a mechanism for sustaining the equality he saw inherent in democracy. Social theorists have also recognized the importance of widespread participation. Durkheim (1951) viewed it as a corrective for the anomie he saw accompanying contemporary society, while Weber (1947) emphasized its role in preserving the legitimacy of the modern state. More recently, Kornhauser (1959) noted its importance in ensuring that government remains responsive to the needs of the majority.

Reality does not always conform to theory, however, and the actual picture of political participation in the United States is quite different from that assumed by Tocqueville and other observers. Few Americans, as we shall see, ever take part in one of the many forms of non-voting participation available to them. Several problems result from such a low rate of involvement. To the extent that political leaders listen to the voices of the active minority, they may be responding to concerns different from those of the majority that remains silent. Worse, those most in need of government services are, for a number of reasons, those least likely to participate. Their nonparticipation increases the likelihood that their needs will continue to be unmet or only partially fulfilled.

Among its many goals, the Commission on Maine's Future is rightly concerned with enhancing the level of citizen participation in Maine as we move into the next century. This paper seeks to address this objective. To do so, we will first draw on studies of participation to discuss the kinds of people who tend to take part, or not to take part, in the many possible forms of political involvement. We will next discuss the implications of demographic projections for Maine for the variables so identified. An integrative final section will discuss the prospects for citizen participation in Maine in the years ahead, and advance some models for enhancing such participation.

I
CORRELATES OF PARTICIPATION

A large body of literature describes the forms and extent of political participation in the United States, as well as the social and economic correlates of such activity (e.g., Alford and Friedland 1975; Campbell, et al. 1960; Lane 1959; Lipset 1960; Milbrath 1965;), with Verba and Nie's (1972) analysis of a national sample perhaps the most extensive and perceptive work. Almost all studies in this area, however, were published before the mid-1970s and based on research performed in the 1950s and 1960s. Although we do not have more recent research for comparison, we can discuss the possible transitions that have occurred as we near the end of the 1980s. Some of the earlier findings pertain today and we will comment below when we feel they may not.

One line of research has been the identification of the many forms of political participation, and their subsequent grouping into categories based on characteristics such as electoral or non-electoral work, intensity of energy and commitment, individual or joint effort, and the like. This task has not been as simple as it might appear. Students of participation have identified more than a dozen possible forms, including, but not limited to, voting, working for a candidate, attending town meetings, and contacting a local official. Verba and Nie (1972) devised perhaps the most useful such categorization: *voting* in local, state, or national elections; *campaign activity* (working for a candidate, attending campaign meetings, contributing money, and trying to convince others how to vote); *cooperative activity* (helping to form a local group to deal with a community problem, and working with such a group); and *citizen-initiated contacts* (contacting a local, state, or national official about some personal or social issue or problem.)

Whatever scheme used, the identification of the various forms of participation has allowed scholars to determine the extent to which Americans actually take part in these different kinds of activity. The findings from many studies are clear: less than 30% of the public engage in non-voting activities, and only about 10-15% become more than occasionally involved (Milbrath 1965; Verba and Nie 1972). To put it another way, about three-fourths of the public does little more than vote, or doesn't even vote at all. Such findings, as noted above, have dismayed students of democratic theory and raised

questions regarding the representativeness of the concerns to which political leaders respond.

If the activist minority were in fact no different socially and economically from the silent majority, these fears would perhaps be less worrisome. Unfortunately, however, that is not the case. Simply put, the kinds of people who tend to participate are different from those who do not. Since this holds true across the many different forms of political activity, our discussion of these correlates will not distinguish among the different forms. The findings for some correlates are stronger and more consistent than those for others, and we will identify in our discussion those correlates that stand out in this respect.

Socioeconomic Status.

One's position on the social and economic ladder is by far the clearest, strongest, and most consistent determinant of the degree of political participation. Virtually every study of participation has revealed that those at the top of the ladder are much more likely than those underneath to participate in the political arena, be it voting, contacting elected officials, giving money to candidates, or the like. This striking finding holds true for all three traditional dimensions of socioeconomic status: education, occupation, and income. People with higher levels of education are more likely to participate than those with lower levels; people with more prestigious occupations more likely than those with lower-status jobs; and people with higher incomes more likely than those with lower incomes.

Several reasons seem to explain the striking relationship between socioeconomic status (SES) and participation. Those with higher SES are said to have, among other things, a greater sense that their actions will in fact make some difference; higher levels of trust in elected officials; higher feelings of self-esteem and self-confidence; and lower feelings of alienation.

The findings for SES are fundamentally important. If those with lower SES are less likely to participate in the political process, their voices are that much less likely to be heard and heeded. Conversely, the concerns of people with higher SES are more apt to be considered. Such results run counter to the egalitarian ideals of a democratic society. To the extent that citizens of Maine are poorer and less educated than those of many other states, we would expect this to be a special problem in this State. As we move into the next century, it is thus essential that the State find ways of enhancing political participation by

residents with lower levels of education, income, and occupational status. In the final section of the report we will suggest ways of accomplishing this goal. At the same time, changes in the educational, occupational, and income levels of Maine residents in the next twenty years will have important implications for political participation at the State and local levels. This is especially true when migration into the State is taken into account. We will discuss these implications later in this paper.

Gender

In contrast to the findings on socioeconomic status, the data on gender may be less reliable as we approach the end of the 1980s. Twenty years ago the evidence was clear. Milbrath, for example, asserted flatly in 1965 that "the finding that men are more likely to participate in politics than women is one of the most thoroughly substantiated in social science" (p. 135), citing 22 studies from nine countries. Verba and Nie (1972) reported that men in their 1967 study were more likely than women to be politically active, but only slightly so. A national sample of young adults taken in 1973 found a similar small but significant relationship between gender and political activity (Jennings and Niemi 1981).

In the absence of contemporary research, however, it is not clear whether the difference in participation between women and men still remains today. There have been, in many ways, far-reaching changes in women's status in the 15-20 years since the classic literature on political participation was written. As women have gone on to higher levels of education and become more independent socially and economically, it would not be surprising to find that their levels of political participation have increased, and the widely-reported gender gap in the last two Presidential elections indicates that any old notions that women voted or otherwise acted politically like their husbands should best be put behind us. It thus must remain unclear for now how, if at all, gender affects levels of political participation as we reach the end of the 1980s. Of special interest here is the increasing number of single-parent house holds headed by women. This phenomenon has implications for participation that we will explore later in this paper.

Race

Most of the research on race and political participation has compared whites and blacks, and little exists on other nonwhite races, save, perhaps, for Hispanics. We know of no reliable studies of participation levels of Maine's primary minority group, Native

Americans, and it would be premature for several reasons to generalize the results for blacks to Native Americans. The lack of contemporary research on race and political participation compounds the problem. That said, we feel that the findings for whites and blacks from the 1960s and early 1970s would probably still hold true today, and, further, that comparable results would obtain for Native Americans.

The common finding in the literature is that whites are more likely to participate politically than blacks. This seems to hold true in all regions of the country, and applies to voting as well as other forms of political activity. Blacks are said to participate less because of their lower levels of education, income, and occupation, and concomitant lower levels of political efficacy and higher levels of alienation. Verba and Nie's (1972) study emphasized that the racial differences in participation were due solely to the lower SES of blacks, as they found that whites and blacks with similar levels of SES had similar levels of participation, with blacks even having slightly higher participation rates for a few forms of political activity.

We would assume that Native Americans would also have lower participation rates than whites, and, probably, lower participation rates than blacks as well. The latter expectation arises from the lower socioeconomic position of Native Americans compared to that of blacks. It is especially critical that the State take every effort to enhance participation by Native Americans in the years ahead, and we hope that the models discussed later will aid this process.

Age

The findings for age are fairly clear and consistent, and would seem to hold true today. Political participation levels rise as people move into their 30s, seem to peak in the 35-55-year-old period, and decline afterward. The increase in the middle period seems due to a general "settling down"--marriage, children, lengthened residence in a community, and increasing interest in community affairs. The decline afterward has been attributed to worsening health and a general slowing down, though our sensitivity to ageism makes us at least a little skeptical of this traditional explanation for the apparent declining participation levels of those in their late 50s and beyond. Another reason for the lower participation levels of the elderly is perhaps more persuasive; their levels of education have historically been lower than those of younger citizens.

The data on age are especially provocative for an estimation of what the future holds in Maine. As we'll discuss below, the Maine population, like others elsewhere, will be older some twenty years from now, and there will be a particularly marked increase in residents falling into the 35-55 age group, the one with the highest levels of political participation. For this reason, if for no other, we would expect political participation rates in Maine to increase in the next twenty years. On the other hand, the proportion of elderly will also rise. Their expected lower participation rate would partially offset the higher rate expected from the 35-55-year-old group. But the elderly twenty years from now may in fact participate more than their counterparts have done in the past. As we'll discuss below, they will be better educated than their predecessors, since they will be from a generation that has seen markedly higher rates of completion of high school and, especially, college. This would auger well for participation by the elderly some twenty years from now, adding to the increment in participation resulting from the increased numbers of 35-55-year-olds. We will discuss these possibilities at greater length in later parts of this paper.

Rural/urban environment

One final correlate to be discussed here is the rural/urban dimension. Findings comparing urban and rural communities, or examining the impact of community size, are especially difficult to interpret and thus to draw on for estimations of what the future may bring in Maine. Two very conflicting findings may be expected from theory in the field. The greater levels of communication and interaction characteristic of urban communities would suggest greater levels of political participation in these locations (Milbrath 1965). In contrast, the greater sense of alienation and impersonality also said to be characteristic of urban communities would suggest lower levels of political participation in such areas (Verba and Nie 1972). The lower education levels found in rural communities would also suggest that lower political participation levels would obtain there. On the one hand, conflicting empirical findings on the impact of urbanization reflect these conflict ing theoretical expectations. Drawing on a number of studies, Milbrath (1965) reported that urban residents participate politically more than rural residents, although he also noted that some studies had found no difference. On the other hand, Verba and Nie's (1972) careful work found a far more complex picture. After devising a more valid and accurate measure of the rural/urban dimension than that used in previous research, they first found that community type did not affect participation levels. After ruling out the effects of SES, race, and age differences in the various kinds of communities, they then found that people in rural areas and small towns were in fact more likely to participate overall than those

elsewhere. They then determined whether this somewhat surprising relationship held up for each specific type of participation. For voting, rural areas, large suburbs, and core cities had higher rates than other types of communities. Campaign activity was lower in rural communities than elsewhere. On the other hand, cooperative activity, involving working together in groups, was higher in rural areas and small towns than elsewhere. Finally, individual contacting of elected officials tended to be lowest in rural areas and suburbs, and highest in medium- sized cities. As Maine becomes increasingly more crowded and less rural in the next two or three decades, it is thus difficult to predict the repercussions for participation. If the studies cited by Milbrath (1965) are correct, participation rates of all forms in Maine should increase. If Verba and Nie (1972) are correct, voting should decrease, campaign activity should increase, cooperative activity should stay just about the same, and individualized contacts should increase. Overall, we would expect, then, increased rates of most forms of political participation from the growth expected in Maine in the next twenty years, and will discuss this issue at greater length later in this paper.

We now turn to the second section, which explores the implications of demographic projections for Maine in view of the correlates discussed above. We will see that these projections, coupled with our understand ing of the correlates, yield a mixed outlook for enhanced participation in the years ahead even if the State were to take no steps encourage such political activity. Increased political activity by citizens may prove a mixed blessing for elected and appointed officials. While political leaders will benefit from hearing the concerns of an increasing number of people, they may find the concerns competing with one another, with greater potential for alienating one constituency while appeasing another. Furthermore, even with the expected greater levels of political participation, the less privileged in the State in terms of SES and racial and ethnic status will still be those least likely to participate and most in need of the benefits to be gained from such participation. We reiterate our view that the State needs to take every step possible to encourage such people to take part in the political process and to listen to and act upon their needs.

II

DEMOGRAPHIC PROJECTIONS AND IMPLICATIONS

The first section of this paper outlined how educational and socioeconomic variables can affect citizen participation. Compounding these are demographic factors of a population such as the age and sex composition, the rate of natural increase, the rate of in- and out-migration, household composition, and changes in the demographic profile of dependent sectors of the population, particularly the poor and the elderly. In this section we wish to draw attention to how Maine compares to the country as a whole in relation to these factors, and most importantly, how the various counties within the State have and will continue to display different patterns. We then discuss the implications of these patterns and processes for citizen participation in Maine. In particular we focus on:

1. The forms and selectivity of in-migration (labor and retirement) and the implications for the receiving areas; .

2. The nature and extent of out-migration and the implications for the sending areas;

3. The changing experience of women, specifically two counter trends-- the increased participation of women in the labor force, and feminization of poverty; and

4. The nature of the dependent and disadvantaged population.

The Effects of Migration

Maine's population pattern is one of historically slow growth resulting from high out-migration of young adults over the 1950s and 1960s offset by high rates of natural increase, followed by a dramatic increase in growth during the 1970s decade due to a sudden swing toward net in-migration. All Maine counties, except Aroostook, gained population between 1970 and 1980. The period 1980-1987 registered a 5.5% positive population change compared to 7.4% for the country as a whole. About two-thirds of this

TABLE 1

County	Natural Increase*	Net Migration*	Estimated Population by Age Group on 7/1/86 0-4	5-17	18-44	45-64	65+
ANDRO	3.281	-1.657	7.445	19.365	41.267	19.072	14.476
AROOS	4.141	-7.911	7.232	19.327	40.473	17.544	11.655
CUMBE	3.352	2.335	7.878	19.031	44.919	19.444	14.415
FRANK	3.749	2.277	7.429	20.272	44.369	19.897	14.060
HANCO	2.379	3.030	7.793	18.939	41.291	20.306	17.080
KENNE	2.947	-1.048	7.111	18.988	42.149	19.684	13.966
KNOX	1.922	4.657	7.683	19.617	39.987	21.092	18.199
LINCO	2.090	8.186	8.205	21.354	41.742	21.190	17.784
OXFOR	1.833	0.542	6.998	19.397	39.180	21.000	15.800
PENOB	3.601	-2.701	7.025	18.239	44.860	18.899	11.878
PISCA	2.325	-0.215	6.998	20.296	38.403	20.262	16.151
SAGAD	5.998	4.185	9.800	23.261	45.338	18.861	12.922
SOMER	2.926	1.592	7.527	20.968	40.769	20.704	14.549
WALDO	3.611	2.390	7.806	21.908	43.035	19.874	13.377
WASHI	1.968	-4.940	6.558	18.703	36.848	19.352	15.568
YORK	3.713	9.907	8.164	22.728	46.778	20.692	15.258

*As percentage of 1980 population.

Source: Population Estimates: Maine 1986. Office of Data, Research & Vital Statistics.

growth was due to natural increase, and about one-third due to in-migration. However, these figures conceal the variation in experience by county.

The population projections for 1980-1986 predict growth through natural increase for all counties in the State ranging from 1.9 to 5.9%, a considerable variation which reflects the different socio-demographic structures of the counties. Even more significant, however, is the range in migration flow from 7.9% out-migration for Aroostook County to 9.9% in-migration for York County (see Table 1). The consequences of migration for societies lie in the selectivity of migration. Migration is selective of the young, the skilled, and the better educated. These qualities are ones which are traditionally associated with high levels of citizen participation. Hence, out-migration represents a loss to communities of those qualities and in-migration a gain. In-migrants also tend to assimilate to their new communities by over-involvement in voluntary associations. Studies by Ploch (1988) demonstrated such a trend for those who migrated into Maine in the late 1970s. Added to this effect is the stimulus to economic and demographic growth brought by in-migration. As well as simply adding to the population in terms of their own numbers, in-migrants, being generally of a younger age group, add through their higher levels of fertility. The opposite experience is true for those areas losing population; they lose population both in the short and long term.

Two forms of in-migration which are significant for communities in Maine can be identified--labor migration and retirement migration. These migrant bodies are distinctly different both from each other and from the resident population. Spatially, the retirement migration is distributed along the coastal areas of the State, while the labor migration is distributed along the I-95 corridor. The retirement stream differs from the labor stream, not just in the obvious characteristic of age, but also in household size and in the fact that they have associations with Maine, many having owned second or vacation homes in the State. In this last respect they are less "alien" than the labor migrants to the year-round residents of Maine.

The most recent study of in-migrants to Maine during the years 1975- 1983 (Ploch 1988) showed that they were more highly educated than the resident population (two-fifths or more were college graduates) and predominantly from a professional or managerial background--qualities associated with high citizen participation. If recent inmigrants continue to become involved in local and voluntary activities to the same extent as their

predecessors in the late 1970s, then they can be considered assets and a force which can strengthen the political and social structures of the communities in which they settle. However, it must be cautioned that resentment and/or resistance to "outsiders" can be felt by locals, particularly if in-migrants are associated with uncontrolled growth and rising prices of land and housing. This is less likely to occur in the case of retirement migration where ties with the local communities already exist.

In contrast to those areas experiencing economic and demographic growth, areas such as Aroostook County have experienced sustained out- migration. Here the selective forces of migration have removed the younger and more educated and skilled citizens and contributed to an older and more rapidly aging community. Traditionally such effects on a sending community are associated with a reduction in morale and involvement in provision for the future of the community.

In common with the rest of the country, Maine will experience a slowing down of natural growth and will assume a more elderly age profile (as of 1986, 13.3% of Maine's population was over 65 years of age, higher than the national figure of 12.1% and ranking 13 in the country in its percentage share of the elderly), but these effects are more likely to be felt in areas which have already been depleted of their younger citizens. Even where two areas have the same proportion of its population over 65 years of age, one can expect considerable differences in attitudes and citizen involvement where one area's elderly are dominated by retired college-educated, ex-professionals with a secure income or pension, and the other area's elderly are dominated by less well-off, less-educated folk who have remained behind after their children have migrated. In part, of course, this may be offset by traditional virtues of self-reliance and strong local bonds to the community. However, it is significant that out- migration is associated with high levels of unemployment and low average incomes, all of which depress a community's morale.

Migration is notoriously difficult to predict, particularly in- migration. Both forms of migration are sensitive to changes in economic development. It may well be that as the country's population grows, more elderly rates of mobility will decrease. However, as long as the State continues to experience differentials in growth and development, migration will not only redistribute skills but also levels of active involvement in local and State affairs. As the State's population ages in future years it will also become increasingly important to attract and hold onto the young, able, and skilled.

Women Citizens--Contrasting Trends

In common with the rest of the country, Maine is experiencing two trends which directly affect its female population and their potential participation as citizens. The first trend concerns women in the work force. Nationally the most significant change in work force has been the greatly increased rates of participation of married women. As of 1986 women comprised 47% of Maine's labor force compared with under 30% only 30 years ago. This greater participation in paid work outside the home, along with reduction in family size, has contributed to their growing independence and, arguably, confidence, as individuals who are able and willing to become involved in community activities. Ironically for some women, particularly those expected to assume full domestic responsibilities as well as their paid employment, the greater demands on their time resulted in reduction of voluntary activities. State are still concentrated in clerical, retail, and service sectors--traditionally the lowest paying jobs in the economy. (In 1980 one-third of women below the poverty level were employed in the service sector.) Median income for women is substantially below that of men, even where educational levels are higher. Issues of economic independence, viability, and economic power are thus important issues and are likely to be reflected in rates of citizen participation.

One of the most significant trends likely to disadvantage women in the State, and significantly reduce levels of participation is the feminization of poverty. Although the figures for Maine are not as high as those for the country as a whole, partly because of the more familial nature of rural poverty, the growing numbers of women in poverty is both significant and growing. The poverty rate is greater among women at all ages. Females account for 58% of the poor, but only 52% of the total population of the State. Furthermore, women in at-risk groups such as the elderly and single parents are growing as a proportion of the population. This is due to two trends. First, the population as a whole is aging, and women, who have a longer life expectancy, constitute a growing proportion of that population. Second, as more marriages end in divorce, and marriage rates decline, single-parent, female-headed households increase. In both cases there are higher rates of dependency and significantly reduced earning capacity.

As was pointed out in the 1984 report on poverty in Maine (Benson 1984) dependence on public assistance has a profound effect on the individual and on his/her perception of self-worth and self-determination--factors which adversely affect rates of involvement and participation in community and local affairs. The implications of this are important not only

for those women below the poverty line (or indeed all heads of households who fall into this category) but for the children in such families. In 1980 the 15% poverty rate among children climbed to nearly 50% among female-headed households. The young cannot vote nor directly participate in decisions which affect their future but the circumstances in which they grow up directly affect their attitudes toward power, participation and their role in the decision-making process. In terms of the future participation of these citizens of Maine, the importance of the childhood environment needs to be recognized.

The Nature of the Dependent Population

A dependent population can be defined in two ways--demographically (those under 18 and over 65) or economically (those dependent on state or other welfare and aid agencies). Frequently the two overlap as in the case of elderly dependent on social security. Maine has a higher than national rate of both individuals below the poverty level and elderly. Because of a dearth of information on poverty since the 1980 census it is difficult to establish the current trend in poverty levels in the State. Surrogate measures such as employment statistics are unreliable because of the seasonal and short-term nature of much employment in Maine. In common with many other rural states, many of Maine's poor are working poor. All that was discussed in the previous section regarding the short and long term effects of dependence applies to the general population of poor. Compounding these effects is the generally recognized fact the dependence on welfare in rural areas carries greater stigmatization than in urban areas because it runs counter to traditional rural virtues of self-reliance and independence.

One trend which is very evident is the growing significance of the numbers of Maine's elderly, many of them rural elderly. The effects of this trend will be most acutely felt in the decade 2000-2010 as the baby-boomers reach retirement age. The detailed effects of this have been noted elsewhere (Sherwood 1988). What needs to be pointed out here is: 1) that levels of "life satisfaction" among the elderly will be reflected in levels of participation, and 2) that we will most likely have to rethink many of our ideas concerning appropriate needs and roles of the elderly. It is significant that the Federal Administration on Aging has recommended that a number of objectives should be met at the *community level* in order to help older people live meaningful independent and active lives. Among these are:

1) the need to provide a range of options for services and opportunities that respond to the talents and needs of older persons in each community; and

2) the need to assure collaborative decision-making among public, private, voluntary, religious and fraternal organizations, and older people in each community in the development and maintenance of systems of services for older persons.

These objectives are particularly relevant to a rural state such as Maine where population is dispersed throughout many small communities.

The increasing burden of a dependent elderly population is often discussed these days. What is less generally recognized is the extent to which there may be a need to depend on the elderly population as we are increasingly faced with labor shortages and other personnel shortages, for example in voluntary associations. The need to maintain a healthy, independent, active and involved population of older people is all the more necessary as we move toward the future.

Demographic and socioeconomic changes all affect the structure of opportunities of individuals, both inside and out of the local community. In order to maximize these changes and any potential development in the State in terms of future citizen participation, we need to allow for and encourage planning and participation of all those affected by change. Genuine "grassroots" participation may not always be easy to achieve, but it is particularly relevant and important for peoples and communities which frequently feel more than physically remote from the decision-making process. Efforts in this direction can have considerable impact on the decision of people whether to remain or leave a community or state and, more importantly, whether to remain active or passive members of that community or state.

MODEL 1

PARTICIPATION IN A REPRESENTATIVE SYSTEM

Process of decisionmaking	**Locus of control**	**Direction of power and decisionmaking**
Representatives make decisions with little or no direct input from constituents	Rule for the people	Top down decision-making and rule
Representatives seek public information and input, then make decisions (legislative and public hearings, letters other communications from constituents, lobbyists for interest groups	Still rule for the people, but of the people	
Representatives work with local citizens at the smallest representative unit to identify priorities and make decisions --citizens make decisions and representatives carry them out	Rule by the people, for the people	Bottom-up rule and decision-making

Model synthesized from Held, 1987; Held and Pollitt, eds., 1986

III

PROPOSALS FOR CITIZEN PARTICIPATION

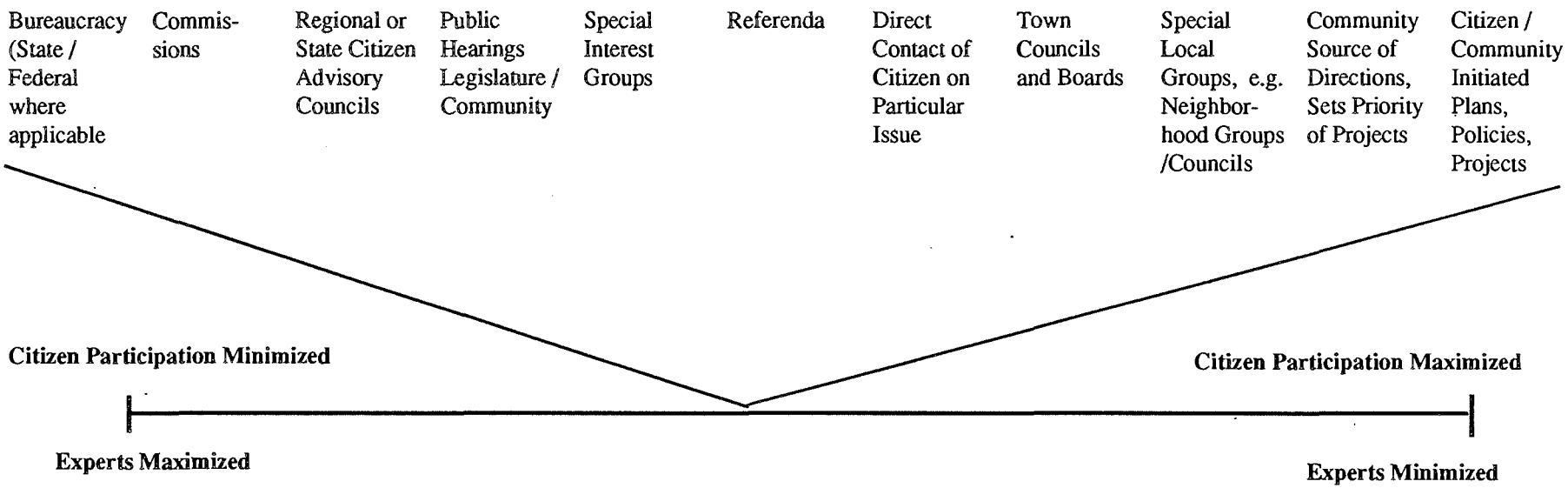
Some social analysts argue that U. S. citizens have lost confidence in their voices being heard and in their actions really making a difference. "What difference does it make if I conserve my use of plastic and recycle my wastes if large businesses are pouring their toxic wastes into my river and the ground in my community?" These analysts argue that the development of large-scale systems of government, institutions, and production (centralization, bureaucratization and industrialization) have led to the locus of control moving further and further from individual and community lives.

As the locus of control has changed from household workplace, and community to conglomerates, the state and national level (and global level--witness the oil "crisis"), so has the locus of responsibility. People who feel less and less control over their lives, feel less and less responsible for themselves and those around them.This has led to growing nihilism in our culture, a "meism" which focuses more on personal gain than on responding collectively to meeting human needs, more on immediate gratification than on long-term implications of our current approaches to living.

Futurist authors (Naisbitt 1982, Toffler 1980, Ferguson 1980, Gowan, et al. 1976) as well as the 1977 Commission on Maine's Future Final Report, cite the American tradition of active citizen involvement in working for positive change as the foundation from which we must build our future. In the words of the 1977 Commission on Maine's Final Report: "We in Maine have a tradition of government that recognizes the value of the individualthe Commission believes that Maine citizens must be encouraged to rekindle that spirit which motivated their forebearers to keen interest and vigorous participation in the affairs of their government" (p. 89).

As the data presented in the previous sections indicate, some strata of the citizenry participate more than others. Therefore, one of the primary questions we pose in this section is how do we increase and enhance not only participation of citizens in general, but specifically those citizens who are outside or marginal to the democratic process?

MODEL 2
CITIZEN PARTICIPATION BY ORGANIZATIONAL FORUM



Model adapted and expanded from DeSario and Langton, 1987, p.217.

Options for Future Citizen Participation

Models of democracy depicting the role of citizens in governance and in policy formation have been proposed, critiqued, reformed, and contested since ancient times (see especially Held 1987, and Held and Pollitt, eds. 1986). We have chosen to focus on those forms of citizen participation which vary according to the type and degree of the participation, and the level at which planning and policy are being developed. The models which we are presenting identify separate continua of participation: (1) levels of participation in the representative process; (2) locus of initiation and control of issues, policies, and projects; (3) gradations of citizen participation.

The first model (p.16) assumes that representatives are elected through the democratic electoral process. It identifies the source of decision- making and the consequent control over policy.

The second model (p. 18) compares the extent of citizen and expert participation when using various organizational units for initiating and setting policies. This model does not assume that all organizational forms are available for each issue, rather it presents the range of possibilities that are currently used across various issues.

The third model (pp. 20-1) identifies eight distinct types of citizen involvement, on a scale representing the *actual* amount of influence and power citizens can exercise as they participate.

As we apply the data from the previous sections to these models, we propose that our current system of decision-making and governance in Maine tends more toward: Model 1: top-down decision-making and rule; Model 2: the left end of the scale with an emphasis on influence from special interest groups through bureaucratic dominance when setting priorities for policy and action; Model 3: nonparticipation and tokenism, especially when we consider those groups of citizens in lower participation categories (lower SES, Native American and other minorities, the aging, single mothers, and rural dwellers).

Our primary thesis is that citizens need to feel that they can exercise some control over their lives--that they are empowered--before they will participate in their governance. When we see decreasing voting rates, and differential participation on other measures (cited in the

MODEL 3

CITIZEN PARTICIPATION ACCORDING TO LEVEL OF INFLUENCE/POWER

8 Citizen control

7 Delegated power — **Degrees of citizen power**

6 Partnership

5 Placation

4 Consultation — **Degrees of tokenism**

3 Informing

2 Attitude adjustment

1 Cooptation — **Nonparticipation**

** *Model and text adapted from Dale, 1978, pp. 12-13.*

EXPLANATION OF CATEGORIES

1. Cooptation

"In the name of citizen participation, people are placed on rubber-stamp advisory committees to 'educate' them or engineer their support. Participation is distorted into a public relations vehicle by power-holders." Example: community action agencies for poverty areas which create neighborhood councils with no legitimate function of power.

2. Attitude adjustment

Under this kind of "citizen participation," a bureaucratic administration assumes that powerlessness is synonymous with inability to manage one's life, to make conscientious decisions about one's self and one's future. "This form of citizen participation is both dishonest and arrogant.. Under the masquerade of involving citizens in planning, the experts subject the citizens to clinical group therapy." Common examples are when tenants in public housing are brought together to help them "adjust their values and attitudes to those of the larger society. Under these ground rules, they are diverted from dealing with such important matters as arbitrary evictions why it takes three months to get a broken window replaced in winter." Instead, the bureaucrats spend time on "improving the tenants' attitudes" regarding their crowded conditions and their responsibility for the denigration of the housing.

3. Informing

Information about rights, responsibilities, options, and methods is a necessary part of citizen involvement. However, information flow often becomes one-way from official to citizen without any channel provided for feedback and any power for negotiation. "Excessively technical information, discouraging questions, and irrelevant answers are common tactics for turning meetings into vehicles for one-way communication. Also, information may be presented at a late stage in planning, giving people little opportunity to influence the program design 'for their benefit.'"

4. Consultation

"If consulting is not combined with other modes of participation, it offers no assurance that citizen concerns and ideas will be taken into account. Attitude surveys, neighborhood meetings, and public hearings are frequently used to consult people. If citizen input is restricted at this level, participation remains just a window-dressing ritual with people primarily perceived as statistical abstractions."

5. Placation

In the placation mode, a few hand-picked "worthy" class or minority representatives are placed on boards of community agencies or on public bodies like the Board of Education or the Housing Authority. Therefore, the "citizens begin to have some degree of influence, though tokenism is still apparent.. If they are not accountable to the constituency in the community and if the traditional power elite hold the majority of seats, the have-nots can be easily outvoted and outfoxed. Other communities allow citizens to advise or plan, but retain for powerholders the right to judge the legitimacy or feasibility of the advice."

6. Partnership

In this participation mode, "power is redistributed through negotiation between citizens and powerholders. They agree to share planning and decision-making responsibilities through such structures as joint policy boards, planning committees, and mechanisms for resolving impasses." Once the ground rules have been established through a negotiation process, they are not subject to unilateral change.

7. Delegated power

Negotiations between citizens and public officials can result in citizens achieving dominant decision-making authority over a particular plan or program. At this participation level, citizens have a clear majority of seats and genuine specified powers on policy and planning boards, and their acknowledged influence is sufficient to assure accountability of the program to them.

8. Citizen control

Citizens have a sufficient degree of power (or control) to guarantee "that participants or residents can govern a program or an institution, be in full charge of policy and managerial aspects, and be able to negotiate the conditions under which 'outsiders' may change them."

previous sections), those groups with lower participation are in need of new and different approaches if their input is to be an integral part of the decision-making process.

Citizen participation is generally defined as active involvement in those structures which give the person a voice in decision-making: cast ing a vote, attending town meetings, attending and speaking at public forums and hearings, belonging to voluntary organizations. (It will be noted that these categories emphasize Model 2 only.) .

Two problems emerge from this approach: (1) These structures for participation do not include lower socioeconomic groups because these groups do not have a sense of political efficacy. Beyond this feeling of powerlessness that is the daily companion of the poor, these groups often lack the writing, organizing and speaking skills necessary to participate in the traditional political system. (2) These structures for involvement are restricted to government, and do not encompass the other social, economic, and cultural aspects of citizens' lives which are coming to be considered equally important for citizen participation.

(1) Empowering low-participation groups

Two conclusions can be drawn from the participation models presented above: (a) if we continue to use only the current structures for citizen participation (voting, public forums/hearings, etc.) we continue to support a system of decision-making and governance supporting participation amongst those in middle to high socioeconomic standing, whites, males, and the mid-range age groups; (b) if we are to increase the involvement of disenfranchised groups, we need new forms of interaction between government and citizens.

In the previous sections we have shown that citizen participation is lower amongst those of lower social class standing, minorities, the aging, and variable for women and rural/urban dwellers. As Dale (1978:11) has pointed out succinctly "Citizen participation is a categorical term for citizen power." Therefore, improving citizen involvement means orienting modes of participation toward those parts of the above models which place more direct control (i.e., power) with those citizens who previously have been peripheral to the planning and decision-making process. This would mean a move toward:

- more "bottom-up" decision-making (Model 1);

o more reliance on those policy and project forums that maximize idea generation and adoption of strategies originating with the citizens (this approach requires a redefinition of the roles of experts as resource persons and trainers rather than as decision- makers) (the right-hand half of Model 2);

o partnerships (between citizens, representatives, the private sector, and government offices), more decision-making influence (power) delegated to currently disenfranchised citizens, and more direct citizen control ("Degrees of Power" in Model 3).

The arguments for moving in these directions have been presented by many writers (Naisbitt 1982; Greenleaf 1977; Freire 1985; and others). These authors document the successes of improving the lives of disadvantaged groups significantly when these new modes of involvement have been earnestly implemented. In addition, the authors reiterate the interactive relationship between (1) gaining a sense of more control over one's life that happens when a person becomes more involved in guiding decisions, and (2) raising self-esteem, confidence, and morale, and (3) increasing participation and trust in the governance process. Therefore, these authors recommend refocussing our efforts away from doing *for* these populations to doing *with* them. This "doing" rhetoric has been around for a long time. The continuing question remains: What is needed to move in this direction?

First, it is a common argument when discussing involvement of lesser participating citizens, that these citizens do not have the skills and knowledge, in an increasingly complex society, to understand the issues and make knowledgeable and reasonable decisions. This very argument, therefore, disenfranchises all citizens, but especially already lower-status members of our society. Those who present this argument, propose that decisions are best formulated and made by those who have been especially trained, i.e., by the experts--planners, bureaucratic administrators, professional service people, etc. Those who support moving toward a more active citizen participatory system argue that citizens are the best experts regarding their lives, their needs and their communities. These citizen participation proponents propose a diversion of resources from the traditional bureaucratic decision-making personnel who currently make the decisions, to newly-developed methods for providing opportunities for citizens to learn skills in planning, problem solving, strategy development, resource attainment, and project implementation. The experts, in this process, take on new roles as guides, facilitators, and resource persons assisting the citizens in learning the planning and development stages and carrying them out. (Methods

of participatory planning and development have been used successfully for citizen-involved and citizen-implemented community development for several years in Appalachia and in the Mid-west. In the State of Maine, the Cooperative Extension Service already has a division--the Institute for Community Leadership and Development--devoted to assisting citizens in developing participatory and leadership skills. (See attached article, Appendix II.)

Second, legislators and government officials often express the worry that if we move to a truly more participatory model and involve currently disenfranchised citizens more extensively in the decision-making process, decisions will never get made, or they will be made so slowly that they will be irrelevant. On the other hand, critics of the current system of governance as being too remote and therefore ineffectual, ask: When decisions are made without citizen knowledge, insight, preferences, and input, are they useful for improving the lives of citizens, or do they end up perpetuating and even exacerbating the situation they are trying to rectify?

Third, and perhaps most importantly, opponents of moving toward more direct modes of citizen participation fear a concomitant reduction in the power of those currently involved in decision-making--i.e., other citizen and interest groups, bureaucrats, legislators, etc. This argument assumes that power is a scarce resource, and if some have it, others can't--a "zero-sum" approach. As the models presented previously indicate, all persons can be involved in participation, yet certain elements of our citizenry are not involved to the greatest extent possible. Futurists outline an already emerging paradigm of power and politics which has been summarized by Ferguson (see Appendix I). This paradigm emphasizes cooperative and collaborative strategy building, consensual decision-making, self-help, and mutual-help networks for problem resolution, a win/win orientation, etc. It is these new approaches that many experts see as the path "back" from centralization, fragmentation, and exclusionary politics to a more egalitarian democratic governance.

(2) Expanding the scope of citizen participation

Current and futurist writers have broadened the definition of citizen participation to active decision-making involvement in those aspects of one's daily life which are most essential to personal wellbeing, i.e., work, education, health, environment, basic needs (housing, food, clothing). Therefore, in proposing directions for Maine's future, the focus

of change is not just on political involvement, but on promoting and supporting those systems of health care, education, work, etc., which encourage active personal involvement and engagement and which foster citizen empowerment. We consider these areas inextricably interconnected, and cannot address the issue of citizen participation without addressing the changes in all these areas. Put another way, the goal of proposals regarding citizen participation should identify the ways in which democratic politics can enable citizens to more effectively shape and organize every aspect of their own lives. If citizens--all citizens--are to participate in these additional social and economic spheres of their lives, there will need to be new forms of citizen participation. These new forms can include, for example, integrating retirees into the educational system to teach youth about the world of work, life histories, etc. (Naisbitt 1982). (This approach provides continued involvement of our aging population in community activities, and also reduces the possibility of conflicts anticipated in the future when the increased older population will be bearing a larger tax burden for schools which their children no longer attend.) Further, new forms of participation can be: cooperative day-care centers; small-scale worker-owned businesses; tenant controlled housing; community recycling projects, etc. Government can be involved in the development of these new forms through facilitative legislation, economic incentives, and providing resources for citizen training in developing and carrying out these programs.

These new forms of participation will need to guarantee that each citizen's voice counts, as much as the current influential and monied voices, in organizations and in the community. This brings up an issue seldomly addressed in discussions of democratic processes and citizen participation: the role of the private sector. And yet private businesses and interests are an integral, though most often separate, entity in the decision-making process.

> Many times the decision-makers we would like to reach are not public officials, but corporate executives who have no direct accountability to the general public. The world is small enough that problems anywhere affect us and large enough that advantaged people, nations or corporations may be tempted to turn their back on the consequences of their decisions for less fortunate people (Dale 1978:44).

As a consequence, the private sector is cast in an adversarial relationship, with competing company interests often conflicting with the common interests of the community. The relationship that results is one in which the citizens feel relatively powerless because they have neither the human nor monetary resources to "go up against

the corporation."(Local businesses, especially large corporations as single employment sources in communities, also use the community's economic dependency on them as a source of further control in negotiations for change.) New modes which would work toward minimizing the power disparity between business, government, and citizens can be drawn from Ferguson's paradigm (Appendix I).

In order for citizens to feel that they have some control over this part of their lives, government can facilitate the empowerment of communities by introducing policies which require the private sector to work *collaboratively* with the community and which establish the community's and citizens' rights to set boundaries.

New forms of participation need to foster equal partnerships between governing bodies, the citizenry, and the private sector in order for us to successfully make inroads into such areas as environmental pollution, land development, supportive job opportunities, affordable housing, health care, etc. If citizen participation is to make a difference in the future, new skills in cooperative planning, strategy setting, problem analysis, problem-solving, and conflict resolution need to be developed by all parties.

IV
SUMMARY

Citizen participation is our scarcest resource in today's governing system. As a result of citizen disenfranchisement an increasingly complex and unmanageable society, citizens become involved in politics in a fragmented and often self-interested manner. This has led to the populist movement (Boyte, Booth, and Max 1986), with interest groups involved in more and more polarized and competing demands for action. To which faction does the politician listen? How does s/he make a decision?

As we talked in the first section about increasing political activity of those groups not currently strongly represented, we raised the problem that political leaders may face in dealing with increasingly competitive and contentious positions of these newly-empowered peoples (p. 10). One thing that has become apparent from looking at new models for citizen participation is that we need to consider whole new ways of restructuring the power relationships between those persons/groups working toward change. *A common theme in citizen participation literature is that: Change for groups of minority and disenfranchised status cannot happen until these groups are integrally involved in decisions regarding the directions of that change.* The underlying value of this statement is: Each person, citizen, has valued ideas and needs. If this person (or group of persons) gets power, this does not mean that others lose, it means simply that all are participating. Further, the new restructuring focuses on identifying common needs and working within a cooperative, rather than a competitive, political environment in meeting those needs. In conjunction with restructuring, there will be a need for a greater use of different conflict resolution techniques, e.g., mediation, collaborative decision-making, etc. These new methods have already been introduced into the Maine court system (divorce mediation), and there is an ever-increasing number of people in Maine from all walks of life trained in these new techniques.

In much of the third section of this paper we discussed citizen participation in general, with only a few references specifically to Maine. There are three areas which warrant further clarification because of the unique characteristics of the State of Maine.

First, Maine is predominantly a rural state. However, as our discussion of citizen participation trends in the first section indicates, many of the current avenues for participation (voting, party activity, attending/speaking at public hearings, etc.) are utilized more by urban citizens than by rural citizens. In contrast, our findings also show that rural citizens are more likely to get involved in cooperative activities (p. 9). These findings, therefore, point to the need to support and put in place the participatory models proposed here, especially for rural areas, or citizen participation and consequently political decision-making will be dominated by "urban" perspectives and needs.

Second, our findings and anticipated trends regarding the differential effects of migration on communities (section 2), suggest that there is a need for a varying use of participation models, depending on the community and changing populations. A community that is experiencing an influx of more highly educated retirees will need a different kind of structure for involving citizens in the affairs of the community, than a community that is experiencing a heavy out-migration of the younger workforce with a large number of indigenous aging remaining as a majority in the community.

Third, the Native American population in Maine continues to suffer from lack of representation and lack of clear avenues for participation in governance in both its own communities and in the State. The models presented in section 3 above allow for social and cultural pluralism. They, therefore, can provide a framework for increasing the involvement of Indians in setting development courses that will enhance their control over their immediate lives and environment while, at the same time, maintaining the basic integrity of their culture and their relationship to larger issues of participation in governance in the State of Maine.

Mainers, often with a mixture of chagrin and pride, comment that "Maine is 10 years behind the times." Indeed, Maine has not become as industrialized, centralized and bureaucratized--and therefore as disenfranchising and disempowering--as other states and regions of the country. However, many of the areas identified for planned and sensible growth by the previous Commission on Maine's Future over ten years ago, remain areas of concern today. Does this mean there has been a lack of statewide attention given to these issues, or that there needs to be further stimulation of citizen awareness and involvement in order for there to be progress?

Citizen involvement can be predicted on the basis of the degree to which the citizens believe that they can make a difference or gain results. Empowered citizens will be citizens working for community as well as for themselves. If there is equality of results arising out of citizen efforts, there will be equality in sharing of responsibility for the future by these citizens.

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APPENDIX I

lieve we will forget our roots. When I was being sentenced by Judge Julius Hoffman at the end of the Chicago trial, he looked bemusedly at me and said, "A smart fellow like you could go far under our system."

Who knows, Your Honor, perhaps I will....

THE EMERGENT PARADIGM OF POWER AND POLITICS

Obviously there are many heresies in the emergent paradigm. It denies that our leaders are our betters, that money can solve many problems, that more and better can solve problems, that loyalty outranks inner authority. The new paradigm avoids head-on confrontation, political poles. It reconciles, innovates, decentralizes, and does not claim to have the answers. If we were to summarize the paradigms, we would find the following contrasts:

ASSUMPTIONS OF THE OLD PARADIGM OF POWER AND POLITICS	ASSUMPTIONS OF THE NEW PARADIGM OF POWER AND POLITICS
Emphasis on programs, issues, platform, manifesto, goals.	Emphasis on a new perspective. Resistance to rigid programs, schedules.
Change is imposed by authority.	Change grows out of consensus and/or is inspired by leadership.
Institutionalizes help, services.	Encourages individual help, voluntarism, as complement to government role. Reinforces self-help, mutual-help networks.
Impetus toward strong central government.	Favors reversing trend, decentralizing government wherever feasible; horizontal distribution of power. Small focused central government would serve as clearinghouse.
Power *for* others (care taking) or against them. Win/lose orientation.	Power *with* others. Win/win orientation.
Government as monolithic institution.	Government as consensus of individuals, subject to change.
Vested interests, manipulation, power brokerage.	Respect for the autonomy of others.
Solely "masculine," rational orientation, linear model.	Both rational and intuitive principles, appreciation of nonlinear interaction, dynamic systems model.
Aggressive leaders, passive followers.	Leaders and followers engaged in dynamic relationship, affecting each other.
Party- or issue-oriented.	Paradigm-oriented. Politics determined by worldview, perspective of reality.
Either pragmatic or visionary.	Pragmatic *and* visionary.
Emphasis on freedom from certain types of interference.	Emphasis on freedom for positive, creative action, self-expression, self-knowledge.
Government to keep people in line (disciplinary role) or as benevolent parent.	Government to foster growth, creativity, cooperation, transformation, synergy.
Left versus Right.	"Radical Center"—a synthesis of conservative and liberal traditions. Transcendence of old polarities, quarrels.

ASSUMPTIONS OF THE OLD PARADIGM OF POWER AND POLITICS	ASSUMPTIONS OF THE NEW PARADIGM OF POWER AND POLITICS
Humankind as conqueror of nature; exploitive view of resources.	Humankind in partnership with nature. Emphasis on conservation, ecological sanity.
Emphasis on external, imposed reform.	Emphasis on transformation in individuals as essential to successful reform.
Quick-fix or pay-later programs.	Emphasis on foresight, long-range repercussions, ethics, flexibility.
Entrenched agencies, programs, departments.	Experimentation encouraged. Favors frequent evaluation, flexibility, ad hoc committees, self-terminating programs.
Choice between best interest of individual or community.	Refusal to make that choice. Self-interest and community interest reciprocal.
Prizes conformity, adjustment.	Pluralist, innovative.
Compartmentalizes aspects of human experience.	Attempts to be interdisciplinary, holistic. Searches for interrelationships between branches of government, liaison, cross-fertilization.
Modeled after Newtonian view of the universe. Mechanistic, atomistic.	In flux, the counterpart in politics of modern physics.

APPENDIX II

From: Explorations (A Journal of REsearch and Public Service at U. Maine, Vol. 5, 1: 1988.

ICLAD

The Institute for Community Leadership and Development

by Jim Killacky and Deb Burwell

The Institute for Community Leadership and Development (ICLAD) is a clearinghouse and coordinating force for leadership education in Maine. Its roots are deeply and richly embedded in three major developments all concerned with the well-being of the people of the state of Maine. These developments are the founding and implementation of the land-grant University of Maine and later its Cooperative Extension Service; the New England Regional Leadership program (NERL), which since 1981-82 has been providing training for a number of emerging leaders in Maine, and a Cooperative Extension needs assessment, conducted to develop its current four-year plan of work, which identified community leadership as a pressing need for people in Maine. The Institute for Community Leadership and Development plays a major role in responding to this need.

ICLAD embraces leadership as an empowering process. Such a view was not central as recently as two decades ago, but views of leadership are evolving. *Collaboration, cooperation and inclusion* are among the current foci of attention as each of us grapples with increasingly complex issues. Both the popular and academic literature are replete with examples. In a recent in-depth feature, *Who Runs Maine*, the **Maine Times** persuasively argued that control of the state is no longer vested in a few male power holders but is much more widely dispersed.

Alexander Astin, a giant in the field of higher education, noted recently that while competition has been central in American education a shift to cooperation is essential. Collaborative learning's most important feature is that *It facilitates the development of teamwork skills and encourages the individual student to view each classmate as a potential helper rather than a competitor* (Astin, 1987, p. 17). Russell Mawby, Chair of the Kellogg Foundation's Board of Directors, wrote in the last annual report

> *Whereas the role of the Foundation was once limited to the relatively passive one of helping to nurture the good ideas of others, now we must often play the more interactive part of catalyst to spark cooperation among diverse organizations and professions.*
>
> (Mawby, 1987, p. 2)

Jim Killacky is a Community Development Specialist for the University of Maine Cooperative Extension Service.

Deb Burwell is Executive Director of the Institute for Community Leadership and Development (ICLAD) with the University of Maine Cooperative Extension Service.

John Gardner writes

> *Team leadership enhances the possibility that different styles of leadership can be brought to bear simultaneously. No one knows enough to perform all the functions in our most demanding leadership posts today. The best leader is one who insures that the appropriate talent and skills are built into the team.*
>
> (Gardner, 1986, p. 16)

The Institute for Community Leadership and Development (ICLAD) views team leadership with its concepts of collaboration, cooperation, and inclusion as central in its leadership education role in Maine. In addition to providing coordination for and between the varying CES leadership activities, ICLAD plans to work with community groups, organizations, Extension faculty and staff in providing and facilitating leadership education.

Some of the key elements and characteristics in our leadership activities are the following:

Effective Listening Skills: How many times do you go to a meeting and feel that you have not been heard or that what you have to say is not worth saying because you won't be listened to? If the answer is *frequently*, then you are not alone. One of the key ingredients for effective leadership is the ability to listen attentively, and yet this is a trait that is often assumed to be in place when, in actual fact, training is very much needed.

Establishing Operating Procedures is a vital part of any leadership activity. These are procedures that can be agreed upon by the group or staff and include items such as how agendas are established, norms by which the meeting will be run, and how long the meeting will last. For people moving into leadership roles such skills are essential, and even for those who have been in these roles for some time, refreshers are useful.

Appreciating and Understanding Differences: The leadership model espoused in this presentation is one that calls for collaboration and cooperation among a range of groups, individuals and organizations. It is, therefore, vital that we engage in processes that will genuinely allow us not only to understand and appreciate differences, but to create a climate which will allow each of us to express honestly our differences and get beyond them so that collaboration and cooperation can occur. This calls for establishment of trust among participants and will lead to the giving and accepting of honest feedback.

Understanding Community Power and Structures: If the leadership activity is in the realm of the neighborhood, the community, or even beyond in the state, region or nation, an understanding of community power, the structure of community organizations, how public policy is made and implemented, is a key ingredient in the portfolio of an effective community leader.

Group Leadership and Process Skills: Leadership and group work are inseparable. In addition to the characteristics already noted, many of which occur in group settings, a group leader who is skilled in cutting off, drawing out, shifting or keeping the focus, will have mastered many of the essential ingredients of effective group leadership.

These are some of the major characteristics of leadership which will be addressed by ICLAD as we move forward in meeting the leadership needs of the people of Maine. The ICLAD Board of Directors has made a serious commitment not only to provide the most effective leadership training possible, but to model this leadership in its own day-to-day operations as we shall see in the case study of the board that follows.

The ICLAD Board and its work

Working with a concept paper and a commitment from UMaine's Cooperative Extension Service, the ICLAD Planning Committee set out with the task of developing an organization to deliver leadership education to Maine. They chose the structure of a 13-member board staffed by an Executive Director. While their work built the foundation for a collaborative team, the individual board members defined the extent to which ICLAD embraced the team approach.

The ICLAD Planning Committee deliberately planned the composition of the board and recruited people from each of the following areas:

- Professionals and consultants in leadership skills
- Youth
- Private sector
- Public sector
- Fund-raising
- Existing Extension client groups
- Alumni of leadership training programs.

People were invited to fill out an application to apply for the board. Applications were reviewed and references checked. Criteria for selection were based on geographic distribution, diversity, interest and skills, experience with boards, and an interest in leadership.

The search successfully yielded a multi-talented and diverse board with members including the president of a consulting and training firm, a grassroots organizer and health professional, presidents of two major Extension volunteer organizations, the retired manager of public affairs for a major paper company, and an academic dean. Board members brought experience and varied views on leadership. Diversity was built into the board.

Learning to work together:
The balance between process and task

The selection of 13 talented people for the ICLAD Board did not ensure that they could work well together. When board members came together for the first meeting in February 1988, they had the luxury and burden of defining their method of working together.

To define a common purpose and vision, the group began its task by reviewing and discussing six statements of purpose from the initial ICLAD concept paper. To define how the purpose statements would be carried out, the board established the following *ad hoc* committees:

- Board Development
- Public Relations and Communications
- Funding
- Program/Operations
- Data Gathering

Each group identified tasks and worked on them between board meetings. Thus, they were able to present the full board with the committee work. This method increased board efficiency and enabled people to become familiar with each other by working in small groups.

By October 1988, following five board meetings and a board retreat, the *ad hoc* committees had made major headway. The Board Development Committee provided the board with three major documents detailing the way the board will work together: ICLAD Operating Norms, Board Meeting Procedures and Board Meeting Norms. The Public Relations and Communications Committee designed and had a brochure printed to advertise the Institute for Community Leadership and Development. The Funding Committee provided the board with a list of potential funding sources and developed a successful preproposal to the W. K. Kellogg Foundation to work with 24 small communities providing leadership training over a five year period. The Program and Operations Committee provided agendas and an interim chair for each meeting. The Data Gathering Committee compiled clearinghouse data on leadership activities in Maine and an initial list of university and community leadership resource people.

The process of reaching this stage of development has involved the active integration of the five key elements and characteristics of leadership activities: effective listening skills, establishing operating procedures, appreciating and understanding differences, understanding community power and structures, and group leadership and process skills. At the same time that board members are practicing effective listening, they are establishing operating procedures and norms

and developing leadership programs. Task and process are linked.

In addition to board meetings, another central place that board development took place was at a two day board retreat. To become better acquainted and to build mutual trust, members explored their similarities and differences and participated in a leadership walk which allowed people to experience leading and following. People came from the retreat with a strong sense of becoming a group.

ICLAD PROJECTS

ICLAD is coordinating a number of leadership efforts within the UMaine Cooperative Extension Service and beginning to develop leadership training for the broad community. One goal is to connect people who have completed leadership training to form community and state networks. ICLAD programs are discrete yet interconnected.

NEW ENGLAND REGIONAL LEADERSHIP (NERL)

By fall, 1988, 268 New Englanders will have graduated from a program which prepares them to be active community decision-makers. Now in its sixth year of operation, the New England Regional Leadership program is a joint effort of the six Land-Grant Universities, their Cooperative Extension Systems, and the W. K. Kellogg Foundation. Maine has been an active participant since the beginning of the program.

NERL provides people with tangible leadership skills such as learning to run effective meetings, an understanding of how decisions are made, communication skills, an understanding of group dynamics, dealing with conflict, and increased analytical skills for evaluating issues. Additionally, people gain confidence, self-knowledge and a broader perspective on public issues.

In the most recent class which ended in September 1988, 18 Maine citizens studied community issues such as water quality, growth management and teenage pregnancy from varying perspectives as a means of increasing their leadership skills.

FAMILY COMMUNITY LEADERSHIP PROGRAM (FCL)

Rapid social changes in Maine present communities with a variety of challenges. Often the challenges specifically affect women, youth, minorities, and elders, yet these groups are the least likely to be represented in the public policy making process.

The Family Community Leadership Program is designed to increase the leadership capabilities and involvement of women and others who are not traditionally represented in the public policy decision-making process. Focus is on issues that affect the quality of family life such as housing, health services, other human support services, allocation of community resources, and educational opportunities. Leadership skills will be taught using a team philosophy with professionals and volunteers participating as partners in the design and delivery of the program.

COMPETENCY-BASED VOLUNTEER TRAINING

Competency-Based Volunteer Training is a program to help volunteer leaders develop the basic skills they need to perform their assigned roles with the 4-H program proficiently.

Leader education will be competency-based, and volunteers will be required to demonstrate an acceptable level of skill mastery. Volunteers who successfully perform agreed-upon learning outcomes may have the opportunity to apply for university credit or other forms of continuing education units.

VOLUNTEERS FOR THE FUTURE

In each of the 16 counties of Maine, the University of Maine Cooperative Extension Service depends on volunteer leaders to identify issues, set priorities and determine how Extension at the county and state levels will respond. Volunteers serve on county executive committees in each of the 16 counties. To strengthen these committees and aid them in being proactive in setting county agendas, ICLAD is developing a workshop series on leadership for them and for the county Extension staff.

On Leadership

Jane Kelley, Extension Agent, Piscataquis County Cooperative Extension Service, New England Regional Leadership graduate.

I look at leadership as the process of taking a group from point A to point B and serving as a task-oriented person. Leadership means determining whether a goal involves solving a community issue, or just sitting down and dealing with a problem from a leadership perspective. In the latter case, a leader focuses the group's attention on finding out what needs to be done, bringing the needed information together, and moving from there.

Jim Killacky, Community Development Specialist, University of Maine Cooperative Extension Service.

In the school I went to growing up in Ireland, rugby was the major sport and my major love. To my great joy once, I was elected captain of the under 11's (age group) team. I came home full of importance about this and after explaining it to my mother, she asked, "How many people are there on a rugby team?" "Fifteen," I replied with great bravado and confidence. "Well," she said, "Do you know how to play in each of those positions and what is expected of them?" With some increasing sense of hesitancy, I gingerly said, "Well, em, yea, I think so." "Well," she said, "if you are going to be a good captain it is very important that you know all the positions and what the people in them should be doing. This way you can know what areas need support, what needs to be changed or added, and in the process help make your team be the best it can be." Now some 30 years later this story is still very central to my view of leadership, and its telling is always part of my presentations on the subject. to page 64

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Since children existed before the stepfamily did, previous relationships and understandings between the parent and the child also exist. This is another important fact that makes stepfamilies different from nuclear families.

The relationship between biological parents and their children is a longstanding one. It is also likely that this bond has grown stronger the longer they have lived in a single parent family before the remarriage. With this strong biological, emotional and legal bond, it is only natural for the parent to take sides with his or her own children when conflicts arise in the stepfamily. The result is often feelings of rejection and unfair treatment for other members of the stepfamily.

"For a long time, I couldn't understand why my wife didn't love my kids as she would her own. It hurt. I kept telling her that I knew I could take someone else's kids in and love them just as much as mine. Now I know that isn't true: I couldn't. And I understand why my wife doesn't. I now know it isn't just an issue between her and my kids. I'm not as hurt and defensive as I used to be."

In stepfamilies, people come together with diverse histories of rituals and routines that were understood in their previous families. The merging of these different backgrounds is not without conflict and confusion as the stepfamily negotiates new traditions and routines. Typically, nuclear families do not face the difficult tasks of blending two separate families into one functioning unit.

"My stepdaughter has begun talking about living with her mother. Before the workshop, I thought that that was absolutely out of the question, but I've learned that it's a possibility to explore. For her to leave doesn't mean I have failed as a stepmother."

Stepfamilies do not have the benefit of legal relationships as do nuclear families. These legal ties represent a strong commitment between adults and children that can not be denied.

There are many obstacles in stepfamilies' quests for satisfaction and success. Many of these difficulties are caused by a lack of information. The Strengthening Stepfamily workshops provide valuable information and support which participants need and seek to help build strong stepfamily units.

"For a long time I have wished someone would help those of us in stepfamilies. Thank you for recognizing our needs and offering this program."

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Luke Muzzy, Owner-Broker of Century 21/Goodwin Real Estate in Greenville, Maine, New England Regional Leadership graduate.

Basically leadership is getting involved. The New England Regional Leadership program (NERL) allowed me to come back to my community and use my skills to get things done. A leader does not have to be chairman of the group: a leader gets the group process moving. Leadership is about gaining a type of respect. You recognize leaders because they get involved. They go to town meetings and speak; they go to Fourth of July celebrations and dip out ice cream. They are always there doing something for the community's benefit.

Bettina Blanchard, Utilization Specialist for Resource Conservation Services, Inc.

Leadership can be learned. I believe that everyone has the capacity to be a leader; the second part of being a leader is having the skills and tools to do it. That is why I was involved in the New England Regional Leadership program and why I am a board member of the Institute for Community Leadership and Development. Leadership means that you can either sit back and watch things that you don't like happen or you can act to do something about them. There can never be too many leaders. Leadership education is particularly critical to women.

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purpose of this committee is to promote anti-bruise nation wide through production and distribution of education materials. These materials consist of videos, bulletins, fa sheets, leaflets and bumper stickers. To this end the Natio al Anti-Bruise Committee has been awarded a $40,000 gra from the United States Department of Agriculture to produ these materials and promote anti-bruise concerns nationwid

That's what it's all about!

PROPERTY TAXES IN MAINE

A Summary and Evaluation of Some Issues in Property Taxation

Prepared for
The Commission on Maine's Future

By

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February 5, 1989

I

TRENDS IN PROPERTY TAXATION IN MAINE

Several data series are available that permit a review of Maine's recent historical experience with property taxation. Several measures are worth examining:

a. trends in total property tax revenues per capita;

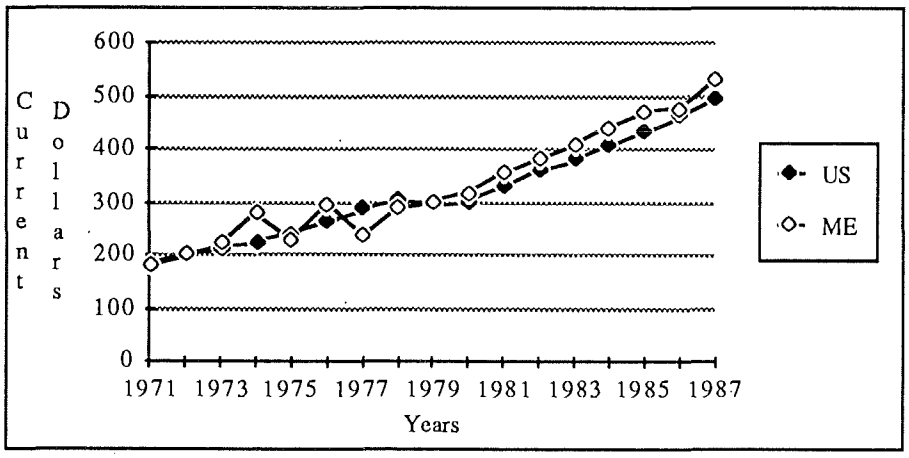
b. trends in property rates:
   i. relative to property values;
   ii. relative to income;

c. trends in the relative importance of property taxes in the state and local tax structure.

Property Tax Revenues Per Capita

Property tax revenues, like most aggregate economic measures, will tend to grow along with the growth of the economy as a whole. Consequently, growth in the overall level of property taxation is perhaps best measured on a per capita basis.

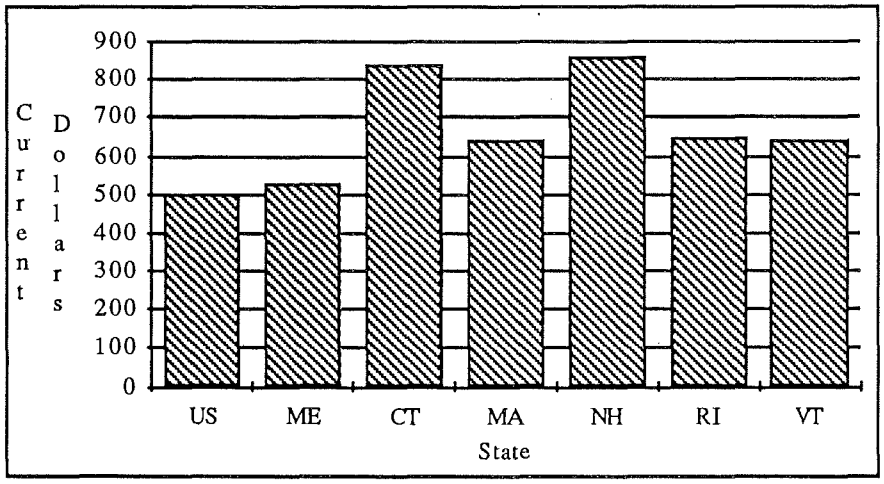
Figure 1: Per Capita Revenue from Property Taxes (Source: Appendix Table V)



As indicated in Figure 1, on a per capita basis property taxes in Maine have been rising roughly in line with property taxes nationally. Since about 1980, per capita property taxes in Maine have been somewhat above the national average. In 1987, at $530, per capita property taxes in Maine exceeded the national average of $498 by about 6 percent.

The New England states have consistently relied more heavily than other states on property taxes. This remained the case in 1987, as shown in Figure 2. All of the New England states taxed property more heavily on a per capita basis in that year than other states nationally. Yet Maine showed a lower per capita property tax burden than all other New England states.

Figure 2: Per Capita Revenue from Property Taxes; US and New England, 1987
(Source: Appendix Table V)



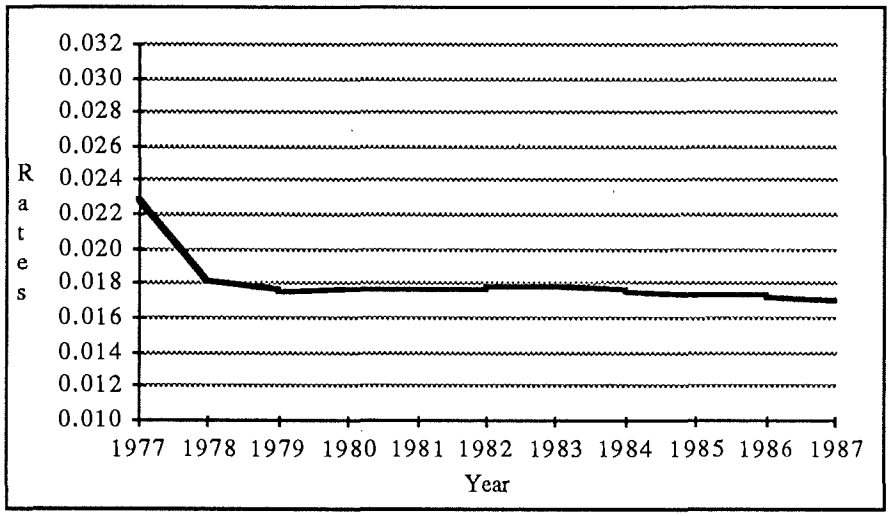
Effective Property Tax Rates

Property taxes relative to property values. One way of measuring the aggregate burden of the property tax is to express tax liabilities as a percentage of the market value of taxable property. Property values can be interpreted as one possible measure of ability to pay taxes, although they are imperfect in that regard since they do not constitute an accurate measure of net worth, the most widely accepted indicator of wealth. Nonetheless, it is worth examining the relationship between property tax assessments and the value of the property against which the assessments are levied.

Maine Bureau of Taxation data permit the calculation of effective (or "full value") property tax rates for the state and for each of its political subdivisions. Property tax rates for the state and for each county for the years 1977 through 1987 appear in Appendix Table XI. Tax rates of the state's ten largest municipalities appear in Table XII. These rates are calculated by dividing property tax assessments (Appendix Table IX) by state valuation (Appendix Table VII), the state's estimate of the full market value of taxable property in each community.

Figure 3 shows the trend in effective property tax rates for the state as a whole for the period 1977 to 1987. Since 1978, rates have shown a slight decline statewide.

Figure 3: Effective Property Tax Rates; Maine, 1977-87 (Source: Appendix Table XI)



The Advisory Commission on Intergovernmental Relations publishes tabulations of average effective property tax rates for existing single family homes with FHA mortgages . Trends in this measure for Maine and the U.S. are displayed in Figure 4. Rates are expressed as percentages. Rates showed a sharp decline during the 1970's both nationally and in Maine, followed by a more gradual decline during the 1980's. The sharp difference in the pattern of effective rates before and after 1980 is probably accounted for to a substantial degree by shifts in intergovernmental fiscal relations. The late 1960's and early 1970's saw a major upswing in Federal transfers to state and local governments. This trend turned around with the advent of the Reagan administration, ensuring that continuing declines in property tax rates could not be supported into the mid- to late - 1980's.

Figure 4: Average Effective Property Tax Rates (%), Existing Single Family Homes with FHA Mortgages; US and Maine, 1958-86
(Source: Appendix Table III)

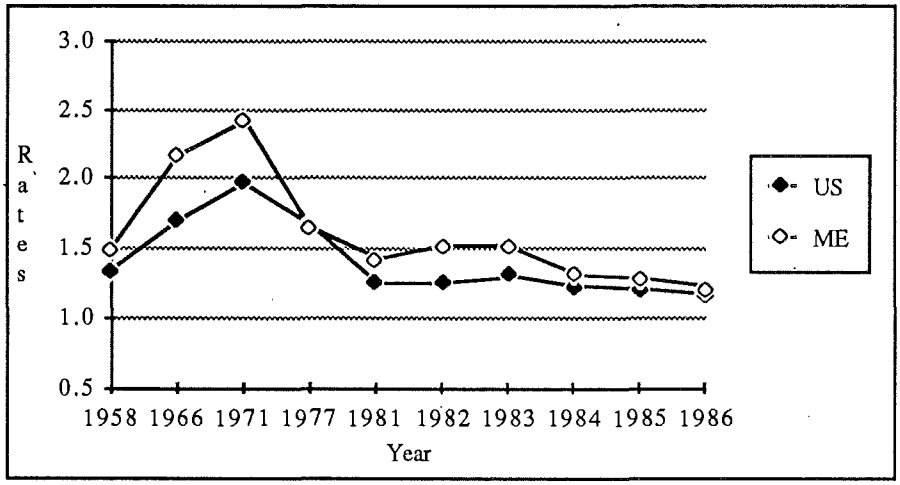
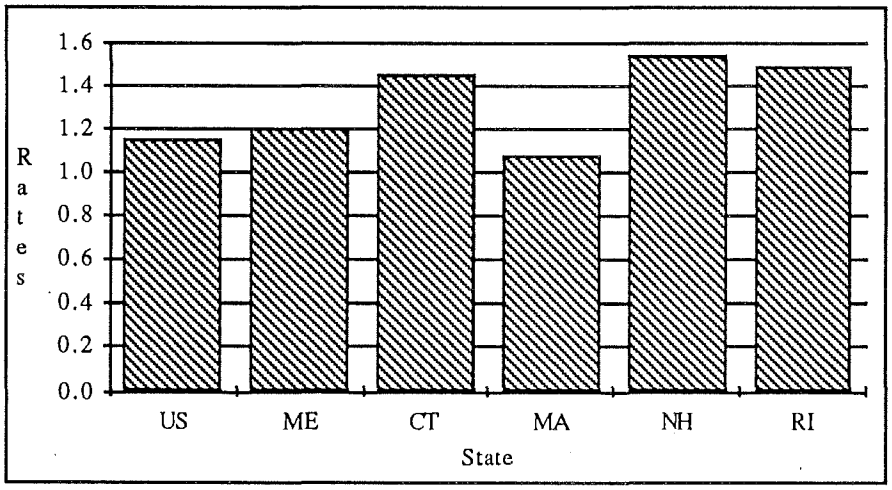


Figure 5 displays the FHA effective property tax rate data for the U.S. and the New England states for 1986, the most recent year for which the data are available. With the exception of Massachusetts (no data are available for Vermont), the New England states again lie above the U.S. average, with Maine only slightly above.

Figure 5: Average Effective Property Tax Rates (%), Existing Single Family Homes with FHA Mortgages; US and New England, 1986
(Source: Appendix Table III) (Vermont = N/A)

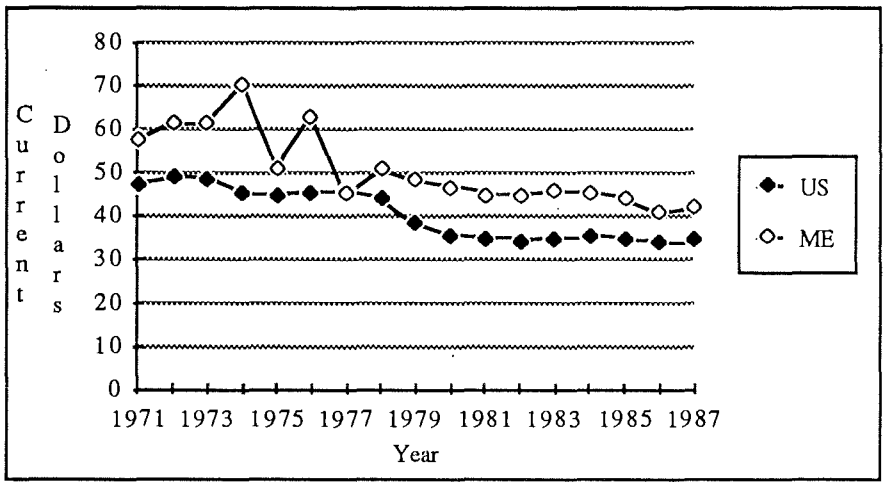


As the raw data in Appendix Table III indicate, Massachusetts has experienced a significant decline in effective property tax rates since 1971, and a precipitous decline since 1981. The decrease reflects the effects of Proposition 2 1/2, which lead to a major shift

toward the state in the responsibility for financing local expenditures in Massachusetts. The relatively low effective rate in Massachusetts in 1986 may also reflect relative underassessment of residential vs. other kinds of taxable property in that state.

Property taxes relative to income. Income is perhaps the most widely accepted measure of ability to pay taxes. For a single state and local governmental system., the measure is imperfect to the extent that property taxes are paid by non-residents in the form of higher prices for goods and services purchased within the state by out-of-state residents or in the form of assessments on Maine properties owned by out-of-state residents. It is not known whether Maine is a net "importer" or "exporter" or property tax revenues. The aggregate data only permit calculations of the gross ratio of property tax assessments in Maine to personal income. The U.S. Bureau of the Census data showing property tax revenues per $1,000 of personal income are displayed for the U.S. and for the New England states in Appendix Table IV. Figure 6 shows trends in this measure for the U.S. as a whole and for Maine for the years 1971 through 1987.

Figure 6: General Revenue from Property Taxes per $1000 of Personal Income; US and Maine, 1971-87 (Source: Appendix Table IV)

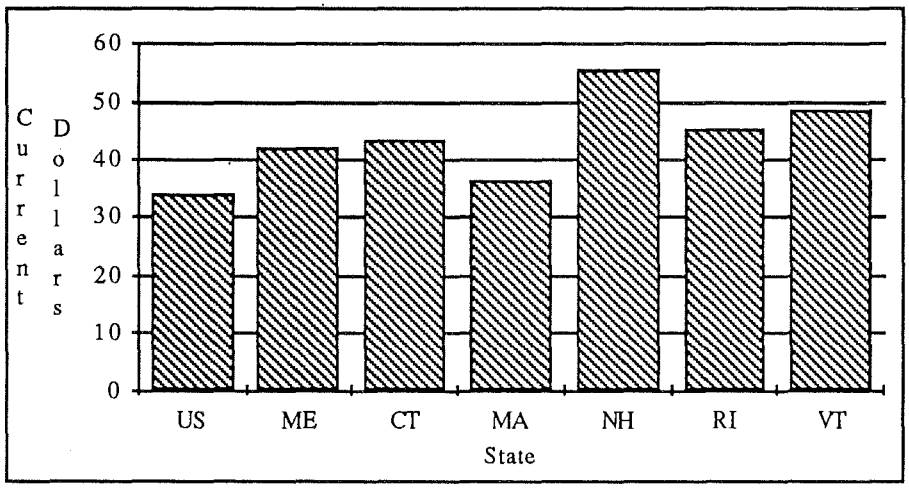


Property tax revenues have declined significantly relative to personal income in Maine and in the U.S. as a whole since the early - to mid - 1970's. The decline has moderated since 1980, and there was a slight up-turn in Maine between 1986 and 1987. Overall, the long-term trend has been downward. It is not clear what accounts for the 1986-1987 up-turn or, given data limitations, whether the up-turn continued in 1988. Over

virtually the entire period, the rate of property taxation relative to personal income was somewhat higher in Maine than nationally. This historical experience reflects both the slightly higher reliance in Maine than in the U.S. as a whole on property taxation and Maine's relatively low personal income.

Figure 7 illustrates Maine's standing relative to the U.S. as a whole and the other New England states for 1987 in terms of property tax revenue relative to income. Maine ($41.97 per $1,000) lies above the national average ($34.35 per $1,000), but below all New England states except Massachusetts.

Figure 7: General Revenues from Property Taxes per $1000 of Personal Income; US and New England, 1987 (Source: Appendix Table IV)



Property Taxes as Percent of Total Taxes

The per capita property tax burden and the burden relative to income both reflect, among other things, the extent to which the state relies on property taxes as opposed to other sources of revenue. Appendix Table XIV records the ratio of property tax revenue to total tax revenue for the U.S. and for the New England states for the years 1971 through 1987. Historically Maine has relied more heavily on property taxes than other states nationally. Figure 8 illustrates this fact. However, the gap between Maine and the U.S. narrowed considerably since 1983. In 1987, 32.9 percent of total state and local tax revenue in Maine was generated by the property tax, about 10 percent above the national average.

Figure 8: Property Tax Revenue as a Percent of Total Tax Revenue; US and Maine, 1971-87 (Source: Appendix Table XIV)

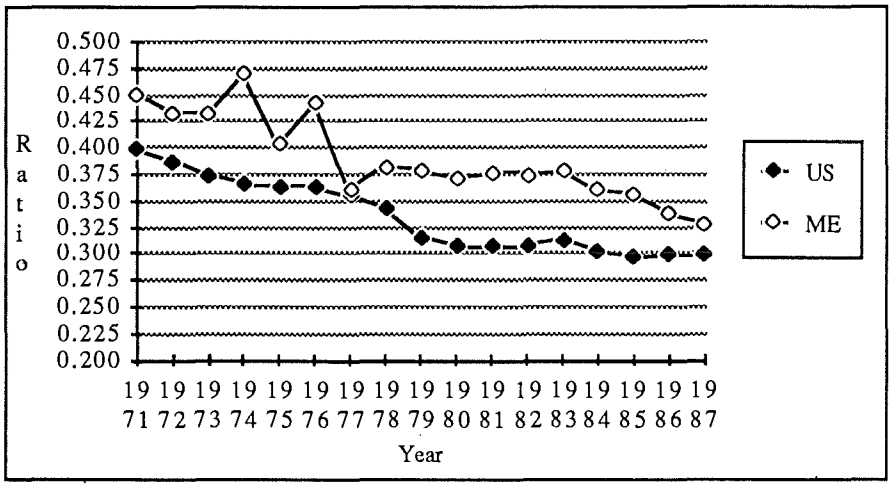
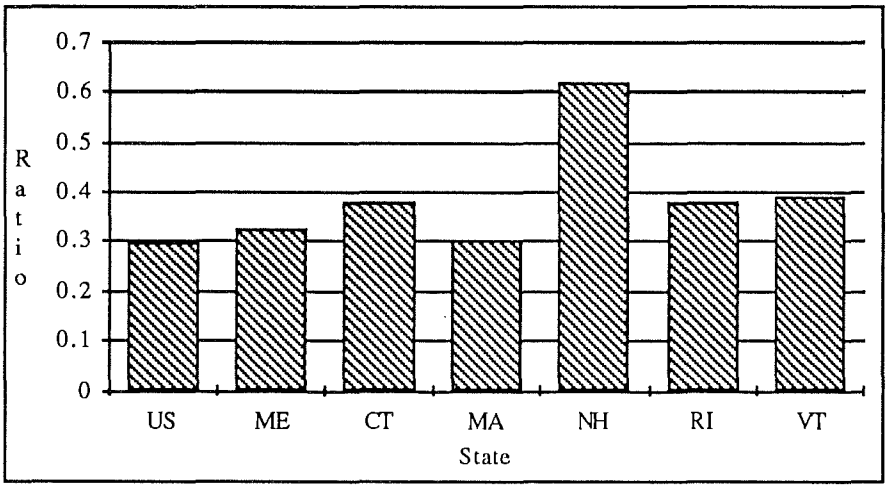


Figure 9 displays the ratio of property tax revenue to total tax revenue for the U.S. and for the New England states for the year 1987. As already noted, Maine is above the national average, but the ratio of property tax revenue to total state and local tax revenue is lower in Maine than in any of the other New England states except Massachusetts, which has lowered this ratio considerably in the last ten years (from about 50 percent to about 30 percent). With respect to its reliance on the property tax, Maine is strikingly different than its nearest neighbor, New Hampshire, which relies on the property tax for over 60 percent of its tax revenue.

Figure 9: Property Tax Revenue as a Percent of Total Tax Revenue; US and New England, 1987 (Source: Appendix Table XIV)



Discussion

In the last decade and a half, Maine appears to have participated in a national trend of declining reliance on property taxation, a trend that was very pronounced during the 1970's but which has leveled off during the 1980's as the Federal government has reduced or eliminated major transfers -- such as general revenue sharing -- to local governments. The data reviewed here certainly do not support the widely held conception of a continually increasing burden of property taxation in Maine either relative to property values or relative to income. Neither does the continual rise in property tax revenues per capita indicated a substantial increase in the absolute burden of the tax. Between 1971 and 1987, per capita property tax revenues in Maine rose at roughly the same rate (by factor of 2.85) as the Consumer Price Index (2.80). (U.S. President, *Economic Report of the President, 1989,* p. 373).

It is clear that the political discontent with the property tax so evident in Maine must be traced to some factor(s) other than an alarming rise in the aggregate burden of the tax, either absolutely or relative to property values or income.

Several explanations are plausible:

a. that the property tax burden, measured by any or all of the indexes examined above, is rising rapidly in some local jurisdictions and not in others. While there are doubtless wide variations in property tax burdens across jurisdictions, the overall stability (and indeed, the slightly declining trend) that has been observed during the 1980's (through 1987) could occur in the face of rapidly rising rates in some jurisdictions only if rates in other jurisdictions were declining proportionately. This possibility deserves further exploration beyond what can be done for this report.

It is sometimes casually asserted that the rising property values in some coastal jurisdictions give rise to higher property tax rates in those communities. This cannot be the case, since, given a constant tax commitment, rising assessed values must lead to proportionately declining nominal (mil) rates. If effective rates are going up in these communities it can only be because expenditures are rising more rapidly than property values.

b. that within specific jurisdictions some taxpayers are experiencing significantly more rapid increases in property tax rates than others. If property tax burden is measured relative to market value, this could occur only if the quality of property tax assessments is deteriorating. While the data on coefficients of dispersion for local tax jurisdictions are worth examining in this light, a serious impairment in local assessment quality is unlikely to have occurred in the face of the state's modest but apparently successful effort to improve assessment quality by requiring more frequent property revaluations.

Alternatively, if burden is measured relative to income, the ratio of property tax payment to income could rise for some households either as a result of declining incomes or increases in assessed values with fixed incomes. Voters finding themselves with rising property tax bills relative to their incomes are bound to be dissatisfied (providing they do not feel compensated by a corresponding increment in the services they receive from local government) and those interested in tax "reform" will seek to remedy the situation on equity grounds.

c. Although the plight of fixed income taxpayers may go a long way to explaining political dissatisfaction with property taxes, it cannot fully explain the intensity of dissatisfaction evident in some quarters in Maine, especially in light of the fact that overall rates of property taxation have not been rising. One has to look at the spending side of the local budget equation to understand what may be another major, although not widely recognized, explanation of dissatisfaction with property taxes.

For many taxpayers, especially elderly homeowners (regardless of income), additional local government spending may appear to be a losing proposition. For every dollar increase in tax payments, the typical elderly homeowner will receive at best no more than forty or fifty cents worth of benefits. These will be in the form of services of general local government. The residual tax payment will go to education, a category of expenditure in which they are likely to feel they have little or no stake. A similar calculus faces any taxpayer without children in public schools or with no expectation of having children in public schools, including those who send their children to private schools. These taxpayers might be termed "fiscal losers." It is clear that such individuals will have a negative attitude toward local public spending. If they feel their concerns are not accounted for in the routine political decision-making processes of local government, they will express their concern as overall dissatisfaction with the property tax. The increasingly frequent calls for tax and spending caps in Maine communities probably stem in part from this phenomenon.

The impact of "fiscal losers" on tax policy is likely to become more rather than less significant in the future. The portion of th electorate in the older age categories is already relatively high in Maine and will increase along with national demographic trends. In the future, the median voter will have less and less stake in primary and secondary education and will vote accordingly. A growing segment of the electorate will be dissatisfied with the return on their local property tax dollar. This phenomenon will be important in determining future levels of financial support for primary and secondary education in Maine and in changing the role of the property tax in the state's revenue structure.

II

NORMATIVE PROBLEMS IN PROPERTY TAXATION

The strengths and weaknesses of various kinds of taxes are typically analyzed relative to a traditional set of normative criteria. These are:

a. the impact of the tax on the efficiency with which productive resources are used,

b. the fairness of the tax, and

c. the responsiveness of tax revenues to economic growth.

The property tax has been and continues to be criticized on all of these accounts.

Fairness

Regressivity. While there is no universal agreement on what is a fair distribution of tax burdens, it is widely accepted -- at least in principle -- that regressive taxes should be avoided. The word regressive has a specific meaning that is often lost in political discussions of property taxation. A tax is regressive if the effective rate of tax -- the real burden of the tax divided by income -- falls as income rises. It is also widely accepted that tax fairness requires that people with the same ability to pay -- usually measured by income -- should bear the same tax burden.

It is generally believed that the property tax is a regressive tax. It seems reasonable to assume that renters -- of either residential, commercial, industrial, or agricultural properties pya higher rents to cover the property taxes that are in fact the legal responsibility of landlords. It is also reasonable to assume that the ratio of the value of owner-occupied residential property to income declines as income goes up. That is to say, higher income people may spend more absolute dollars on their homes, by the market value of their property may be lower relative to their income than would be the case, on average, for

lower income households. The latter assumption is borne out by statistical evidence, but the former is not. Some economists belive that the property tax falls on landlords rather than renters. This belief leads to a conclusion about the fairness of the property tax that is radically different from the conventional view. The tax, rather than regressive, is progressive under these assumptions.

This alternative view of property taxation has carried little weight to date in policy debates. Regardless of any theoretical misgivings on the part of economists, most policy-makers will probably continue to hold that the property tax -- especially the residential component -- is regressive and that "reforming" the property tax should mean moderating the burden of property taxation on low and middle income persons. This position is especially convenient for those, such as local officials, who would prefer to see a larger share of the cost of local services borne by state government. This, regardless of the merits of the assumption that property taxation is regressive, the notion is likely to continue to have an impact on state tax policy.

Circuit breakers. Thus, one theme of property tax reform proposals is ameliorating the assumed burden of property taxation on low income individuals and households. One common prescription is the property tax circuit breaker, a device used in Maine in two state programs: one specifically aimed at the elderly and one more general in nature, both of which would be combined into Governor McKernan's Home-Saver program. Circuit breakers have the attractive characteristic of responding directly to some of the perceived inequities of the property tax. Relief is tied directly to income and appears to mitigate the incentives for low income persons with relatively high property values to liquidate their property in order to pay their taxes. However, circuit breakers have the unfortunate -- although generally unrecognized -- consequence of rewarding taxpayers in the same income bracket in proportion to the amount of wealth they hold in taxable property. Within the same income category, the household with the more valuable home will be rewarded with a higher circuit breaker payment, a clearly inequitable result. This problem could be avoided through the use of deferral or recapture provision, such as that used in several states. (National Conference of State Legislatures, *State Tax Policy and Senior Citizens*, Denver, Colorado, 1985) Tax deferral allows the qualifying taxpayer to postpone payment until the property is sold or becomes part of the taxpayer's estate. A deferral program eliminates the cash flow problem associated with rising property tax assessments with fixed incomes and involves no cost to other taxpayers if deferred payments are collected with interest. However logical such a program may be, its appeal

runs afoul of a widely held value judgement that wealth in the form of real property should be transferable at death to heirs of one's choosing, and that, in any event, liens on residential property carry a social stigma. Both of these factors suggest that deferral plans will have only a limited appeal in Maine.

The political appeal of narrowly targeted circuit-breakers is also limited. The low-income beneficiaries of a targeted program are not politically influential. Consequently the political viability of circuit-breaker proposals will depend on how broadly their eligibility limits are expanded.

State aid. Granting the assumption of regressivity, the burden of property taxation on low income people can also be moderated by further shifting the responsibility for funding local public services and primary and secondary education to the state. This is the approach favored by the local government lobby and, as such, is an attractive political alternative. But from an efficiency perspective, there are reasons to be concerned about broad-based state subventions. First, greater state aid to local governments will not lead to dollar for dollar reductions in local property taxes. Intergovernmental aid raises expenditures at the local level above what they otherwise would be as well as lowering local taxes below what they otherwise would be. Secondly, state aid impairs political accountability at the local level. It seems reasonable to speculate that local officials will be more careful spending money which they themselves have to raise than they will be spending only they receive from the state. The extent of the resulting inefficiency is, of course, not known.

Horizontal inequity. Regressivity is seen as the principal fairness issue in property taxation. Much less attention is paid to the more readily documentable dimension of unfairness in property taxation: the fact that within a given taxing jurisdiction properties are often assessed for tax purposes at wildly different ratios of assessed to market value. The more stringent efforts made by the State in the past to tighten up assessing performance -- such as mandatory regional assessment districts -- have met with politically effective protests from local public sector interests. Time did not permit a review of the improvements in assessment quality that have occurred in the past decade or so. It is likely that there is ample room for more improvement but that additional gains will in fact be quite small.

Exemptions. A question of fairness is also raised by institutional property tax exemptions. Institutional exemptions can erode the tax base substantially in communities blessed with an abundance of governmental, educational, and charitable institutions. (David Wihry, *Institutional Property Tax Exemptions in Maine*, University of Maine Bureau of Public Administration, Orono, 1975) Past proposals to address the intra-jurisdictional inequities associated with these exemptions -- such as authorizing local governments to levy fees in lieu of taxes -- have not met with much favor in a legislature in which the adversely affected communities are in minority. Such is likely to continue to be the case.

Efficiency

The property tax can affect the efficiency of resource use in many ways. Principal among these are:

a. the cost of collecting the tax;

b. the impact of the tax on land use;

c. the impact of the tax on the willingness of owners to undertake improvements; and

d. the impact of the tax on the geographic distribution of economic activity.

The property tax is among the more expensive taxes to collect since it presents difficult problems of discovery and valuation. In large degree, the product that is purchased by expenditures on property tax administration is assessment equity. It appears that the additional cost of equity is not high -- especially in light of computerized appraisal techniques and potential economies of scale through larger assessment jurisdictions -- but that little value is placed in Maine on further improvements in assessing performance.

The impact of the property tax on the location of economic activity is difficult to quantify and theoretically debatable. Property taxes are used to provide public services that are of some value to those who are making plant location decisions. Only is there are gross

imbalances between taxes paid and services received will the property tax be likely to have a net impact on a location decision.

The negative effect of the property tax on the willingness of property owners to undertake improvements that would increase the assessed value of their property is widely conceded but quantitatively difficult to evaluate. Little interest has been shown in Maine or elsewhere in recent years in mitigating whatever negative impact the property tax has in this regard and this is likely to continue to be the case.

Finally, the property tax is widely thought to influence patterns of land use, inducing the conversion of parcels of farm and open space land to their so-called "highest and best" residential, commercial, or industrial uses. This belief is correct to the extent that taxation at best use (market) value may lead to high taxes relative to income for owners of land that is ripe for conversion. The stimulus of capital gains may well be of greater importance in explaining changes in land use patterns at the urban fringe. At any rate, Maine's tree growth tax and farm and open space laws have mitigated these concerns to a degree.

Revenue Productivity

The property tax is notoriously unresponsive in the short run to economic growth compared to the principal sources of revenue at the state level, income and sales taxes. Increases in the assessed value of property generally lag increases in market value due to the unresponsiveness of the assessment process. The low short term elasticity of property tax revenues can be seen as both desirable and undesirable. Low elasticity means that at least in the short run the demands on local services stemming from local economic growth must be met with higher nominal tax rates. But from a different perspective, the low elasticity of the property tax is desirable in that any increases in local government spending are more likely to require increased nominal rates than would be the case with a more responsive revenue source. The property tax simply does not provide the fiscal dividend that progressive taxes offer. What may be a weakness from the point of view of the local government official may be strength from the point view of the taxpayer.

III

PROSPECTS FOR THE FUTURE
THE POLITICAL ECONOMY OF PROPERTY TAXATION

The principal questions that can be asked about the future of property taxation in Maine are as follows:

a. Will the property tax continue its current level of importance in Maine's state and local tax structure?

b. Will the normative deficiencies of the property tax be corrected or mitigated?

Future Importance of the Property Tax

Analysis of both question is an exercise in political economy. Rates of property taxation and levels of property tax are the result of the interaction of complex forces at the local level and at the state level and at the interstice between the two, i.e., the system of state grants-in-aid and other state-determined influences on local levels of spending and costs, such as program mandates.

The major factors influencing property tax rates are:

1. The market value of taxable property; and

2. Local expenditures for public services, which, in turn, are influenced by the following considerations:

    a. the demand for services provided by local governments and the factors that influence that demand:

        i. personal incomes;
        ii. citizen preferences for public goods;

iii. demographic influences such as the location and age-composition of the population;

iv. patterns of industrial and commercial development;

v. the age and condition of the local public sector physical infrastructure, including, for example, roads and sewerage systems.

b. the unit cost of services provided by local government:

i. local public employee wages and the prices of other inputs such as land and materials;

ii. environmental influences on the cost of providing local services such as weather, crime rates, population density, and socio-economic characteristics of school children and their families.

c. state and federal aid.

An exhaustive analysis of these factors with a view toward forecasting future pressures on the local tax base is well beyond the scope of this paper. Any forecast could be invalidated by forces that are unpredictable or beyond the control of the political system in Maine. For example, in the possible -- if unlikely -- event that the Organization of Petroleum Exporting Countries revivifies itself and regains control of oil prices, the economic fortunes of the northern tier states could be reversed, with substantial negative consequences for the tax bases of these states. The increasing taxable capacity that the New England states, including Maine, have experienced in recent years could be halted or reversed. Tax based growth in Maine has been substantial in recent years and has permitted increasing expenditures with declining tax effort. (See Appendix Tables I and II). Even apparent intra-regional trends that are pushing Maine property values may be short-lived.

The most that can be said, then, is that for the foreseeable future virtually all of the forces outlined above will probably carry with them increased pressure for higher spending on services that have been traditionally the responsibility of local government. This assertion is based on the following guesses:

a. Per capita personal income in Maine will continue rising at least proportionally and perhaps more than proportionately with the national trend. The experience of other states is that higher incomes are accompanied by greater demands for public services, especially for education.

b. For the foreseeable future there are forces at work in Maine that will tend to shift citizen preferences toward some specific kinds of public services. For example, the orientation towards maintaining and enhancing the quality of the physical environment of the state will lead to greater expenditures on solid waste management and sewage treatment. Likewise, partly through the efforts of organized education and business interests in bringing the "aspirations" issue to the forefront, Maine can expect continued growth in concern with accessibility and quality in education, including primary and secondary education.

c. Maine will partake in national demographic trends that will influence the demand for primary and secondary education over the next ten years. These trends will be modified in their local impact by patterns of in- and out- migration that are difficult to forecast. Recent estimates suggest that the number of public high school graduates in Maine in the year 2004 will be only slightly fewer than in 1986, but that the long term change will be the net result of shorter term fluctuations. Projections of the Western Interstate Commission for Higher Education (WICHE) (*High School Graduates: Projections by State, 1986 to 2004,*, Boulder, Colorado, 1988) suggest the number of public high school graduates in Maine will decline from 1989 to 1994 and then rise steadily but moderately until 2003. In 2004, the number of public high school graduates is expected to be about 5% less than in 1989. The number of high school graduates obviously tracks primary and secondary enrollments. The expected pattern of change over the next fifteen years does not suggest that increasing numbers of primary and secondary students will be a major source of increased demands on local budgets. These forecasts are conjectural; regional migration patterns are difficult to forecast over the relevant time period.

d. Maine will probably continue to experience the urbanization -- the increase in population density and in the density of industrial and commercial development -- that has occurred in the southern portion of the state in recent years. If growth in the state continues, it is likely to spread north along the state's major transportation corridor defined by the Maine Turnpike and Interstate 95. Urbanization has always had a major positive

influence on local spending *via* increased demands for locally-supplied public services such as sewerage, solid waste disposal, roads, and public safety. The extent to which continued urbanization in Maine will lead to higher public service costs will depend in part on the effectiveness of programs designed to stimulate local planning and growth management activities.

e. The older communities in the state are likely to be faced higher maintenance and replacement costs for existing physical infrastructure such as roads and sewerage and water systems. The magnitude of such needs is conjectural and probably deserves closer examination.

f. If wages of municipal employees and teachers rise proportionately with the rest of the economy, the unit cost of municipal and local educational services will continue to rise. In order to maintain existing levels of services total expenditures will have to rise proportionately, since there seem to be few prospects for improving the productivity of local government.

g. Higher input prices and lagging productivity will fuel increased resistance to further spending increases on the part of the "fiscal losers" described above. This will have a moderating effect on the growth of local expenditures.

h. There will be increasing experimentation with private sector alternatives to public provision of local services. Regionalization trash-to-energy conversion operations are an example of this. Talk of privatizing other local public services such as jails will continue. The same forces will lead to explorations of competition-oriented schemes for inducing efficiency in the delivery of local services. The Minnesota experiment with competition among local school districts is an example that will be watched closely and imitated if it works.

i. Greater population density and industrial and commercial development have always been associated with increases in the unit cost of local public services. Maintaining a low crime rate in the face of increased population density requires higher expenditures, even on a per capita basis. The literature on determinants of local spending amply demonstrates this fact. The urbanization of Maine will carry with it this kind of cost-increasing impact.

Rising property values. Economic development, in addition to raising the cost of government, also raises the tax base. The perennial question raised by municipal cost-revenue studies cannot be answered by a generalization. The mix of commercial, residential, and industrial growth will determine demands on local services as well as the impact on the local tax base. At least through 1987, increases in taxable capacity in Maine statewide have led to both lower tax effort and higher spending levels. The fiscal dividend of growth is, however, much more readily realized at the state than at the local level due to the greater elasticity of state revenue sources, especially the progressive income tax. At the local level, the demands on public services occasioned by growth can be felt suddenly and the increased revenues may be realized only as assessed values catch up with market values. At the local level, the short term impact of growth can be higher tax rates.

Politics of state aid. If local governments were limited to property taxation for the support of local services, the factors outlined above would determine property tax rates. In fact, of course, local officials -- appointed and elected, both in general government and education -- have a safety valve they can pursue: increased state and federal grants.

Local government officials in Maine form a well-organized and influential lobby at the state level. Much of the information that state officials and legislators have at their disposal on taxation issues comes from individual local government officials or the Maine Municipal Association. (There are, of course, other significant sources of information, including the press, institutions of higher education, and national resources such as the National Conference of State Legislatures.) Local officials have a strong interest in shifting the tax burden for local public services to the state through more generous state grants-in-aid, especially in the form of revenue sharing. State aid, with minimum strings attached, gives local officials the ability to increase services to the local electorate without experiencing the negative political consequences of raising taxes. With the very large number of municipal governments and school districts in Maine, it should not be surprising that the opinions of local government officials are weighed heavily in the political process. At the same time, there is an offsetting force. State decision-makers are not particularly interested in suffering the negative political consequences of raising taxes only to have the political benefits of spending accrue to local officials. As a consequence, there will always be some resistance to additional no-strings-attached state subventions. The recent trend toward more specific state mandates for locally delivered programs no doubt reflects the legitimate desire of state legislators to influence the way the money they raise is spent. Resistance to increased state influence on local government spending decisions and the

understandable reluctance of state officials to transfer purchasing power to their local counterparts will act to offset the forces that otherwise would combine to reduce further the significance of the property tax in the mix of state and local tax sources in Maine. The traditional significance of the property tax will be further reinforced if a down-turn in the regional economy stems the windfall of tax revenues that could go into more generous state grant programs.

The nation's experiment with federal-to-local grants-in-aid appears over for the foreseeable future.

All things considered, the increasing demands for local public services that will accompany economic growth will not necessarily lead to higher property tax rates. Rates will remain level if property values and incomes rise proportionately with increasing expenditures and any pressure on rates that does occur will likely translate into at least some additional state aid. Based on these speculations, it seems fair to expect that the role of the property tax will continue to decline at a moderate rate for the foreseeable future. This is, of course, only a guess. Adoption in Maine of stringent state-wide controls on property taxes could lead to the kind of precipitous decline in the share of the property tax in state and local tax revenues witnessed in Massachusetts in recent years.

Property Tax Reform

A distinction should always be made between property tax reform -- mitigating the normative deficiencies of a tax -- and changes in the tax structure that are brought about by political forces reflecting the interests of politically influential segments of the electorate. Yet in the case of the property tax, the two motives for changing the tax law can overlap and reinforce one another.

For example, if the absolute burden of the property tax on low income persons is great and if, indeed, the tax is regressive, shifting the responsibility for funding primary and secondary education increasingly to the state will not only moderate these normative weaknesses of the tax, but also further the interests of local officials in reducing the locally-felt cost of higher education spending. This kind of synergism generates powerful political forces for change and accounts for the increasing popularity of property tax reform in Maine. Reform can be ethically defensible as well as politically convenient.

The same synergism does not arise, however, in the area of administrative reform. Constitutionally, equitable administration of the property tax is a state responsibility. Until the early 1970's this responsibility was totally decentralized in Maine with the consequence that measures of property tax assessment equity -- such as the coefficient of dispersion -- were as dismal as local assessing practices themselves. Radical efforts by the state to improve assessment equity by mandating regional assessment districts ran afoul of the political power at the state level of local public officials. A compromise between state control and local autonomy in assessing has been reached which should persist for the foreseeable future. Time did not permit an examination of what progress has been made in reducing assessment inequities, but a state-wide rise in assessment ratios suggests significant inroads into the problem.

Likewise, the distribution of political power has also thwarted efforts to respond to the problem of institutional property tax exemptions. Apparently, the number of communities with large proportions of tax exempt property is not large enough to generate legislation that would spread the costs of servicing exempt organizations over the entire state or would even permit local governments to levy charges in lieu of taxes. There is no reason to expect that this balance of political forces will be upset in the near future.

APPENDIX

Data Tables

Table I

Representative Tax System Tax Capacity Indexes

Year	US	ME	CT	MA	NH	RI	VT
1967	100	81	117	98	110	91	88
1975	100	84	110	98	102	88	94
1977	100	82	112	95	102	87	93
1979	100	80	109	93	96	84	85
1980	100	80	112	96	97	84	84
1981	100	79	110	96	95	80	84
1982	100	84	117	101	100	81	89
1983	100	90	124	107	108	86	94
1984	100	88	124	111	110	86	95
1985	100	89	127	113	112	88	97

Source: Advisory Commission on Intergovernmental Relations, Significant Features of Fiscal Federalism, 1988, V. 1, p. 98.

Table II

Representative Tax System Tax Effort Indexes

Year	US	ME	CT	MA	NH	RI	VT
1967	100	105	93	121	81	105	119
1975	100	104	99	129	75	112	108
1977	100	100	103	133	73	114	104
1979	100	110	102	144	78	121	110
1980	100	111	100	135	75	123	104
1981	100	113	103	134	74	130	105
1982	100	107	99	119	75	133	102
1983	100	100	96	112	69	126	95
1984	100	105	99	105	69	123	94
1985	100	104	99	106	65	118	93

Source: Advisory Commission on Intergovernmental Relations, Significant Features of Fiscal Federalism, 1988, V. 1, p. 99.

Table III

Average Effective Property Tax Rates, Existing Single Family Homes with FHA Mortgages

Year	US	ME	CT	MA	NH	RI	VT
1958	1.34	1.5	1.44	2.21	1.81	1.67	1.63
1966	1.7	2.17	2.01	2.76	2.38	1.96	2.27
1971	1.98	2.43	2.38	3.13	3.14	2.21	2.53
1977	1.67	1.65	2.17	3.5	NA	NA	NA
1981	1.26	1.42	1.53	2.43	NA	NA	NA
1982	1.26	1.52	NA	NA	2.39	NA	NA
1983	1.31	1.52	1.6	1.85	2.23	2.01	NA
1984	1.23	1.31	1.68	1.57	2.02	NA	NA
1985	1.21	1.28	1.64	1.33	1.87	2.08	NA
1986	1.16	1.21	1.46	1.08	1.55	1.49	NA

Source: Advisory Commission on Intergovernmental Relations, Significant Features of Fiscal Federalism, 1988, V. 1, p. 70.

Table IV

General Revenue from Property Taxes
Per $1,000 of Personal Income

Year	US	ME	CT	MA	NH	RI	VT
1971	47.37	57.57	56.91	66.28	63.57	46.66	54.72
1972	49.15	61.37	61.89	71.33	66.39	49.12	60.11
1973	48.41	61.74	66.05	74.11	62.69	48.89	64.36
1974	45.14	70.09	56.01	72.78	60.5	50.18	69
1975	44.71	50.89	54.59	75.14	64.51	49.99	66.15
1976	45.33	62.67	53.28	70.31	65.8	50.37	62.74
1977	45.53	44.95	55.92	74.25	65.69	52.07	61.97
1978	43.74	50.8	53.94	71.82	61.81	53.27	61.15
1979	38.01	48.3	51.49	68.84	58.9	53.04	55.58
1980	35.48	46.54	46.63	62.05	56.03	49.52	53.28
1981	34.66	44.79	44.7	57.88	54.98	47.8	52.23
1982	34.05	44.62	43.71	45.54	56.36	50.23	51.55
1983	34.71	45.79	44.68	43.19	56.76	49.92	48.32
1984	35.28	45.31	45.08	40.46	56.46	48.42	49.53
1985	34.35	43.86	42.73	38.56	53.66	46.16	49.69
1986	33.74	40.55	40.61	36.76	50.76	45.19	46.41
1987	34.35	41.97	43.27	36.25	55.74	45.29	48.83

Source: U.S. Bureau of the Census, Governmental Finances, Series GF-.

Table V

Per Capita General Revenue from Property Taxes

Year	US	ME	CT	MA	NH	RI	VT
1971	183.51	185.69	273.14	286.08	221.93	180.4	184.6
1972	202.33	203.75	307.68	324	247.75	200.81	214.69
1973	215.78	223.04	352.61	357.9	259.15	218.05	236.22
1974	225.9	280.88	331.28	383.5	278.01	252.23	276.16
1975	241.6	230.97	351.63	430.49	315.04	269.96	299.29
1976	265.54	297.01	368.93	430.52	347.91	294.14	307.88
1977	289.07	237.85	412.53	491.44	382.39	326.68	330.66
1978	304.6	289.67	436.09	521.95	393.67	360.73	353.31
1979	295.07	302.35	456.42	545.97	425.6	398.72	360.45
1980	302.42	319.47	473.14	554.91	450.63	413.42	376.71
1981	330.92	355.96	525.19	587.5	503.4	452.96	409.81
1982	361.59	383.47	564.9	509.98	572.15	513.21	453.68
1983	381.46	409.48	617.18	523.31	603.84	537.3	451.64
1984	408.44	442.24	667.95	533.72	666.07	561.3	489.86
1985	434.6	471.24	703.05	567.68	692.78	588.06	531.54
1986	463.38	477.83	730.98	601.12	737.98	624.12	556.05
1987	498.06	530.57	842.27	639.93	861.56	652.79	643.34

Source: U.S. Bureau of the Census, Governmental Finances, Series GF-.

Table VI

Per Capita Personal Income

Year	US	ME	CT	MA	NH	RI	VT
1971	3921	3257	4856	4360	3590	3902	3465
1972	4156	3375	4995	4562	3796	4126	3638
1973	4492	3610	5328	4855	4241	4483	3686
1974	5041	4082	5938	5253	4694	4841	4054
1975	5448	4590	6455	5757	4944	5343	4227
1976	5902	4786	6973	6114	5315	5841	4960
1977	6399	5365	7356	6588	6012	6328	5414
1978	7019	5734	8161	7258	6536	6775	5823
1979	7836	6292	8911	7924	7357	7472	6566
1980	8773	7039	10129	8893	8351	8510	7329
1981	9521	7925	11720	10125	9131	9444	7827
1982	10619	8535	12816	11128	9994	10153	8723
1983	11107	9042	13748	12088	10729	10723	9507
1984	11658	9847	14895	13264	12021	11670	9979
1985	12789	10813	16556	14784	13192	12840	10802
1986	13855	11887	18089	16380	14964	13906	12117
1987	14641	12790	19600	17722	15911	14579	13348

Source: U.S. Bureau of the Census, Governmental Finances, Series GF-.

Table VII

State Valuation by County

Year	ME	Andro	Aroost	Cumber	Franklin	Hancock	Kennebec	Knox	Lincoln	Oxford
1977	11657790	811000	626750	2637150	328950	672540	961950	451300	704250	495000
1978	16046700	1023850	935350	3363600	603350	953950	1332400	574850	835850	712700
1979	17737400	1135050	1040850	3782800	642459	1044300	1468350	641550	892450	792350
1980	19818200	1291350	1134750	4313550	688500	1148250	1626300	703850	939200	848200
1981	21884050	1421200	1225150	4876350	761400	1243150	1757500	759700	1004800	915200
1982	23652200	1502850	1266000	5261000	872500	1336300	1865300	830000	1067300	1067900
1983	25179450	1574250	1318300	5664950	924400	1453100	1940800	885550	1147400	1133450
1984	26829950	1632250	1385950	6150600	980850	1515900	2029450	914350	1234400	1218100
1985	29029700	1743650	1409450	6931050	1034600	1609250	2160900	979600	1323000	1296300
1986	32075530	1920600	1448950	8097600	1079500	1764150	2319050	1095800	1385200	1399800
1987	37013970	2133350	1528800	9796350	1147600	2005550	2584950	1287450	1599600	1534650

Source: Maine Bureau of Taxation, Municipal Valuation Return Statistical Summary.

Table VII (cont.)

State Valuation by County

Year	Penobscot	Piscat	Sagada	Somerset	Waldo	Wash	York
1977	1163500	127700	290950	356750	259500	298800	1471700
1978	1674250	186850	398200	647350	374150	481700	1948300
1979	1857450	212900	446450	702500	406750	500250	2170950
1980	2124250	232600	501500	765100	453900	538600	2508300
1981	2400700	248950	555850	815550	485450	560800	2852300
1982	2512150	267100	607300	899050	507150	601150	3189150
1983	2589650	277950	635950	1030500	527700	617250	3438250
1984	2653200	286800	702850	1179550	553350	631000	3761350
1985	2779450	301250	773050	1224750	584850	639750	4238800
1986	2934600	317850	865550	1242130	644000	644000	4897400
1987	3170300	344250	1015150	1299470	718900	711350	6136250

Source: Maine Bureau of Taxation, Municipal Valuation Return Statistical Summary.

Table VIII

State Valuation, Ten Largest Municipalities

Year	Portland	Lewiston	Bangor	Auburn	S. Port.	Augusta	Bidde	Sanford	Waterv	Bruns
1977	727000	345300	262450	203500	295800	198300	162900	124900	175250	148650
1978	862500	416700	385650	253800	365100	274700	207650	158550	221800	206550
1979	939300	455400	420100	287900	408350	307150	228250	181600	245400	239100
1980	1052200	512050	512150	332950	461150	338650	262450	211200	266050	262950
1981	1224150	548650	574950	376100	517400	370350	300800	246300	285250	292950
1982	1326850	579800	591600	394850	554550	399500	331650	264800	288600	318550
1983	1426300	599350	598900	423800	606250	408150	349750	291850	291000	350350
1984	1567800	613850	612250	442200	674900	427850	369750	304600	302350	390450
1985	1817100	656900	666750	478700	784450	456650	393850	344050	317850	435200
1986	2245100	728150	734800	523350	851300	500650	458500	396100	332500	488450
1987	2711400	803550	795800	584700	1042700	556700	581350	474950	374100	562100

Source: Maine Bureau of Taxation, Municipal Valuation Return Statistical Summary.

Table IX

Property Tax Assessment by County

Year	ME	Andro	Aroost	Cumber	Franklin	Hancock	Kennebec	Knox	Lincoln	Oxford
1977	266857.7	20276.4	16348	68123.6	6520.9	13052.7	20366.4	8815.9	11552.8	10498.4
1978	289649.7	21880.2	17180	74660.3	7000.8	13931.7	22723.4	9642.8	11541.2	11872.7
1979	310535.5	23093.9	19375.6	76946.4	7768.9	14919.4	24973.5	10696.2	11376.5	13240.3
1980	350975.8	24736.4	21631.5	85929.5	8924.5	16948	27945.9	12121.9	12475.6	15053
1981	386806.2	26613.6	23685.9	94263.5	9821.1	18217.7	29847.6	13617.9	13646.4	17426.3
1982	419823.1	29774.4	25192.5	106012.4	10349.9	19334	32016.7	14361.6	14289.2	18190.1
1983	446570.7	32836.1	26103.1	113100.9	11217.4	20068.1	34460.7	14604.2	15332.8	19436.7
1984	470760.6	34235	26930.1	119683.9	11961.1	21026.2	36990.4	14873.4	16379.1	19966.1
1985	500802.9	37170.3	27539.9	130025	13166.3	21858.5	38378.9	15068.9	17066.1	20789.8
1986	550479.1	41418.5	28896.8	145744.3	13323.3	23494.2	41678.6	16324.5	18664.8	22578.8
1987	625337.8	46777.3	31627.4	169394	14886.6	26812.8	46362.8	18851.9	20846.3	25376.2

Source: Maine Bureau of Taxation, Municipal Valuation Return Statistical Summary.

Table IX (cont.)

Property Tax Assessment by County

Year	Penobscot	Piscat	Sagada	Somerset	Waldo	Wash	York
1977	29938.2	3243.3	6663.6	8032.6	4888.1	6464.8	31972.1
1978	31411.3	3424.3	7120.1	8581.6	5271.5	7192.1	36215.8
1979	35015.7	3530.1	7873.5	10350	5941.9	7857.8	37574.7
1980	41776.5	3931.9	8999.6	11945.8	6706.8	9116.1	42732.7
1981	45399.3	4253.8	10222.1	13649.6	7363.3	10437.2	48340.9
1982	48654.4	4579.7	10622.1	14668.7	7732.3	10027.7	54016.9
1983	51580.6	4634.1	11757.7	15822.4	7913.2	10255.7	57456
1984	52713.4	4743.8	12834.1	16733.6	8027.7	10367.9	63294.8
1985	55602.6	4860.7	14212.8	17849.1	8504.1	10875.9	67834
1986	59125.4	5176.1	15483.4	20384.4	9743.4	11699.5	76743.2
1987	62438.2	5934.5	18141	21691.3	10700.4	12847.8	92649.3

Source: Maine Bureau of Taxation: Municipal Valuation Return Statistical Summary.

Table X

Property Tax Assessment, Ten Largest Municipalities

Year	Portland	Lewiston	Bangor	Auburn	S. Port.	Augusta	Bidde	Sanford	Waterv	Bruns
1977	23718.4	9131.1	9172.2	5691.2	8260.9	4943.3	3964.4	3279.4	3973.1	3950.7
1978	24093.8	9907.1	8451.3	6051.9	8542.4	5110.2	4333.8	4195	4539.4	4392.5
1979	24497.9	10260.8	9728.7	6382.9	9048.8	5854.1	4569.3	3884.9	4755.6	4787
1980	27508.1	10908.5	12214.4	6641.2	10196	6347.6	5102.1	4860.6	5623.5	5624.7
1981	30706.9	11621.2	14105.4	7204.3	10944.3	6885.8	5789.7	5555.7	5812.2	5766.9
1982	34277.9	12768.1	14664.5	8569	11911.7	7865.1	6868.1	6025.2	6296	5950.8
1983	38343.3	13948.4	15823.3	9793	12883.3	8860.7	7095.4	6254.9	6635.2	6816
1984	40785.2	14774	15500.3	10180.7	13618.7	9595.9	7912	6727.4	6910	7027.9
1985	44301	15828.5	16423.2	10922.8	14196.8	9793	8530.5	7023.5	7427	7916.7
1986	47990.9	17116	17128.3	12785.1	14918.6	11184.4	9243.6	7456.4	7584.1	8885.4
1987	55764.3	19530	18098.4	14484	18377.5	13068.4	12011.3	9115.9	7878.1	10144.6

Source: Maine Bureau of Taxation, Municipal Valuation Return Statistical Summary.

Table XI

Effective Property Tax Rate* by County

Year	ME	Andro	Aroost	Cumber	Franklin	Hancock	Kennebec	Knox	Lincoln	Oxford
1977	0.022891	0.025002	0.026084	0.025832	0.019823	0.019408	0.021170	0.019534	0.016404	0.021209
1978	0.01805	0.021371	0.018367	0.022197	0.011603	0.014604	0.017054	0.016774	0.013808	0.016659
1979	0.017507	0.020346	0.018615	0.020341	0.012092	0.014287	0.017008	0.016672	0.012747	0.01671
1980	0.01771	0.019155	0.019063	0.019921	0.012962	0.01476	0.017184	0.017222	0.013283	0.017747
1981	0.017675	0.018726	0.019333	0.019331	0.012899	0.014654	0.016983	0.017925	0.013581	0.019041
1982	0.01775	0.019812	0.019899	0.020151	0.011862	0.014468	0.017164	0.017303	0.013388	0.017034
1983	0.017736	0.020858	0.019801	0.019965	0.012135	0.013811	0.017756	0.016492	0.013363	0.017148
1984	0.017546	0.020974	0.019431	0.019459	0.012195	0.01387	0.018227	0.016267	0.013269	0.016391
1985	0.017251	0.021318	0.019539	0.01876	0.012726	0.013583	0.017761	0.015383	0.0129	0.016038
1986	0.017162	0.021565	0.019943	0.017998	0.012342	0.013318	0.017972	0.014897	0.013474	0.01613
1987	0.016895	0.021927	0.020688	0.017292	0.012972	0.013369	0.017936	0.014643	0.013032	0.016535

Source: Tables VII and IX. *Effective property tax rate = (tax assessment / state valuation).

Table XI (cont.)

Effective Property Tax Rate by County

Year	Penobscot	Piscat	Sagada	Somerset	Waldo	Wash	York
1977	0.025731	0.025398	0.022903	0.022516	0.018837	0.021636	0.021725
1978	0.018761	0.018326	0.017881	0.013257	0.014089	0.014931	0.018588
1979	0.018851	0.016581	0.017636	0.014733	0.014608	0.015708	0.017308
1980	0.019666	0.016904	0.017945	0.015613	0.014776	0.016926	0.017037
1981	0.018911	0.017087	0.01839	0.016737	0.015168	0.018611	0.016948
1982	0.019368	0.017146	0.017491	0.016316	0.015247	0.016681	0.016938
1983	0.019918	0.016672	0.018488	0.015354	0.014996	0.016615	0.016711
1984	0.019868	0.01654	0.01826	0.014186	0.014507	0.016431	0.016828
1985	0.020005	0.016135	0.018385	0.014574	0.014541	0.017	0.016003
1986	0.020148	0.016285	0.017889	0.016411	0.01513	0.018167	0.01567
1987	0.019695	0.017239	0.01787	0.016692	0.014884	0.018061	0.015099

Source: Tables VII and IX. *Effective property tax rate = (tax assessment / state valuation).

Table XII

Effective Property Tax Rates, Ten Largest Municipalities

Year	Portland	Lewiston	Bangor	Auburn	S. Port.	Augusta	Bidde	Sanford	Waterv	Bruns
1977	0.03262	0.02644	0.03494	0.02796	0.02792	0.02492	0.02433	0.02625	0.02267	0.02657
1978	0.02793	0.02377	0.02191	0.02384	0.02339	0.0186	0.02087	0.02645	0.02046	0.02126
1979	0.02608	0.02253	0.02315	0.02217	0.02215	0.01905	0.02001	0.02139	0.01937	0.02002
1980	0.02614	0.0213	0.02384	0.01994	0.02211	0.01874	0.01944	0.02301	0.02113	0.02087
1981	0.02508	0.02118	0.02453	0.01915	0.02115	0.01859	0.01924	0.02255	0.02037	0.01968
1982	0.02583	0.02202	0.02478	0.0217	0.02147	0.01968	0.0207	0.02275	0.02181	0.01868
1983	0.02688	0.02327	0.02642	0.0231	0.02125	0.0217	0.02028	0.02143	0.0228	0.01945
1984	0.02601	0.02406	0.02531	0.02302	0.02017	0.02242	0.0214	0.02208	0.02285	0.01799
1985	0.02438	0.02109	0.01463	0.02281	0.01809	0.02144	0.02165	0.02041	0.02336	0.01819
1986	0.02137	0.0235	0.02331	0.02442	0.01752	0.02233	0.02016	0.01882	0.0228	0.01819
1987	0.02056	0.0243	0.02274	0.02477	0.01762	0.02347	0.02066	0.01919	0.02105	0.01804

Source: Maine Bureau of Taxation, Municipal Valuation Return Statistical Summary.

Table XIII

Total Tax Revenue Per Capita

YEAR	US	ME	CT	MA	NH	RI	VT
1971	460.47	411.07	533.19	548.54	375.2	465.96	495.1
1972	522.49	470.35	630.91	638.59	426.85	513.9	560.52
1973	577.08	514.32	727.21	713.88	453.55	542.09	618.23
1974	618.39	597.42	688.55	766.68	482.67	606.2	661.07
1975	663.77	571.36	696.85	813.59	525.22	644.79	699.38
1976	730.52	671.42	777.84	902.71	571.44	710.52	742
1977	813.01	658.12	885.1	1001.87	618.36	792.82	810.1
1978	888	757.72	940.87	1098.06	669.46	848.18	836.7
1979	933.74	798.23	1012.95	1176.41	722.18	975.15	904.76
1980	986.57	858.26	1070.27	1243.37	739.98	992.46	900.02
1981	1079.31	944.52	1198.02	1347.7	794.62	1092.32	987.44
1982	1175.47	1022.73	1324.01	1353.04	925.55	1222.74	1106.42
1983	1216.27	1082.03	1433.58	1424.51	950.52	1294.91	1138.1
1984	1355.85	1228.84	1655.5	1549.42	1092.33	1402.95	1271.48
1985	1465.16	1327.6	1816.19	1715.39	1126.28	1478.65	1391.97
1986	1547.44	1413.78	1947.4	1933.31	1215.78	1532.08	1483.83
1987	1664.54	1614.18	2216.05	2105.39	1389.11	1720.18	1630.6

Source: U.S. Bureau of the Census, Governmental Finances, Series GF-.

Table XIV

Property Tax Revenue as a Percent
of Total Tax Revenue

YEAR	US	ME	CT	MA	NH	RI	VT
1971	0.398528	0.451724	0.512275	0.52153	0.591498	0.387158	0.372854
1972	0.387242	0.433188	0.487677	0.507368	0.580415	0.390757	0.383019
1973	0.373917	0.43366	0.484881	0.501345	0.571381	0.402239	0.382091
1974	0.365303	0.470155	0.481127	0.500209	0.575984	0.416084	0.417747
1975	0.363981	0.404246	0.504599	0.529124	0.599825	0.418679	0.427936
1976	0.363494	0.442361	0.474301	0.476919	0.60883	0.413978	0.414933
1977	0.355555	0.361408	0.466083	0.490523	0.618394	0.412048	0.408172
1978	0.343018	0.382292	0.463497	0.475338	0.588041	0.425299	0.422266
1979	0.316009	0.378776	0.450585	0.464098	0.589327	0.408881	0.398393
1980	0.306537	0.37223	0.442075	0.446295	0.608976	0.416561	0.418557
1981	0.306603	0.376869	0.438382	0.435928	0.63351	0.414677	0.415023
1982	0.307613	0.374947	0.426658	0.376914	0.618173	0.419721	0.410043
1983	0.313631	0.378437	0.430517	0.367361	0.635273	0.414932	0.396837
1984	0.301243	0.359884	0.403473	0.344464	0.60977	0.400086	0.385268
1985	0.296623	0.354956	0.387102	0.330933	0.615105	0.397701	0.381862
1986	0.299449	0.33798	0.375362	0.310928	0.607001	0.407368	0.37474
1987	0.299218	0.328693	0.380077	0.303948	0.620224	0.379489	0.394542

Source: Tables V and XIII.

The Commission on Maine's Future was established by the Maine Legislature in 1987 to "recommend a desirable and feasible description of the state's future," under bipartisian legislation originated by Senate President Charles P. Pray and cosponsored by Speaker of the House John L. Martin, Sen. Thomas R. Perkins and Rep. Donnell Carroll. Forty members were appointed by the Governor, President of the Senate and Speaker of the House to represent diverse viewpoints, backgrounds and regions of the state. The Commission's publications program is one part of a coordinated response to our legislative mandate. Reports in the series explore various aspects of Maine and its future and are intended to provide useful information, to provoke discussion and disseminate the Commission's findings as broadly as possible to the people of Maine.

THE COMMISSION ON MAINE'S FUTURE

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