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Proceedings of the 1986 Environmental Congress

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December 2-3, 1986
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St. Paul, MN

Sponsored by the
Minnesota Environmental Quality Board

Proceedings of the
1986
Environmental Congress

MINNESOTA ENVIRONMENTAL QUALITY BOARD

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Dear Reader:

Earth Day 1970 made us all realize that we must think about what we are doing when we affect the environment. The Environmental Congress held on December 2-3, 1986, gave many of us the chance to reflect on progress made since Earth Day and to lay out the problems facing us as we prepare for the year 2001 and the turn of the century. The following report outlines the efforts of more than 250 people who considered what are present problems, what are likely to be problems in the future, and most importantly what we should begin now to do in order to plan the future.

There is a common theme to many of the concerns that arose in the various sessions. That theme is the level and continuity of funding in programs that are addressing environmental problems. In almost every session people from industry, business and commerce, state agencies, educators, and citizen-activists agreed that concern for the environment must become one of the central issues of decision making. In order to assure that decisons are well founded there needs to be research and careful thought about the alternatives available to us.

Thus, you will discover as you read in more detail about each of the six issues discussed at the Congress that the delegates present want to be sure that environmental matters are established as central to the workings of the State. It is difficult to make plans for the future when there are up and down swings in the amount of funding available. Environmental planning extends well into the future and biennium funding causes major problems in planning programs when levels rise and fall. People are being asked to think about long-range problems with short-range budgets.

AN EQUAL OPPORTUNITY EMPLOYER

Discussions during the Congress also made it crystal clear that it is impossible to isolate environmental problems. The world is a complex system which defies pigeon-holing. Problems of water pollution cannot be separated from soil conservation, health, energy use, ethics, and education. More cooperation among state agencies and between state agencies and the private sector is needed. Cooperation can help eliminate working at cross purposes, and it can make government more efficient. Creating and running the Congress was an excellent exercise in the kind of inter-agency cooperation that is needed for the future.

Education was also a common theme among the participants. Education which is formal and directed at school children is terribly important to the future. Active, informed citizenship becomes more difficult with each passing year. Yet, those who have completed their formal education also need good, solid facts and information in order to make intelligent decisions about today, as well as the future. Each of us needs knowledge about ecosystems and values before we can make public and personal commitments to a healthier environment.

This report points out progress, draws attention to ongoing complex difficulties, and suggests directions for solving problems today and in the future. The Minnesota Environmental Quality Board is committed to using it to guide our future. I hope you will join us in making the future brighter and healthier.

Sincerely,

Edward Buchwald
Congress Chairman

EXECUTIVE SUMMARY

The Minnesota Environmental Quality Board (EQB) was created because the Legislature found that debate concerning the environmental future of the state was essential. The Legislature wanted to assure that the consequences of alternative decisions in respect to the environment can be better known and understood by the public and its government. Among the tools which the Board was authorized to use to foster this debate was an Environmental Congress.

The EQB held its first Environmental Congress in St. Paul on December 2 and 3, 1986. Over 250 persons attended, representing state, federal, and local governments; business and industry; educational institutions; and environmental and citizen organizations. Dr. Edward Buchwald, a citizen member of the EQB, chaired the Congress.

The Congress marked a point of reflection midway between the first Earth Day in 1970 and the end of the 20th century. The EQB convened the Congress to gather interested persons together to:

- Assess the environmental accomplishments since Earth Day;
- Identify current and future issues; and
- Recommend actions to resolve the issues of greatest concern.

ACCOMPLISHMENTS

Much has been accomplished since Earth Day. These accomplishments are outlined in detail in the text of the report and in the appendix. However, conference participants identified three broad areas of achievement in particular:

- Increased public awareness and understanding of the environment and environmental issues.
- Significant protective legislation and regulation in each of the important areas for environmental protection.
- The creation of effective public and private institutions dedicated to the preservation of the environment.

Although much remains to be accomplished, the achievements since the first Earth Day in 1970 have established a sound framework for future issue identification and problem-solving.

ISSUES

The environmental issues and problems which will require attention between now and the turn of the century may be more complex and difficult to resolve than the problems which have been addressed in the last 17 years. The issues which Congress participants anticipate emerging in the next 17 years are defined in greater detail in the text of the report; a complete listing of the issues raised is found in the appendix.

Cutting across all areas of discussion, three issues consistently emerged. These were:

- Adequate and stable funding.
- Improved coordination between and among governmental and private groups.
- More and better environmental education.

Interestingly, the areas noted as requiring attention are strongly correlated with areas in which Congress participants indicated that progress has been made. The conclusion appears to be that we have made progress in important areas, but the State of Minnesota cannot rest on the accomplishments of the past if it intends to maintain a position of national leadership in protection of the environment.

ACTIONS

The Environmental Congress focused discussion on six topic areas. Actions were recommended in each of these areas. As noted above, adequate and stable funding and improved coordination were issues which cut across each of these areas, and were items on which action was recommended. These issues are not repeated below, but, in the reader's mind, should be added to the listings for each topic area. Environmental education was a separate topic area and is discussed below.

- To protect the state's water resources, these key actions were recommended:
  - Improve ground water protection;
  - Establish a non-point source pollution control program;
  - Expand monitoring and improve enforcement; and
  - More clearly delineate the powers and authorities of the myriad of actors responsible for water resources management.
- To address the problems of hazardous materials and toxic substances, the following actions were recommended:
  - Develop alternative treatment technologies;
  - Improve risk assessment techniques;
  - Tackle the issues associated with pesticide use and management;

Hazardous materials and toxic substances, continued

- Expand research for new "threshold limit values" (TLV's);
- Complete the siting of a safe hazardous waste disposal facility; and
- Assure a continued balance between the preservation of environmental quality and concern for provision of an acceptable standard of living for citizens of the state.

- In respect to health and the environment, Congress participants recommended:
  - Actions designed to change the attitudes and behavior of individuals and institutions;
  - Increased attention to the issue of who should bear the costs of injuries resulting from the release of contaminants into the environment;
  - Evaluation of health risks in the face of uncertainties about the long-term effects of numerous substances; and
  - Increased research in environmental health to improve the currently incomplete and sometimes conflicting knowledge base.

- To assure exemplary management of our natural resources, Congress participants recommended:
  - Expanded inventories of the state's natural resources and improved access to these inventories;
  - Preservation of the public land base of the state;
  - Preservation of ecological diversity;
  - Expanded protection against soil erosion and contamination;
  - Establish a program for control of non-point sources of pollution (also listed under water resources, above); and
  - Improved methods of solid waste disposal and controls in respect to solid waste going to landfills.

- To deal with the problems of assessing environmental risk, the Congress participants recommended:
  - Expanded emphasis on determination of responsibility for risks imposed;
  - Improved linkage between science and the use of scientific findings in policy-making (and, in general, an improved decision-making process which makes better use of scientific data);
  - Preservation of biological diversity; and
  - Expanded research.

- To emphasize the area of environmental education, Congress participants recommended:
  - Improved visibility for environmental education, in part through better marketing of the need for environmental education;
  - Strengthened formal and informal education initiatives;
  - Value-centered education;
  - Additional planning for the delivery of the recently adopted elementary education requirement for environmental education; and
  - Improved training for those who will provide environmental education.

PRIORITY ISSUES

In addition to recommending actions, Congress participants suggested priorities for statewide attention. Participants recommended that Environmental Education be added to the EQB's priority issues listing. The priorities suggested will be considered by the Environmental Quality Board and used to revise the Board's 1985 priorities list. Priority Issues results are in the appendix.

ABOUT THE ENVIRONMENTAL CONGRESS

The six topic areas discussed at the Congress were selected from the priority issues list developed by the EQB in 1985. Two EQB members assumed responsibility for each topic area and led the respective Congress activities.

Water

Martha Brand, Citizen Member; Chair, EQB Water Resources Committee; Attorney, Leonard, Street and Deinard
Jim Nichols, Commissioner of Agriculture

Hazardous Materials and Toxic Substances

Tom Kalitowski, Director of Pollution Control Agency
Dr. Mary Arneson, Citizen Member; Physician, Occupational Medicine, Ramsey County Hospital

Health and the Environment

Sister Mary Madonna Ashton, Commissioner of Health
Barbara Hughes, Citizen Member; Executive Director, Ramsey County Lung Association

Natural Resources Management

Joseph Alexander, Commissioner of Natural Resources
Jack Ditmore, EQB Chair; Deputy Director of State Planning Agency

Environmental Risk

Mark Dayton, Commissioner of Energy and Economic Development
Richard Braun, Commissioner of Transportation

Environmental Education

Dr. Edward Buchwald, EQB Citizen Member; Chair, EQB Environmental Education Committee; Head, Geology Department, Carleton College
Robert Dunn, Citizen Member; Chair, EQB Long Range Planning Committee; Former Chair, Waste Management Board

NATIONAL SPEAKERS

Larry Downing, National President of the Sierra Club and Jacqueline Warren, Attorney for the Natural Resources Defense Council, were the luncheon speakers for the two-day Congress. They spoke about national and international environmental concerns. Mr. Downing focused on environmental health issues and Ms. Warren emphasized the legal aspects of the hazardous and toxic substances issue. (See Appendix for texts of speeches).

CONGRESS DESIGN

The Congress was designed for participants to both receive and give information. Attendees received a background paper on each topic which gave all Congress participants a general understanding of all topics. (See Appendix). Background information was cooperatively prepared by staffs of the Departments of Transportation, Health, Natural Resources, Energy and Economic Development, Agriculture, Pollution Control, and Education, as well as the State Planning Agency's EQB staff.

GENERAL SESSION

At the opening session, participants were welcomed by Lieutenant Governor Marlene Johnson who articulated the importance of the environment to the state. She also cited the importance of the results of the Congress to both the Governor and the state.

For each of the six topic areas, an EQB member presented general information, current issues and personal perspectives. Panel discussions which focused on the inter-relationships between the six Congress topics concluded the general session. (Texts of EQB member's speeches are in the Appendix.)

SMALL GROUP SESSIONS

To gather information from attendees, two sets of concurrent work group sessions were held on the six topics. Participants attended two sessions of their choice. Two EQB members led each work group.

At the small group sessions, participants first identified accomplishments in the topic area since Earth Day. Second, the attendees listed environmental issues and problems and "voted" for three issues to focus on between now and the year 2000. The attendees then made recommendations for actions to resolve the issues receiving the most "votes". The EQB members led a general discussion of the recommended actions at the end of each work group session.

CLOSING GENERAL SESSION

For the final wrap-up session, the EQB convened a public, regularly-noticed Environmental Quality Board meeting. EQB members summarized the results of the small group sessions and received comments from the Congress participants and the public.

During the public comment period, all speakers commended the EQB for holding the Congress. Almost all requested the EQB to hold Congresses much more frequently and several asked that similar meetings be held at locations outside the metropolitan area.

The Congress concluded with the EQB adopting a resolution to prepare and distribute a Congress Report to the Governor and Legislature, Congress participants, and others as appropriate. The Report will be reviewed and analyzed by the EQB's Long Range Planning Committee and used to prepare future EQB work programs.

TOPIC RESULTS SUMMARIES

Summaries of the results of the work group sessions are found in the following chapters. The summaries were prepared by a program staff person and reviewed by the volunteer participants listed in the Acknowledgements. The Appendix contains the transcribed, comprehensive lists generated by each work group.

WATER RESOURCES TOPIC AREA

ACCOMPLISHMENTS

The accomplishments of the last sixteen years in the water resources arena can be summarized in four categories: legislation; better understanding of water issues; improved water management; and increased public involvement and awareness.

LEGISLATION

A wide variety of state and federal legislation has been passed. A detailed listing can be found in this report's appendices.

Major laws, particularly at the state level, that have tied land use to water management include: the Wild and Scenic Rivers Act, Flood Plain Management Act, Shoreland Management Act, Public Waters Act Amendments, Protected Waters and Wetland Inventory Process, Soil Loss Limits Act, and the Re-Invest in Minnesota (RIM) initiative.

State and federal laws concerning pollution control, recycling, toxic substances management, and clean up of contaminated waters have bolstered protection of water resources. Major examples include the Clean Water Act and its amendments, the Toxic Substances Control Act, the state Acid Deposition Control Act, and the state and federal Superfund laws.

In addition to the above laws, passage of both state and federal Safe Drinking Water Acts, along with the state Water Well Construction Code has supported protection of public health.

Legislation that established and later merged the Environmental Quality Board and Water Planning Board focused on water resources planning and coordination. Legislation also encouraged (and required in the metropolitan region) comprehensive local water planning.

BETTER UNDERSTANDING

A better understanding of water issues is a major category of accomplishments since Earth Day. Participants cited the improved capabilities to detect both air and water pollutants and to predict their effects on water resources. Increased information about Minnesota's geology and its influence on water resources quality and quantity, and recognition of the relationships between land use and water quality and of the threat of toxic contamination of drinking water supplies are other examples raised by participants.

IMPROVED WATER MANAGEMENT

Participants identified improvements in various aspects of water management as landmark accomplishments. The particular aspects were: the major steps taken to control municipal sources of pollution; protection of wetlands; regulation of water well construction and abandonment; the evolution in solid waste management from open dumps to sanitary landfills to the emerging emphasis on resource and energy recovery; the new programs for erosion control; and beginning the set-aside of marginal farm lands.

It was noted that strides have been made in the development of water information systems and in the recognition of the interconnections between many complex facets of water resources.

The new responsibility defined for local governments in comprehensive water planning illustrates the growing movements to view issues holistically and recognize that wise water management requires a local-state partnership.

INCREASED PUBLIC INVOLVEMENT AND AWARENESS

Finally, increased public involvement and awareness of water issues and the effect this involvement has on the way government manages water was cited as a major achievement over the last 16 years.

PARTICIPANT'S ISSUES OF MAJOR CONCERN AND RECOMMENDED ACTIONS

Participants chose ground water protection and adequacy of funding as their main issues of concern in the water topic. Other top issues identified are education; non-point source pollution; failure of enforcement, monitoring, and evaluation of programs and decisions at all levels of government; and clear delineation of powers. Other issues identified are listed in the report's appendices.

ISSUE: GROUND WATER PROTECTION

To protect groundwater, participants recommended actions on:

- pollutant source reduction,
- a better understanding of ground water,
- development of criteria and standards for regulations affecting ground water,
- funding,
- public awareness, and
- policy/legislative needs.

Pollutant Source Reduction. To reduce the source of pollutants in ground water, participants recommended the use of recycling technology instead of polluting the land, air and water through landfills or incinerators. The primary sources of pollution should be identified and priorities set for addressing them. Controlling land use, outlawing land disposal of waste, moving toward total

recycling of waste and by-products and permitting only the application of pesticides that are biodegradable in groundwater were recommended actions. Participants also recommended establishing a statewide household hazardous waste management program and inventorying and properly sealing abandoned wells.

A Better Understanding of Ground Water. Recommendations for actions to improve understanding included: accelerating collection of data identifying aquifers and recharge areas and documenting water quality and better organization of the data (a central depository was suggested). Expanding research on ground water and pollutant movement, modeling of the fate and transport of contaminants, and the quality effects of water withdrawals also were recommended.

Criteria and Standards. Participants recognized the need to establish comprehensive standards for quality and quantity aspects of ground water management. They recommended developing criteria to define acceptable levels of various contaminants and the refining of risk assessment techniques. The resource value of ground waters needs to be categorized and the question, "Is non-degradation of ground water a feasible state policy?" needs to be addressed.

Funding. Actions recommended for ground water programs include enacting an adequate surcharge on pesticides for research and education needs and addressing the impact of changes in funding for waste treatment and other water issues (both federal and state funding).

Public Awareness. Participants ideas for action include the overall need for a ground water public awareness program and the need for industry cooperation in various aspects of ground water research and management.

Policy Changes. In addition to the items described above, participants recommended:

- further development of state legislative policy to coordinate agencies involved in ground water regulation and water use;
- further involvement of watershed districts in ground water protection;
- further support of federal legislation for groundwater protection and management;
- development of a cancer registry to link contaminants with incidence of cancer;
- encouragement, and possibly the requirement of routine water quality testing of private wells; and,
- developing local clearinghouses to oversee implementation and technical assistance efforts in ground water protection and management.

ISSUE: ADEQUACY OF FUNDING

Over 20 recommendations were made for funding water resources management. These included recommendations for: underlying considerations; type of fund; sources of revenue; and related public awareness needs.

Underlying Considerations. Participants recommended defining the real costs of water and passing it to users. Efficiently using available funds by targeting them to priority problems and finding innovative ways for spreading costs to all levels of government were also recommended.

Type of Fund. Suggestions included: adoption of a dedicated fund for water management; a water development fund for infra-structure; a "RIM approach or concept" to reinvest a portion of taxes from a specific resource use into water protection and improvement programs; and increased general fund support.

Sources of Revenue. Participants' recommendations included: receipts from deposits on containers; taxes on agricultural and other chemicals; stiffer penalties for violating regulations; endowments; assessing consumers and/or polluters the costs of cleanup, protection and maintenance; and increased taxes, including dedicated funds and user fees. Participants noted that new and novel funding sources need to be identified.

Related Public Awareness Needs. Participants cited the need for government to tell people how their taxes pay for programs that improve the quality of life through resource protection, and to communicate how much clean water is really worth. The need to particularly educate policy makers was noted.

ISSUE: EDUCATION

Education-related recommendations include: overall educational goals; educating targeted groups; and specific action steps.

Overall Goals. The need to create an overall sense of responsibility for water protection and management was cited. It was noted that this "responsibility" should embrace the concepts of cradle-to-grave education and coalition-building among diverse groups (such as farmers, consumers, and environmentalists).

Educating Targeted Groups. Actions recommended include:
- orient new officials to environmental issues;
- find ways to provide support for elected officials to undertake and continue water education programs;
- develop environmental education programs at primary and secondary levels, including curriculum specifications;
- have environmental groups develop their own priorities and involve all environmental groups in the process; and,
- mandate and train agencies to initiate education programs (coordinated through an adequately funded Minnesota Environmental Education Board [MEEB]).

Specific Action Steps. Participants recommended redirecting the University of Minnesota and Extension information and research to farming practices which do not degrade the environment -- shift some of the emphasis away from production practices. Developing a graduate degree in water resources management also was recommended.

Specific Action Steps for Education Issue, Cont'd.

Participants cited the need to provide a greater variety of informal education opportunities relating to water issues (e.g., through television). Establishing more nature centers and other visible demonstration projects relating to water issues; using "hands-on" experiential techniques in education relating to water issues; and, educating about the value of using recycled products were other recommended actions.

NON-POINT SOURCE POLLUTION

Session participants called for: recognition that ground water is as important a focus as surface water, and that atmospheric deposition should also be addressed. Flexibility in solutions, regulations, financial incentives, and technical assistance is needed. Additional recommendations were made in the areas of process and roles, information and research, and strategy components.

Process and Roles. Recommendations included:

- have statewide water quality planning and an integrated inter-agency strategy but rely on local controls and involvement;
- create federal/state/local partnerships;
- specify leadership needs and opportunities at appropriate levels of government;
- develop forums to monitor progress and refine programs;
- encourage cross-fertilization of professional expertise from various agencies and disciplines; and,
- expand the role of local health departments in addressing non-point issues.

Information and Research. Recommendations of the participants include developing new and better farm management practices and expanding water quality monitoring efforts. Updating land use, soils and hazardous materials information were other recommendations. Integrating data and activities relating to non-point pollution was cited as a need.

Strategy Components. Participants recommended actions were to:

- find creative ways to have businesses and farmers reduce non-point pollution, e.g., by demonstrating economic savings from using non-point measures;
- develop greater incentives for soil and water conservation than exist for increased production;
- adopt compulsory farm conservation programs (such as in Iowa), including mandatory soil conservation requirements;
- use local land use control measures to minimize pollution;
- urge or require disclosure of product effects on the environment by manufacturers;
- train staff and elected and appointed officials on non-point issues, and educate non-point contributors about source reduction methods; and,
- implement recommendations of the Non-Point Pollution Issue Team report.

ISSUE: FAILURE OF ENFORCEMENT AND MONITORING

Recommendations have been grouped into: overall approaches; education; and incentives and other strategies.

Overall Approaches. Participants recommended developing overall state goals and a plan for water management including identification of mission and statewide priorities, and funding needs/means. The current governmental framework needs to be evaluated to identify problems and gaps. Issues relating to enforcement and monitoring should be studied comprehensively and specific legislative recommendations made at the 1988 session.

Education. Participants recognized that increased awareness of the need for enforcement and monitoring is needed and recommended providing better information to the state legislature and other elected officials (including county commissioners) through seminars, workshops, and other mass media efforts. The public needs to be educated about agency roles, procedures and penalties and participants recommended that the Environmental Quality Board be responsible. Specifically target local legal and enforcement officials for education about the importance of program enforcement. A broader understanding of, and agreement on standards needs to be developed.

Incentives and Other Strategies for better enforcement and monitoring of water programs recommended by participants include:
- provide incentives to implementing units to promote better enforcement;
- require increased assessment and monitoring of existing programs, including annual reports and audits by and to oversight agencies and the Legislature;
- evaluate state programs with neutral professionals (e.g., the legislative auditor or Environmental Quality Board);
- use the concept of "sunset" laws with extensions tied to objective evaluations from outside of state government;
- make willful violators liable and assign responsibility;
- tie funding of programs/projects to compliance;
- authorize state agency enforcement staff to write tickets for violations of local or state regulatory programs; and,
- provide adequate financial and technical assistance for program monitoring and enforcement.

ISSUE: CLEAR DELINEATION OF POWERS

Nine recommendations included:
- identify the coordinating unit within state government and give it the power to act;
- centralize water-related data collection and management;
- recodify all state water statutes;
- develop local government alternative models, and consider organization of local water authorities on resource boundaries
- consider mandating watershed district for major watersheds
- reform local zoning authorities to assure consistency across jurisdictions and include incentives such as the "use it or lose it concept."

HAZARDOUS MATERIALS/TOXIC SUBSTANCES TOPIC AREA

ACCOMPLISHMENTS

Participants easily identified numerous accomplishments since Earth Day associated with our ability to manage hazardous materials/toxic substances. In general, accomplishments fell into four broad categories: increased awareness, regulations, scientific/technical advances, and problem identification and solution.

INCREASED AWARENESS

One main area of accomplishments centered on increases in public education and public awareness of the problems and issues associated with hazardous materials and toxic substances. The public knows that not all aspects of technology are good and that land use and pollution are connected. Further, citizens and business and industry accept hazardous materials/toxic substances management and public health as an environmental issue.

However, lack of awareness, or lack of inclination to change behavior based on awareness, remains as an issue. Participants stessed a lack of, or inadequate, education and information dissemination. Specific problems included lack of consumer responsibility, throw-away lifestyle, and sacrifice of environmental quality for standard of living.

LEGISLATION/REGULATIONS

The establishment of regulatory agencies and the promulgation of legislation and regulations appeared prominently on the lists of accomplishments. The Environmental Protection Agency, Minnesota Pollution Control Agency, and Minnesota Department of Health were specifically noted.

Regulations that enhance our ability to control the use and disposal of hazardous materials and toxic substances have increased dramatically. These include regulations governing the use of substances, such as the federal Insecticide, Fungicide, and Rodenticide Act, state Pesticide Control Act, Occupational Safety and Health Act, employee right to know requirements, and regulations governing the emissions or discharges of substances, such as the Toxic Substances Control Act, Acid Rain Deposition Control Act, and the Clean Water Act.

Examples of advances controlling disposal and clean-up included the state (MERLA) and federal (CERCLA) superfund programs and the Resource Conservation and Recovery Act. Participants cited as significant the regulations to ban products such as lead, asbestos, and PCB's, and efforts to guard against future problems. This included the Minnesota Environmental Policy Act and Waste Management Act.

While advances have been made in legislation and regulations, problems still remain. Participants identified the need for adequate enforcement of existing laws and improved regulations based on best available control technology. Specific problem areas noted included pesticide use and disposal, leaking landfills, hazardous waste facility siting, and illegal dumping.

SCIENTIFIC/TECHNICAL ADVANCES

Major scientific and technical advances have been made. The sophistication of our ability to assess risks and benefits and to detect toxic compounds has increased. Participants cited accomplishments in the areas of treatment processes, waste reduction, proper disposal, recycling efforts, and major manufacturing improvements to eliminate hazardous waste production have been made.

However, problems remain, including a lack of research on ecosystem effects, human disease and health risk; and a lack of standards and delineated acceptable risk levels.

PROBLEM IDENTIFICATION AND SOLUTION

The final area of accomplishments dealt with the ability to identify problems and initiate solutions to those problems. Included were superfund efforts of hazardous waste site identification and cleanup, waste disposal facility siting efforts, advances in monitoring, and movement away from landfills.

Problems noted in these same areas included lack of adequate data, difficulty in siting a hazardous waste disposal facility, need for better identification of generators and disposal sites, and assured continuation of cleanup efforts.

PARTICIPANT'S ISSUES OF MAJOR CONCERN AND RECOMMENDED ACTIONS

As noted repeatedly in the above discussion, many remaining hazardous materials/ toxic substances problems and issues relate to the same areas as the accomplishments. In general, participants in both sessions noted that, while significant progress had been made in specific areas, additional actions in these same critical areas still were required.

A complete listing of all of the issues and problems identified by participants is in the Appendix to this report.

ISSUE: INCREASED AWARENESS

Three of the top eight issues identified dealt with some aspect of public awareness. These were: inadequate education and dissemination of information; lack of education and awareness throughout society, including the exaggerated fear of cancer stemming from such a lack; and sacrifice of environmental quality for standard of living, including excessive consumption of resources and lack of conservation.

Also included within the top twenty issues were lack of consumer and generator responsibility/throw away lifestyle, and the need to integrate environmental concerns into product development, advertising and manufacturing. The common theme was the belief that improvements in education and the use of incentives can foster more informed and environmentally responsive citizen and industry actions.

Recommended actions ranged from formal education to improved enforcement of existing standards. A comprehensive environmental education program was deemed appropriate at all levels. Specifically, participants recommended that environmental education on hazardous materials and toxic substances be developed at the primary, secondary, college, extension and community level. Attendees recommended mandatory environmental education at the secondary level. Requiring that scientific literacy be made a condition for high school graduation was also recommended.

General educational recommendations stressed informing the public of the true costs and hazards of product manufacturing, use and disposal. Public campaigns, media blitzs, establishment of an information resource center and hot line, and better product labels were suggested. Coordination of efforts of state and federal agencies, local units of government, private groups and others involved in information dissemination was also stressed as a way to avoid duplication of effort and to ensure complementary approaches. The need to educate news media personnel was also stressed.

Finally, delegates recommended that incentives and fees be used to change additudes and practices. These included incorporating the costs of waste disposal and environmental degradation into the cost of products, and encouraging recycling and repackaging.

ISSUE: LEGISLATION/REGULATIONS

The need for improvements in the areas of regulations and standards was also a common theme. Better regulation of pesticide use and disposal was among the top eight priorities, as were the problem of lack of standards and acceptable risk levels and lack of standardized risk assessment procedures. Pesticide use was among the top twenty issues, together with the need to regulate nonpoint sources of pollution and household and small quantity generators of hazardous wastes, and problems associated with nonuniformity of standards across the nation and world.

Pesticide use and disposal control recommendations covered education, use of incentives, and alternatives to current pesticide use practices. General education of users and consumers was recommended, along with specific education of farmers and other users through mandatory certification or registration. Product labeling to focus on and promote biodegradability was also recommended, as was a conference to educate the pesticide industry and pesticide users on existing pesticides regulations.

Incentives for more environmentally responsible pesticide use were suggested. These include deposits on containers to promote recycling and taxes on non-biodegradable pesticides. Finally, promotion of pest management approaches that integrate all possible techniques and controls with accurate assessments of need were recommended. Development of alternatives to pesticide use and of ways to reduce application rates and frequencies were also recommended.

Recommendations regarding risk assessment stressed the determination of appropriate and acceptable levels of risk and uniform health risk assessment and management procedures. Establishment of an interagency task force was recommended to develop risk assessment policies and standards for specific substances. Avoiding duplication of effort, funding health research, and increasing monitoring activities were all considered necessary for development of an adequate risk assessment/risk management program.

ISSUE: SCIENTIFIC/TECHNICAL ADVANCES

Numerous areas were mentioned as requiring scientific and technical advances. Included in the top eight issues were the development of alternative waste treatment technologies and the lack of adequate resources for research, particularly in the area of establishing new or revised health advisory levels. Also among the top 20 issues noted under this category were better research generally, and research into ecosystem effects and disposal and treatment technologies specifically.

Recommended actions for development of alternative treatment technologies included encouragement of federal research and development programs, funding research and pilot projects, and providing a central clearinghouse for information on proper treatment and disposal techniques. Delegates also recommended that development of treatment and disposal technology be required before product marketing, and that use of new technologies be required. Alternative approaches to establishment of disposal facilities were suggested. Other recommendations called for direct and indirect subsidies to encourage pilot project development, and state supported construction of a hazardous waste incinerator with economic incentives for further site development.

A major focus of the recommendations addressing research needs was the establishment of priorities. Specific categories for research priorities were identified: toxic standards; threshold limit values (TLV); Radon; multiple exposure/synergism; and toxicity categorization. Establishing a technical review board to identify and prioritize needs and developing a process to review research requests were also recommended.

To improve information flow, fostering cooperation among researchers, academia and agencies; and, establishing easily accessed technical data bases were recommended. Two approaches to funding research were suggested: legislative appropriations and passing costs on to consumers.

ISSUE: SITING HAZARDOUS WASTE DISPOSAL FACILITY

Siting a hazardous waste disposal facility was among the top eight issues in the hazardous waste/toxic substances area. The need for waste disposal sites was also among the top twenty issues, as were better data for problem identification, and continued waste site identification and cleanup.

Recommended solutions to the hazardous waste disposal facility siting problem included providing incentives, payments and appropriate mitigation to local governments and impacted landowners. Delegates also recommended that the credibility of the siting process be better established by providing greater technical assurances and safeguards and by providing for more public education and citizen participation. Finally, recommendations to improve the technical aspects of disposal and site selection were suggested. These included improving isolation technology, conducting baseline studies, developing alternative technologies for waste handling, and reducing disposal needs through recycling and treatment.

HEALTH AND ENVIRONMENT TOPIC AREA

ACCOMPLISHMENTS

Accomplishments identified by participants in the Health and the Environment sessions can be organized into four broad categories: scientific and technical; public awareness and education; reductions in contaminant levels and legislation/regulation. Although accomplishments are numerous, participants noted that much remains to be done in each of these broad category areas.

SCIENTIFIC AND TECHNICAL

Major accomplishments have occurred in the environmental medicine field. Participants cited improvements in medical equipment and techniques and the growing awareness of bio-accummulation as a significant problem by scientists and the general public. Also noted was the increasing ability to identify new health/environmental problems such as lead, groundwater contaminants, ozone and acid rain. The introduction of risk assessment to evaluate health impacts was another accomplishment cited.

Advances in research technology have resulted in improved analysis, monitoring and data collection, standards, and health risk assessment capability and other improved analytical capabilities.

PUBLIC AWARENESS AND EDUCATION

A major accomplishment cited was the growing public awareness of the tie between health and the environment. Participants identified an increasing respect for and value of the environment as well as a shift in emphasis to prevention rather than cure. Recognition of smoking as an environmental hazard, chemical contamination of water supplies, indoor air quality and the food/health relationship were noted as specific examples.

Awareness of the need for a holistic approach to problems; the concept of the global/local system; and the need for intergovernmental cooperation were cited as advances which have positively affected the health and environment issue.

Removal of toxic substances from the marketplace, accountability (cost/profit), better land use practices and improved personal fitness were cited as business and individual accomplishments in the awareness and education category.

REDUCTIONS IN CONTAMINANT LEVELS

The conversion to unleaded vehicle fuels as well as reductions in other lead products were identified as major accomplishments. Landfill abatement/open dump closing, combined sewer separation, and abatement of water pollution point sources were recognized as specific actions which have reduced contaminants in the environment.

LEGISLATION/REGULATION

The advance of emergency planning has been a major accomplishment. Participants listed as accomplishments numerous specific legislative and regulatory actions in the Health and Environment area:

- Safe Drinking Water Act
- Clean Air Act
- Clean Water Act
- Toxic Substances Control Act
- Superfund Act
- Resource Conservation and Recovery Act
- MN Clean Indoor Air Act
- MN Acid Rain Control Act
- MN noise standards
- Occupational safety laws--OSHA, NIOSH
- Pesticide regulation
- FDA (Food and Drug Administration)
- NEPA/MEPA (environmental impact assessment)

PARTICIPANT'S ISSUES OF MAJOR CONCERN AND RECOMMENDED ACTIONS

A comprehensive listing of all of the issues and problems identified by participants is in the Appendix to this report.

Both groups in the health and environment topic area identified the following top issues (although the order varied each day): resources funding; changing the attitudes and behaviors of individuals and organizations; and evaluating health risks in the face of uncertainties.

ISSUE: RESOURCES FUNDING

The need to use resources more efficiently was a major theme. Participants recognized the need to better identify and prioritize a framework of health issues and recommended that the solutions emphasize prevention rather than cures. Simplifying the state's regulatory matrix and reallocating existing resources were other actions recommended to increase the effectiveness of existing resources.

The use of financial incentives aimed at preventing problems was recommended. The need to obtain increased appropriations was acknowledged and was tied to better informing the public of program costs and past accomplishments.

Participants recommended finding alternative (non-tax) sources of program funding and suggested foundation funding as well as dedicated funds based on user fees and penalties. Increased volunteerism and

cooperative approaches between government, industry and the public also were recommended as ways to increase resources.

Participants recommended that regulated industries/groups should pay for regulation and the revenue generated should be tied to the risk imposed by the activity. The user fee concept was strongly supported by participants in regard to water use and sewage and waste disposal. In particular, it was suggested that the waste disposal fees should be based on volume as an incentive to reduce waste.

ISSUE: CHANGING ATTITUDES AND BEHAVIOR

Participants recommended that the state develop and implement a comprehensive state environmental policy as well as mission plans and goals for agencies and programs. Better coordination among governmental units and increasing the cooperation between government and private organizations were recommended to counter lobbying efforts by established organizations.

It was recommended that agencies and organizations cooperate to produce public service announcements aimed at modifying attitudes and lifestyles. Participants noted that information should be produced which focuses on facts rather than rhetoric. Establishment of an information clearinghouse was another recommended action.

Participants stated that alternative behaviors should be explored, but expectations should be realistic and recognize the existence of vested interests.

Other actions recommended were: better education programs; improved communications; grassroots/non-governmental solutions; corporate responsibility; financial incentives (e.g., bottle deposits) and disincentives (e.g., taxes); motivational research; and, citizen/peer pressure.

ISSUE: EVALUATING HEALTH RISKS

This issue relates closely to a main point made by Commissioner Ashton in her address to the Congress -- that one of the biggest challenges is the development of exposure standards for pollutants which cause chronic health effects.

Participants recognized the need for more research and more funding. They recommended that agencies, industry and educational institutions commit to basic research and that the state's universities provide the research necessary to support state regulatory actions.

The need for formalized risk assessment and management was noted by participants. They recommended using consistent criteria for assessing risk. Finally, the participants noted the need for better quality data and certification of laboratories and better training of personnel.

Other actions cited were: educate the public and the decision-makers about distinctions between "tolerable risk" and "risk-free"; reduce the risk from new products by requiring assessment of risks before products are put on the market; require an evaluation of alternatives; and, in case of future liability, require a posting of bond before a product can be sold.

NATURAL RESOURCES MANAGEMENT TOPIC AREA

ACCOMPLISHMENTS

Accomplishments listed by the two group sessions for Natural Resources Management covered the full range of topics. The comprehensive listing (in the appendices of this report) shows substantial progress in protecting and managing Minnesota's natural resources since Earth Day. This summary presents the major accomplishments by natural resource topic area.

FISH, WILDLIFE, AND NATIVE PLANT RESOURCES

The ecological concept of habitat, and its protection and management, were listed repeatedly. Steady progress has been made in identifying, acquiring and managing habitat which supports valued species. Participants mentioned both public and private programs and emphasized the Department of Natural Resources' programs for deer, wild turkey, and pheasant. They noted the DNR/Department of Transportation strategy for roadside habitat management and DNR's fish intensification programs, specifically the Lake Superior sport fish program.

The state Reinvest In Minnesota (RIM) and the federal Conservation Reserve laws enhanced habitat protection and development, as have wetland protection and restoration programs.

Expanded programs to manage adequate populations of important species have been generally successful. Funding methods, such as pheasant and duck stamps and other dedicated funds, were considered an accomplishment. The Turn-In-Poachers (TIP) program was noted as an effective enforcement tool.

The Nongame Wildlife program and its funding by income tax checkoff was voiced as a benefit to all citizens. Legislation which created scientific and natural areas and protecting endangered species was also noted.

FOREST RESOURCES

Many accomplishments listed under other resource areas relate to forest resources, though several were specific to forests. The Forest Management Act of 1982 was a major accomplishment, as were programs to inventory forest resources and promote utilization and management of aspen. The state shade tree progam has also been important.

MINERALS

Mineral exploration and evaluation of potential development have increased. Major efforts with the copper-nickel studies and the DNR peat inventory and management program are underway. The Mineland Reclamation Act was a significant legislative accomplishment.

RECREATION RESOURCES

Highlights in recreation resources include the continued development of state parks, trails and water accesses, specifically the snowmobile trails and canoe and boating routes. Outdoor recreation opportunities have expanded. The Boating-While-Intoxicated program was an important regulatory accomplishment. Handicapped access has expanded and tourism promotion increased. The Legislative Commission on Minnesota Resources' recreation program was also an accomplishment. The Outdoor Recreation Act of 1975 expanded recreational opportunities in scientific and natural areas, state parks, state trails, wild, scenic and recreational rivers, water accesses, wildlife management areas, and state forests.

The Boundary Waters Canoe Wilderness Area and Voyageurs National Park were created and subsequent additional protections established. Recreation opportunities on Lake Superior and the St. Louis River were also developed.

WATER RESOURCES

Many accomplishments overlap with those in the Water small group sessions but are noted here because of their importance to natural resource management.

Water and wetlands protection was improved. Data inventory and collection expanded. Water quality standards and improved wastewater treatment were established.

Regulatory accomplishments included: federal Executive Orders for protection of wetlands and floodplain management, the U. S. Army Corps of Engineers 404 Wetland permit process, state and federal water bank programs, the Surface Water Management Act and Protected Waters Act. Watershed management programs and local water planning were also cited as contributing to improved water quality.

GENERAL

Several interdisciplinary areas of accomplishment were also identified. Better planning was identified in the areas of long-range strategies, improved resource assessment, integrated resources management, and environmental assessment. The Land Management Information Center, now the Planning Information Center, was established. Expanded resource inventories across all resource types were recognized as important planning tools.

Increased citizen awareness and participation was a theme noted in conjunction with several listed accomplishments, as was improved interaction between public agencies and private groups. The EQB's interdisciplinary mandate, the increased attention to public education both through DNR programs and the school systems, and the 1986 Environmental Congress were all considered accomplishments.

ISSUES TO BE FOCUSED ON FOR FURTHER DISCUSSION

Nearly 140 issues were generated, some of which were duplicative or similar. A comprehensive listing is in the Appendix.

ISSUE: FUNDING FOR NATURAL RESOURCE MANAGEMENT/ PERMANENT FUNDING FOR THE REINVEST-IN-MINNESOTA PROGRAM

Suggested additional sources of revenue include:

- expanding and dedicating a portion of the sales tax to resource management and staffing
- a federal excise tax on additional types of sporting equipment (cross-country skis, bird seed, snowmobiles, binoculars)
- a cigarette and liquor tax
- a deed tax (development of real estate)
- exploring new user fees (have all users pay a share)
- state lottery proceeds
- unrefunded bottle/container desposits

Participants recommended improving management efficiency to stretch budgets further. Increased efforts to prioritize and focus program evaluations would also realize cost savings. Delegating some programs to local or county governments was also recommended as a method of stretching scarce monetary resources.

Expansion of federal funding to mandated programs, such as acid rain and wastewater treatment, would reduce state expenditures. The groups also noted that the release of federal dedicated funds (Land and Water Conservation) would lessen budget constraints.

The development of innovative private programs to include increasing private sector and foundation donations and sponsorship and/or use of existing state funds to leverage private monies (matching grants) also was recommended.

The two groups ideas for obtaining adequate and stable funding included:

- political action;
- accountability for DNR expenditures;
- public education and involvement;
- government involvement at all levels;
- priority determinations; and,
- use of natural boundaries for management and regulation.

ISSUE: AGENCY/GROUP COORDINATION

Participants recommended improving coordination among private groups and all public agencies as a way to reduce costs and enhance management. Other recommended actions to improve coordination included personnel transfer and sharing among state agencies and, implementation of existing and new interagency agreements. Holding an annual natural resource coordination conference before

legislative sessions; intergovernmental training; and creating a central data repository were suggested actions. Finally, it was recommended that the state should establish as a high priority improved coordination among resource agencies.

ISSUE: CURRENT AND ACCESSIBLE INVENTORIES

Resource inventories were identified as important tools in natural resource management and planning. Forming an interagency working committee to standardize data and establishing a clearinghouse for computerized data bases of environmental resources were actions recommended to improve inventories.

The participants noted that adequate budgets must be established for data collection and management, and that funding is a necessary prerequisite to turning raw data into accessible and useful information. When developing programs for data collection, both data collection and service requirements to sustain the system should be included. Users should be trained to operate the systems and be familiar with their versatility. The group also recommended that systems should be updated continually to preserve their usefulness.

ISSUE: PRESERVATION OF PUBLIC LAND BASE

Participants recognized the need to determine the highest and best use of public land and consolidate various units of public land if appropriate. Priorities should be determined for development of public lands. Participants also recommended that alternatives to acquisition, such as leasing, set aside programs and conservation reserve programs should be promoted. The groups' also suggested that adjustments in payments to counties may be appropriate.

ISSUE: PRESERVATION OF BIOLOGICAL AND ECOLOGICAL DIVERSITY

The first effort of a general work plan should be to identify the components of natural systems, such as plants, animals, habitats, climate, etc. An inventory should then be developed, focusing on components such as endangered species and critical habitats. Programs to monitor key components should be coordinated with resource units.

Management should also be coordinated, with emphasis on setting goals, priorities, acquisition where appropriate, preservation through cooperation of public and private entities, and development of suitable land use controls. Outreach to the public through education is also necessary.

ISSUE: SOIL EROSION AND CONTAMINATION

Participants recommended that goals set by the current inter-agency Non-point Pollution Issue Team be supported. These are: establishing special projects to solve high priority existing or potential water quality problems caused by non-point sources of pollution, using land management practices implemented through statewide programs, protecting resources from further degradation by non-point souces of pollution; and achieving water quality goals.

It was recommended that public education programs in soil and water conservation be adequately funded. Participants also recommended that the state support passage of the Clean Water Act and full implementation of the 1985 federal "Farm Bill", specifically provisions for sodbuster, swampbuster, cross compliance and conservation measures. At the state level, the state drainage code needs revising and state erosion control laws are needed. Finally, shelterbelt restoration was recommended along with mandatory watershed planning and expanded private incentives for conservation.

ISSUE: NON-POINT WATER POLLUTION

Though related to the soil conservation issue discussed above, participants considered the non-point pollution issue as a specific problem facing the state. They recommended that agricultural sources of non-point polluton should be the primary focus of efforts. It was also recommended that existing ditch laws be enforced (specifically buffer strip requirements) and that pools should be added at specified distances when reditching or constructing new ditches.

Monitoring of non-point pollution on ground and surface waters should be improved. Interagency agreements to formalize working relationships between agencies need to be completed. The best and most economical management practices should be identified and disseminated to agricultural, urban and forest-based communities. Direct benefits of non-point pollution control should be emphasized by, and to, public and private entities. Again, participants emphasized the need to implement the provisions of the federal farm bill.

ISSUE: SOLID WASTE DISPOSAL AND GENERATION

The two groups identified the need for more research, education and statewide intergovernmental coordination to deal with solid waste issues. They recommended legal and financial incentives for recycling and reuse of solid waste. To reduce litter, passage of a bottle bill and continued educational emphasis was advocated. Market development to facilitate reuse of tires should be expanded. Encouraging waste reduction through education, funding, and packaging regulations and expanding recycling and marketing of recycled materials were recommended by participants.

OTHER ISSUES

A complete list of issues identified by participants can be found in this report's appendices.

ENVIRONMENTAL RISK TOPIC AREA

Environmental risk cuts across the Congress topics of water, natural resource management, hazardous materials/toxic substances, health, and environmental education. All of these involve environmental risk and were frequently mentioned in the group sessions. Most of the participant comments focused on how to improve, revamp, and restructure the decision-making process to better incorporate environmental risk assessment and management.

ACCOMPLISHMENTS

The 37 accomplishments listed by the participants of the two group sessions have been divided into three general areas and summarized. A complete listing can be found in the appendices to this report. Participants categorically stated that listing an accomplishment did not mean that improvement is not needed. They also commented that in some accomplishment areas ground gained has been lost in recent years.

INCREASED PUBLIC AWARENESS

The public has become increasingly aware of the environment and its finite resources, of environmental risk, risk assessment, and risk management. Public groups have been formed to carry out education and encourage activism.

ESTABLISHMENT OF EFFECTIVE INSTITUTIONS, PROGRAMS, POLICIES

More effective environmental institutions, programs, and policies have been established. The Environmental Protection Agency and the Pollution Control Agency were created. Environmental review and permitting processes have been established. Environmental programs have been funded and management techniques have been initiated.

INCREASED KNOWLEDGE AND COMMUNICATION

The level of knowledge about risk has increased. Improvements in technology and scientific information now link public health concerns to broader environmental issues. New methods and concepts of risk analysis have gained acceptance. Cooperation between government, industry, and interest groups has increased.

PARTICIPANTS' ISSUES OF MAJOR CONCERN AND RECOMMENDED ACTIONS

All issues raised are listed in this report's appendices. Included below are the top three issues and participants' recommended actions from each day.

ISSUE: RESPONSIBILITY FOR ENVIRONMENTAL RISK

According to participants, responsibility for risk should be determined and the responsible level of government identified. Participants noted that "Who pays", i.e., who bears the risk, who pays for damages which might occur, and who pays for the prevention of future damages must be determined also.

Participants recommended analyzing the existing environmental assessment framework to identify gaps and problems and use as a basis for developing alternate courses of action. Selected courses of action concerning risk assessment and management must be implemented.

The groups concluded that coordination of both intra and interstate government responsibility and review must be improved. The EQB has relinquished significant authority to agencies and local units of government and subsequently has lost the ability to coordinate environmental issues. In many cases the only way to make the present system responsive to environmental concerns is through litigation. The EQB needs to play a greater role in the whole environmental process to ensure sound environmental review and strengthen coordination across agency lines.

Costs and implementation must go hand in hand, combined through mechanisms such as user fees. A long-term assessment framework is needed to ensure an understanding of the full impact of a decision, the cost of correction, the cost of prevention and which costs should be borne by government and which by the private sector.

ISSUE: LACK OF LINKAGE

Linkage between science and policymakers is lacking and poor agreement exists among scientists regarding environmental research. Several recommendations addressed ways to establish and encourage increased communication between scientific and political communities, including organization of workshops and forums. Legislative committees, such as the new technology committee in the Minnesota House of Representatives and legislative hearings could have important roles.

Funding for research/study to increase the knowledge of environmental risk and the accuracy of risk assessment must be obtained. Some of the funding to the University of Minnesota should come through state agencies so that research would more directly address public needs as identified by the agencies.

Participants also recommended establishment of a "science court" (as proposed by the National Academy of Science) to resolve differences among experts.

ISSUE: PRESERVATION OF BIOLOGICAL DIVERSITY

Biological diversity should be preserved. Local, comprehensive planning and management is a very important element in preserving diversity.

Public, legislative, and agency awareness of the importance (absolute necessity) of preserving biological diversity must be strengthened by making it a high priority, and providing incentives. The impacts of proposals on individual species must be considered.

Participants recommended that an inventory of present biological diversity be conducted and compared with past diversity inventories.

Reforming local and state land and water planning; implementation of habitat protection; reclamation; and programs to preserve existing biological diversity were also recommended by the participants.

ISSUE: LACK OF FORMAL RISK ASSESSMENT OR MANAGEMENT PROCESS

The group recommended establishing two task forces to provide a formal process for risk assessment and management. Both should be formed and directed by the EQB or by the Governor.

The first would be a public task force to address broad public policy. It would assure broad public, private, government, interest group, and academic representation and involvement in incorporating risk analysis into public policy. The group's charge should include the determination of acceptable risk, where risk analysis should be included, and general methods of risk assessment and management.

The second task force would be an interagency work group (with input from the public and private sectors) charged with standardizing risk assessment/risk management procedures. The rulemaking process should be used to codify recommendations and develop operating procedures.

ISSUE: MORE RESEARCH

The State should be involved in more research on environmental risk.

Participants recommended establishing a task force to: review and propose research and funding for establishing the parameters for risk analysis; determine the best way to incorporate risk analysis into public choice processes; and differentiate research needs and standards for different issues, i.e., economics, health, environment.

Research should be conducted to find biological markers that indicate exposure to a particular substance, the degree of exposure, and the changes which have occurred as a result of exposure.

ISSUE: INADEQUATE DECISIONMAKING

The State's traditional decisionmaking process is inadequate. Participants recommended establishing a task force to examine the incorporation of risk analyses policy into an agency's traditional decisionmaking process while assuring that the agency's integrity and public involvement is preserved. Other recommendations included: alternative considerations earlier in the process; assigning the cost of risk management decisions to the benefactors (public or private); and incorporating regional planning into the process.

ENVIRONMENTAL EDUCATION TOPIC AREA

ACCOMPLISHMENTS

Participants listed many diverse environmental education accomplishments. They have been grouped into five categories: Awareness; Legislation/Regulation; Institution/Organization development; Curricula/Other Educational tools; and Public/Private partnerships. A complete listing of the accomplishments is in the Appendices.

AWARENESS

Public awareness of the environment, its issues and problems has increased significantly since Earth Day. Awareness of the legitimacy of specific environmental problems such as radioactive waste, hazardous waste, energy, conservation and acid rain were cited as accomplishments in the environmental education area.

Awareness of the importance of education to the resolution of environmental issues has increased, especially in the state agency, business, agriculture, mass media and education communities.

LEGISLATION/REGULATION

Elementary environmental education, and the creation of Environmental Education specialties in the Department of Education (MDE) and Department of Natural Resources (DNR) were significant achievements. So, too, was legislation, such as the Waste Management and Energy Acts, which require education for specific environmental problems.

INSTITUTIONS/ORGANIZATIONS

The Minnesota Environmental Education Board (MEEB), the Regional Environmental Education Councils (REEC), an Environmental Education Specialty in MDE and DNR were established. Many environmental groups and organizations have been created or grown. Numerous environmental programs have been initiated, such as MCC, YCC, (Jr. naturalist programs) 4H and BSA conservation projects, the St. Paul Environmental Education Magnet school, and volunteer stewardship programs through the churches.

CURRICULA/EDUCATIONAL TOOLS

Curricula, e.g., Project Wild, Learning Tree, Great Lakes, and Agstravaganza have been developed. Agency and private groups have developed general educational tools such as Acid Rain Tapes, and the Smokey the Bear campaigns, as well as specific materials for specific audiences for specific purposes.

PUBLIC/PRIVATE PARTNERSHIPS

Many of the identified accomplishments point to the importance of public/private partnerships to environmental education in Minnesota. Beginning with the Regional Environmental Education Councils (small, state-supported staff with regional volunteers) numerous accomplishments have depended upon public/private cooperation. Some cited by participants were: Roadsides for Wildlife; SWCD environmental education mandate, nature centers, environmental education camps, Minnesota zoo, MN Beautiful, and NSP energy education workshops.

Participants noted that the listing of accomplishments is strikingly similar to the listing of issues and problems. Although significant gains have been made, much remains to be done. Past accomplishments have lain the ground work for future actions and refinements.

PARTICIPANT'S ISSUES OF MAJOR CONCERN AND RECOMMENDED ACTIONS

During the Congress, a variety of diverse issues surfaced. All of the issues raised are listed in the appendices.

The top issues of concern included the need to: stabilize and sustain environmental education in Minnesota; develop a statewide coordinating structure; market high quality environmental education for all Minnesotans; and, strengthen and improve formal and informal environmental education.

ISSUE: STABILIZE AND SUSTAIN ENVIRONMENTAL EDUCATION IN MINNESOTA

The actions recommended for this issue fell into two distinct areas -- ethics and funding.

Ethics. Participants adopted an environmental education "mission statement" to foster and support an environmental ethic which treats the planet with the care it requires to survive ecologically:

"Environmental education is a life-long process. Its aim is to impel people into value-forming experiences. It is a way of looking at life, fostering awareness of other life and of inter-relationships, learning to recognize the effects (both good and bad) man has on his physical and biological surroundings, and the responsibilities he must accept for the mere fact of his presence and his activities in the environment. It should enable him to make sound ecological decisions and foresee their consequences; to make value judgements, and act accordingly. Environmental education encourages development of life, values and a style of living which minimizes destruction and maximizes those relationships that enhance life. It is learning how to contribute to the quality of life, and its fosters the constructive use, rather than exploitation, of the environment."

The participants agreed that this statement will be periodically evaluated and revised as appropriate.

Funding. A primary concern was the need for adequate, stable funding to stabilize and sustain environmental education. Participants recommended developing diverse sources of funding from state agency programs, various private sources, and non-state government sources.

Participants also recommended that appropriate state agencies include environmental education as a line item in their budgets.

ISSUE: DEVELOP A STATEWIDE COORDINATING STRUCTURE

Participants recommended developing more effective and cohesive coordination networks in both the public and private sectors. A statewide coordinating structure should establish goals, inventory existing educational resources and evaluate curriculum for interdisciplinary and value contexts. Evaluating past accomplishments to learn from successful strategies and developing the funding incentives listed above are other duties recommended for the coordinating structure.

Strengthening MEEB and restoring its advisory committee with expanded representation was recommended. An adequate, stable source of funding for the coordinating structure was recommended also.

ISSUE: MARKETING HIGH QUALITY ENVIRONMENTAL EDUCATION FOR ALL MINNESOTANS

Participants recommended the following actions to address the marketing issue: identify audiences, then develop programs to address specific group needs; find new and different ways to market environmental education; identify the benefits of environmental education and market them professionally.

Worthy programs should be professionally developed and marketed. Recommended marketing strategies include: develop campaign in mainstream media newspapers, radio, TV (includes Cable), billboards, and weekly columns; and, involve major advertisers and corporations to support a strong message which bolsters their own image.

ISSUE: IMPROVE AND STRENGTHEN FORMAL AND INFORMAL ENVIRONMENTAL EDUCATION EFFORTS

Actions recommended for formal education were to: implement a teacher and administrator training program which includes certification, continuing education and assures comfort with topic familiarity; develop a value-centered education that concentrates on lifestyles, philosophy, and moral and ethical considerations; develop and implement a secondary level requirement for environmental education; implement the elementary rule; professionally develop curriculum materials; obtain local commitment from school boards and administrators for support and/or initiation of in-service training for teachers; and stress "hands on" participatory activities and better access to the outdoor classroom.

Actions recommended for improving informal education included exploring new ways to educate diverse groups (e.g., farmers, homemakers, etc.) that address their interests. (Also, see Marketing Issue above).

RECOMMENDATIONS FOR ACTIONS CHART

Recommendations for Action

For comprehensive, verbatim actions see Appendix

Hazardous Materials / Toxic Substances

EDUCATION
-Coordinate efforts
-Funding legislation
-Mandatory secondary education
-Scientific literacy to graduate
-College, community toxics classes
-Agency involvement in formal ed.
-Educate media
-Support Waste Education Roundtable
-Involve industry, public
-Charge education fee at purchase
-Money awards
-Media blitz - source reduction/ safe disposal/alternatives
-Better labelling; proper disposal
-Use U of M Extension and others
-Information resource center and hot line

ALTERNATIVE TREATMENT TECHNOLOGY
-Central clearinghouse for info
-Free market disposal determination
-Pre-marketing treatment/disposal techniques
-Federal research and development
-Legislate waste minimization
-Enforce new technology use
-Build hazardous waste incinerator
-Incentives for siting incinerator
-Fund research and development pilots

RESEARCH FOR NEW TLV"s
-Prioritize, focus research
-Research priorities should be:
  Toxic standards
  Threshold Limit Values (TLV)
  Radon
  Multiple exposure/synergism
  Toxicity categorization
-Pass cost to users
-Legislate funding
-Foster cooperation among researchers, academia, agencies
-Establish data base on contaminant levels/public health effects
-Expand agency in-house research
-Inform public

DISPOSAL FACILITY SITING
-Incentives to local government
-Develop alternative technologies
-Recycling/treatment reduce need
-Site near generation
-Technically sound site & buffer
-Improve isolation technology
-Educate public
-Citizen participation
-Do Baseline studies
-Allocate generator responsibility
-Credibility of siting process
-Legislate authority:siting agency
-Technical assurance of impacts

RISK ASSESSMENT
-Federal responsibility
-Increase state monitoring
-Fund health research
-Standardize risk assessment
-Avoid duplication of efforts
-Determine acceptable risk
-Create interagency task force

PESTICIDES
-Control manufacturers labels
-Incentives for biodegradable
-Deposit on pesticide containers
-Educate users, consumers
-Pesticide regulation conference
-Reduce application rates/frequency
-Educate farmers - calibration
-Promote integrated pest mgmt.
-Mandatory application registry
-Tax non-biodegradable
-Develop alternatives

LIFESTYLE/ENVIRONMENTAL QUALITY
-Establish real cost of resources
-Enforce existing standards
-Recycling/repackaging incentives
-Visible risks of lifestyle
-Awareness campaigns
-Use appropriate technology
-Comprehensive environmental ed.
-Higher user fees

Environmental Risk

DETERMINE RESPONSIBILITY
-Assess current govt. framework
  -Identify problems and solutions
  -Implement appropriate actions
-User fees
-Coordinate govt. - EQB role
-Mandatory container deposit
-Distinguish between correction/ prevention and public/private costs
-Gaps in env. risk assessment
-Strengthen high state leadership

SCIENCE/POLICYMAKERS LINKAGE
-Fund research, study
-Workshops/forums
-Legislative hearings
-Increase communication
-Agencies fund U of M research
-Establish science court

FORMAL RISK PROCESS
-Commission/task force to:
  -Decide risk analysis methods
  -Decide "acceptable risk"
-Interagency council to:
  -Standardize risk assessment/ management procedures
-Use rulemaking process

RESEARCH
-Expand
-Increase state funding
-Focus - body load, synergistics
-Task Force to determine:
  -Methods, limits of risk analysis
  -Ways to incorporate in public choice
  -Substantive research needs

PRESERVE BIOLOGICAL DIVERSITY
-High state priority
-Incentives
-Educate public on need
-Funds for international development
-Inventory
-Reform land, water planning
-Proposal impact on species

INADEQUATE DECISION PROCESS
-Task force - agency incorporation of risk analysis
-Cost of risk mgmt. decisions
-Rulemaking process
-Earlier alternative consideration
-Regional planning

Environmental Education

STRENGTHEN FORMAL EE
-Secondary requirement
-Higher education
-Local commitment
-Participatory activities
-Exploration

STRENGTHEN COORDINATION
-Agencies voting members of MEEB
-Fund broad-based steering group
-Determine responsibilities
-Better coordination mechanisms
-Develop networks
-Issue identification

MARKETING
-Media campaign - develop image of environmental education
-Professional public relations
-Audience identification
-Identify new ways

TEACHER TRAINING
-Certification requirements
-Continuing education
-Promote teacher/subject comfort
-"Technical support"
-College credits for EE
-Evaluation

IMPLEMENT ELEMENTARY RULE
-Plan for delivery
-Curricula development
-Inventory inter-disciplinary topics/values

DIVERSE FUNDING SOURCES
-State agency program incentives
-Support incentives - non-govt.
-Support from other govt. levels
-Adequate, stable funding

VALUE-CENTERED EDUCATION
-Mission statement

WATER

GROUNDWATER
-Individual well testing
-Well inventory
-Well abandonment procedures
-Identify aquifers, recharge areas
-Categorize resource value
-Expand research
-More data; better organized
-Pesticide surcharge for research
-Biodegradable pesticides only
-Comprehensive standards
-Water use policy
-Watershed districts involved
-Groundwater education
-Fate and transport modeling
-Local clearinghouse
-Regulatory agency coordination

EDUCATION
-Primary and secondary
-Funding
-Mandate agencies to educate
-Water curriculum
-Sense of responsibility
-New and elected officials
-Create coalitions
-Process include all groups
-New issue training
-Value of recycling
-Non-degradable farming practices
-Visible demonstration projects
-Water resources graduate degree

NON-POINT SOURCE POLLUTION
-Funding
-Compulsory farm programs
-Mandatory soil conservation
-Statewide planning; local controls
-Local Health Dept. role
-More water quality monitoring
-Integrated agency strategy
-Implement issue team report
-Executive branch priority
-Legislative branch priority
-Focus research on farm chemicals
-Identify, implement BMPs
-Include ground water
-Include atmospheric deposition
-Forums to monitor progress
-Source reduction through education
-Specify leadership
-Use land use control measures
-Disclosure of product effects
-Develop new farm practices

FUNDING
-Industry awards for recycling
-Dedicated funding
-Deposit bill
-Users pay real costs of water
-Polluters/consumers pay for cleanup
-Endowments
-Raise Taxes
-Increased general fund support
-Fund basic and applied research
-Target funds to priority problems
-Educate policy makers, public

ENFORCEMENT AND MONITORING
-More and secure funding
-Comprehensive study of issue
-Incentives for better enforcement
-Educate public
-Educate and assist local officials
-Mandate evaluation of programs
-Neutral, professional evaluators
-Understanding and agreement on standards
-Willful violators liable
-Overall state goals/plan

CLEAR DELINEATION OF POWER
-Local govt. alternative models
-Joint Powers; MOUs
-Consistent local zoning
-Include incentives
-"Use it effectively or lose it"
-Identify coordination units, empower
-Re-code all water statutes
-Mandate major watersheds districts
-Organize on resource boundary
-Mandatory lab. certification
-Professionalism at all levels

HEALTH AND ENVIRONMENT

RISK ASSESSMENT
-Research funding
-Product assessment before use
-Consistent criteria
-Evaluate alternatives
-Post pre-sale liability bond
-Better personnel training

ATTITUDE/LIFESTYLE
-Develop mission plan/goals
-Education
-Grassroots/non-govt. solutions
-Corporate responsibility
-Financial incentives
-Citizen/peer pressure
-Motivational research
-Alternative behaviors
-Information clearinghouse

RESOURCE FUNDING
-Cooperate: govt./industry/public
-User Fees
-Foundation funding
-Increase volunteerism
-Increase government efficiency
-Reallocation of existing resources
-Increase appropriations
-Simplify state regulatory matrix
-Prevention instead of cure
-Dedicated funds
-Revenue generated tied to risk
-Prioritize framework of health issues

VESTED INTEREST IN STATUS QUO
-Comprehensive env. state policy
-Increase govt./private cooperation
-Increase govt. coordination
-Better communication
-Realistic expectations
-Focus on facts vs. rhetoric

INCOMPLETE/CONFLICTING KNOWLEDGE
-Basic research commitment
-State univ. research for state regulatory actions
-Formal risk assessment and management process
-Educate on "tolerable risk" vs. "risk-free" distinction

NATURAL RESOURCES MANAGEMENT

PRESERVE PUBLIC LAND BASE
-Determine highest, best use
-Consolidate where appropriate
-Develop land with potential
-Leasing, Set Aside
-Conservation reserve
-Adjust county payments

FUNDING
-Increase funding
-Possible sources
 -Dedicated sales tax
 -Fed. excise - sporting goods
 -Non-returnable containers
 -Cigarette tax (smokeless tobacco)
 -User fees (needs study)
 -Liquor tax
 -Deed tax
-Better mgmt/coordination/planning
-Prioritize/focus program eval.
-Accomplish above goals by:
 -Political action
 -Accountability
 -Public education/involvement
 -Involve all government levels
 -Develop priorities
 -Use natural boundaries

SOIL EROSION/CONTAMINATION
-Support NPS team goals
-Soil and water conservation ed.
-Implement 1985 Farm bill
-Revise state drainage code
-State erosion control laws
-Shelterbelt restoration
-Mandatory watershed planning
-More private conserv. incentives

SOLID WASTE DISPOSAL/GENERATION
-Research
-Incentives for recycling/reuse
 -Legal and financial
-Education
-Intergovernmental coordination
-Tires: market development
-Litter: bottle bill, education
-Reduction: education/package regs./ market recycling

NPS POLLUTION
-Concentrate on agriculture
-Enforce ditch laws
-Add pools when ditching
-Improve monitoring
-Interagency implementation
-Inform about BMPs

UPDATED/ ACCESSIBLE INVENTORIES
-Committee to standardize and other inter-agency issues
-Clearinghouse for computer data base
-Revitalize "Index"
-Budget data collection, management
-Update collection for usefulness
-Service program to sustain system
-System and versatility training

AGENCY/GROUP COORDINATION
-Personnel transfer and sharing
-Implement existing/new agreements
-Resolve merger issues
-Annual Nat. Res. Coord. Conference
-Central data repository
-Intergovernmental training
-Priority on coordination

ECOLOGICAL/BIOLOGICAL DIVERSITY
-Identify/inventory components
-Monitor components
-Public education
-Prioritize - set goals
-Acquisition
-State/private conservation
-Land use control
-Embryo and tissue bank

Proceedings of the 1986 Environmental Congress

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APPENDICES

CONGRESS FORMAT

DECEMBER 2, 1986
MORNING SESSION

8:00 Registration Desk opens

9:00 ALL-CONGRESS SESSION IN MAIN BALLROOM
Panel presentations and discussion of Water, Hazardous Substances and Toxic Wastes, and Health and the Environment Topics

10:30 Break

10:50 Panel presentations and discussion of Natural Resources Management, Environmental Risk, and Environmental Education

12:00 LUNCH IN ATRIUM OF TOWN SQUARE. Speaker: Larry Downing, National President, Sierra Club

AFTERNOON SESSIONS

1:30 SMALL GROUP SESSIONS AS ASSIGNED AT REGISTRATION.
Approximately 40 registrants per session.

Break

4:30 RECEPTION IN SWIMMING POOL/GAZEBO AREA - THIRD FLOOR

DECEMBER 3, 1986
MORNING SESSION

8:30 Reception Desk Opens

9:00 SMALL GROUP SESSIONS AS ASSIGNED AT REGISTRATION.

Break

12:00 LUNCH IN ATRIUM OF TOWN SQUARE. Speaker: Jacqueline Warren, Natural Resources Defense Council.

AFTERNOON SESSION
OPEN TO PUBLIC AND OBSERVERS

1:30 EQB MEETING. ALL-CONGRESS SESSION IN MAIN BALLROOM
Presentations of results of small group sessions.
Public Forum and Board Response

4:30 Congress Closure

LAWRENCE DOWNING
PRESIDENT, NATIONAL SIERRA CLUB

HISTORICAL PERSPECTIVE

A little over a century ago, when Minnesota was settled, life expectancy was much shorter. Early settlers faced a range of health problems that we can hardly imagine. Can you recall the health problems endured by the pioneer families as so vividly described in books such as Laura Ingalls Wilder's "Little House on the Prairie" series, or in D. E. Rolvaag's classic, "Giants in the Earth?" Did you see the movie, "The Immigrants", that described in painful detail the barriers to a full and normal life endured by our ancestors who crossed the Atlantic to settle this part of the country?

Childbirth fever, typhoid fever, typhus, tuberculosis, cholera, and dysentery are merely a few of the better recalled scourges that savaged the hardy citizens of that period.

If we were to think of the progress that we have made in the last century, surely better health and longer life would be at the top of the list for most of us. We commonly attribute the progress that has been made in these areas as triumphs of the science of medicine. Some of the medical research that largely eliminated those threats to good health, was conducted right here in our state. For example, the cure for tuberculosis was actually developed first at the Mayo Clinic in Rochester.

What we lose sight of is how much of the improvement in our health was actually due to improvements in our environment. Waterborne diseases like typhus and cholera were major pioneer problems, linked with good water supplies, not drugs. Similarly, malaria was the scourge of the lower Mississippi Valley until we dealt with the mosquito problem. Filtration of dust from air supplies in the iron mines resulted in some reduction in lung diseases. Other intestinal diseases were eliminated or greatly reduced by proper sewage disposal. Sepsis in the almost primitive surgery of that period resulted most often simply from unsanitary working conditions.

TODAY'S CHALLENGES

We are in danger of making the same faulty generalizations in confronting our current health challenges. We tend to overestimate the importance of CURATIVE medical science and underestimating the importance of PREVENTATIVE environmental science.

Let me give you some examples of environmental health problems that are well understood but not yet adequately dealt with.

We understood pretty well the relationship between air pollution and various lung diseases. Yet, more than half of our population still lives in areas that exceed health-based air pollution standards. 1987 is the year by which federal compliance standards for air quality must be met. Yet, 72 metropolitan areas are not in compliance, and at least 30 of those areas have no chance of compliance next year. The Environmental Protection Agency (EPA) has indicated no solution or plan of action to deal with this dilemma.

We know a great deal about water-carried health threats. We have made strides in the clean-up of some waterways. Yet, since 1972 four times as many streams and lakes have had water quality degraded as have been improved.

Toxic waste dumps are "time-bombs" to our health in a multitude of ways. However, the EPA has cleaned up only a small handful of superfund sites. We are still dumping most of our hazardous waste into landfills which we certainly know will eventually leak into our environment.

The unhealthy effect of pesticides to our health is well-documented. Yet, at the present rate of EPA progress, it will be the year 2030 before we get unsafe pesticides off the market and out of our food supplies.

Certainly, we here in Minnesota have made many good environmental health strides. Elimination of the dumping of asbestos-containing tailings into Lake Superior by Reserve Mining is one example. Our Indoor Air Quality Act which has greatly our exposure to cigarette smoke in public places is another. We have adopted and enforce some good air and water quality standards in this state.

But lest we somehow become complacent, let us recall that there are many frontier areas where science is very scanty. What is the health impact of indoor air pollutants such as Radon? Is there a possible link, as some believe, between acid rain, aluminum in water supplies and Alzheimer's disease? What is the role of toxic chemicals in our soaring cancer rates, or in reproductive health problems such as sterility and birth defects?" And what do you suppose are the possible health effects of inadequately regulated commercial genetic engineering?

In these areas we need more and better scientific information. Even with the best of intentions we cannot widely regulate here in Minnesota where data is scanty or nonexistent. Yes, these areas I have cited need more research, but a great deal of caution in permitting unregulated exposure of our population to these risks is unwarranted.

Common sense indicates that we need to move ahead much faster than we have both with developing better environmental health data and using the data we have to take protective action.

RESPONSE TO THIS CHALLENGE

What should our response to these challenges be?

Unfortunately, at the national level, we face continued foot-dragging and recalcitrance from the Executive branch. In a joint TV interview with me last week, Lee Thomas, head of the EPA, cited a lack of adequate funding as a problem. Yet, there are several areas where EPA has both authority and adequate funds yet refuses to regulate adequately. The current Administration lacks the will to deal effectively with many of our environmental health problems.

Consider this, the Clean Water Act received unanimous approval from both the House and Senate. My desk was flooded with copies of letters from the offices of the Governors of most of these 50 states pleading for the President to sign this much needed legislation. Yet it was vetoed!

Superfund was reluctantly signed by Reagan, but already the Office of Management and Budget is talking about funding at only partial and inadequate levels.

We in Minnesota have couragously set an example with tough acid rain control regulation. However, the White House urges still more study in the face of omnibus results from its own prior scientific studies.

White House footdragging mirrors the general response of much of industry. We note the continued pattern of suing EPA whenever the agency does act to regulate health risks. Look at the massive campaign that utilities are mounting against acid rain clean-up. Witness the introduction by the oil industry at the end of the last Congress of legislation to exempt that industry from many environmental standards under RCRA, Safe Drinking Water Act and the industry and some public utilities to take short cuts on the safety of operating nuclear power plants, construction standards, waste disposal facilities, etc.

Congress is sometimes more responsive, but is also subject to pressure from industry and the White House. On the plus side the last Congress did pass a good Superfund bill, a good Clean Water Act, and improved Safe Drinking Water Act.

On the minus side, the Clean Air Act continued to be bogged down in Congressman Dingle's House Committee in spite of Congressman Sikorski's dedicated leadership. The pesticide bill was weakened by the House with language preempting some state authority over pesticide residues in food. Congress did not deal with pressing nuclear power safety issues. Regulation of commercial chemicals under TSCA continues to be a myth. Efforts by Senator Durenberger to obtain federal protection for ground water were thwarted.

Minnesota has been an environmental quality leader, both in the public and private sector. In many respects our laws and regulations are models for other parts of the country. I believe, our present laws and regulations result in part from a heightened sophistication and awareness by our residents of environmental concerns. We in the Sierra Club take great pride in our part in these statewide efforts.

Some of our industries have taken lead roles in pollution control--3M has a pioneer toxic waste reduction program. NSP stands in contrast in many respects to many utilities across the country when it comes to environmental responsibility. Our state's congressional delegation has, with few exceptions, advocated responsible environmental positions.

However, there are still problems even here. For example, why have Pillsbury and General Mills not taken a lead in the Grocer Manufacturer's Association in preventing them from working to preempt state regulation of pesticide tolerances in food?

More leadership is needed in the governmental and corporate sectors.

Folks, the public is way ahead of everybody on these issues. California's Proposition 65 on toxics passed in the face of a five million dollar campaign against it waged by the oil and chemical industry, showing that the public wants much more aggressive action against environmental health problems. Polls consistently show people identifying that environmental health issues are of greatest concern to people in this country, ahead of economic concerns as serious as jobs and growth.

Many environmental groups such as the Sierra Club are leading and riding this tide of public concern. Our organization, now 94 years old, is led, in the tradition of the venerable John Muir, by volunteer activists, such as I am, from across this country. Our agenda is set by democratic processes. We have just reached an all-time high of 400,000 members, active in 57 chapters and 339 groups in the United States and Canada.

We in America do not have to choose between environmental health and economic prosperity. A healthy environment is necessary for a truly healthy economy. We can have both, but only if we act aggressively and vigorously at all levels of society.

MINNESOTA CAN LEAD THE WAY

I propose a goal for the 1990s: eliminate all identified environmental health problems in Minnesota. This is a monumental task, but it is not fantasy.

I suggest the following timetable:

By 1990 we can identify and categorize the environmental health problems in Minnesota into three categories:

1. Those problems whose dimensions are understood and whose control methods are identified.

2. Those problems which are understood, but whose control methods have yet to be developed.

3. Those "frontier" areas, where the problems are still not fully understood.

By 1994, we should implement environmental health strategies for category 1; design strategies for category 2; and complete research on category 3 problems.

By 1997, we should implement environmental health strategies for category 2: and design strategies for category 3.

By the year 2000, we should complete implementation of health strategies for category 3.

This is ambitious; this is bold; this is challenging. But, this is not impossible. It simply requires that we start treating our environmental health problems with the priority that they deserve, and move beyond the fruitless debate about whether we should try to eliminate them.

If we had continued to debate whether it was "cost effective" to eliminate such 19th century scourges as malaria, typhus, typhoid fever, childbirth fever, cholera, and dysentery, we would still be facing the kind of insecure, disease-ridden and short lives that afflicted our pioneer ancestors.

Minnesota can do better. I think it should do better. And I challenge each of you to join with me in making it better--for us, our children and all succeeding generations.

JACQUELINE M. WARREN
ATTORNEY AND TOXICS PROJECT DIRECTOR
NATURAL RESOURCES DEFENSE COUNCIL
December 3, 1986

Thank you very much. I was very pleased to be invited to speak here.

I wanted to say a few words about what NRDC is for those of you who haven't heard of it. The Natural Resources Defense Council is one of 10 large national environmental organizations; it was founded in 1970. It doesn't have local chapters. It has about 70,000 members and a staff of about 100 people - 25 lawyers and scientists in three offices: New York, Washington and San Francisco. It was founded to help the federal government address the nation's environmental problems, to work with Congress to enact environmental statutes, and to have its staff of attorneys and scientists work with federal agencies to oversee implementation of the statutes.

There have always been some states, like Minnesota, that have been out in the forefront on these issues and didn't need the federal government to tell them what to work on. Most states, however, have waited to see what others do or until the federal government told them what to do.

Since 1980, that situation has changed dramatically. We've seen a trend towards a great dimunition of the federal role, deregulation, and a return of responsibility and authority to the states. The federal framework of statutes was enacted with the recognition that environmental problems are not all intra-state. They don't respect political boundaries. If there was no overriding floor of requirements that all states had to meet, the prospects for actually making a dent in solving some of the problems would not be as good.

Through the 1970s, we saw the first major strengthenings of the Clean Air and Clean Water Acts and the great upgrading of the federal pesticide law in 1972. After the House and Senate Agriculture Committees realized what they had done, they spent the next 14 years trying to cut back -- with relatively good success -- the 1974 Safe Drinking Water Act, the 1976 Toxic Substances Control Act (TSCA), further amendments to other statutes in 1977 and '78, and then Superfund in 1980.

In the area I work in, which is toxic substance regulation, the record is really very mixed. The country's clean air and water programs can look back at the same period of time and take some pride in accomplishments, at least with respect to conventional pollutants.

Toxic substances are a different story. It took a long series of fights to get the strong language about toxic pollutant discharges and hazardous emissions put into the 1972 Clean Water Act and the 1970 Clean Air Act. Those words actually mean something, but we have a long way to go.

In 1976, Congress enacted the Toxic Substances Control Act. They touted it as the great statute that was going to fill the gaps between the other media specific statutes. A classic example of that was the problem of chlorofluorocarbons. It is an air pollution problem. But the federal regulatory agencies weren't used to dealing with it as air pollution.

For example, the Environmental Protection Agency (EPA) deals with mobile sources of pollution and stationery sources of pollution. Back in '76 and '77 the aerosol problem was treated as an aerosol can problem. The Consumer Products Safety Commission had been asked to deal with it. But their governing statute doesn't allow them to handle a problem under the Clean Air Act, so they passed the problem to the EPA. The EPA said aerosol cans aren't power plants or vehicles so they couldn't handle them either.

That was the sort of problem that Congress had in mind when they passed the Toxic Substances Control Act. They singled out PCBs, which I know are famous initials in Minnesota, as one family of substances which should be made an example. They were the kind of pervasive, accumulating, and persistent chemicals which had caused environmental problems all over the country.

Congress told the EPA to ban PCB use, with certain exceptions, and to ban the manufacture of PCBs, with certain exceptions. In the summer of 1979 they put out a regulation to ban all but totally enclosed uses of PCBs. The only manufacturer of PCBs -- Monsanto Corporation -- had stopped making them in 1978, so it really wasn't a matter of banning manufacture anymore, it was a matter of controlling PCB use and disposal. EPA calculated that 750 million pounds of PCBs existed in transformers, capacitors, and other electrical equipment. Because they decided that 645 million pounds were totally enclosed uses, the PCB ban reached less than 1 percent of existing PCB sources.

The country seems to feel and say that PCBs have been banned, and technically that's true. However, PCBs remain in varied wide use and their disposal remains a very big problem in many places.

Because that particular chemical was controlled under a statute which made an example out of them at the same time the very same Congress was enacting the Hazardous Waste Statute, the Resource Conservation Recovery Act (RCRA), PCBs are not considered hazardous wastes at the federal level because their use and disposal is controlled under TSCA.

Therefore, PCB disposal doesn't require manifesting of PCB shipments from their generator out to the disposal site. All sorts of intermediate facilities which handle them don't have to be licensed under the RCRA program at the federal level although many states, and I think Minnesota is one of them, have listed PCBs as hazardous waste.

That kind of a problem persists in the toxics substances issue at the federal level because there are splits among the statutes. They haven't taken a cross-media approach and they have not, until very recently, tried to look at it holistically. As we all know, many of the steps that were taken to comply with the Clean Water Act -- such as surface impoundments, holding basins, and lagoons -- have turned out to be sources of ground water contamination, although they played a role in preventing the discharge of substances into surface waters.

Looking at our problems holistically is one of the big challenges we now face. Although the problems are not easy, the easier problems have been addressed and laws have been passed. I think the greatest success of all has been the fact that an environmental ethic has been strongly enshrined in federal and state legislation, and in public consciousness.

We really have to look at the hard questions now and we have to make sure that laws on the books are enforced. Actually changing the way corporations and individuals behave, to begin to get a handle on the hazardous waste problem, is one of the toughest battles we have.

But before I speak of what I see in the future, I do want to say a little bit more about the record we've established. Rivers and lakes are cleaner and we now have widespread sewage treatment across the country. Air pollution has been curbed in many areas. But for toxics, and again I am speaking only of the federal level, once you recount on one hand that leaded gasoline is being phased down, that DDT and other chlorinated hydrocarbon pesticides have been banned, and that, in fact, hazardous waste management is functioning with varying degrees of effectiveness, I think the record is still very spotty. As one who has been toiling in the vineyards since 1973 on these issues, I believe we can solve some of these problems -- or otherwise I still wouldn't be at it -- but the problems are so intractible, especially now with the federal political environment there is a sense that there isn't going to be federal money to help pay for these problems.

That's the theory, although $8.5 billion dollars in the most recent superfund tends to belie that to a certain extent. But the states have to take responsibility for the problems and solve them with a minimum of federal assistance and a minimum of federal financial assistance in particular. A cutback in the federal research establishment is one of the saddest things to happen over the last several years. When it comes down to actually solving particular, very site-specific problems, the lack of information on substance toxicity and the technologies for handling them, is one of the major problems.

The federal government, I think, has a very big role to play in that.

It doesn't make sense for State health and environmental departments all over the country to reinvent the wheel individually and spend collectively a tremendous amount of money researching the same questions. The federal government has had a research and clearinghouse role in the past, and needs to continue that role in the future.

There is a cross-media impact to various pollution control strategies. A big penalty resulting from not seeing these relationships has been widespread ground water and food chain contamination. The question of what we do about it remains, I think, one of the most pressing problems we face.

Clearly, we have to deal with the problems of the past and try to make sure that wastes are managed properly and that we clean up abandoned waste sites with help from state and federal funds. But we need to prevent problems from occurring again. When can we stop looking at generators of waste and where their waste is going? When can we start thinking about pesticides entering ground water from routine agricultural practice, not because of negligent disposal or a lack of concern, but because the pesticides now on the market have not been developed with an eye towards their mobility through soils or their likelihood of getting into ground water?

We've been concerned about non-point pollution -- at least paying lip service to it for many years under the Clean Water Act. I know that many states are concerned. New pesticides that the federal EPA approves are subjected to, at least on paper, extensive testing requirements. For any new compound going on the market, the burden of testing is very expensive and extensive. But many pesticides have been out there, in use, for over 30 years and weren't subjected to that same battery of requirements. They are in wide use and farmers rely on them. They were not marketed with a concern about possible ground water contamination.

To solve the problem, there needs to be a basic change in pest control practices. The difficulties are exacerbated to some extent by changes in tillage practices to prevent soil erosion. The problem doesn't have a simple solution. It requires action at the local, state, and federal level, and in the federal research establishment to come up with non-polluting alternatives to pest control.

I was involved this past year with efforts to amend the federal pesticide law and put in a pesticides and ground water amendment. Monitoring that will reveal exactly how extensive pesticide contamination of ground water is scanty. The EPA has a $6 million dollar survey just getting under way to do a representative sampling. But it's going to be sampling at wells only so it may not even find or be able to characterize the problem's extent. Measurements that have been taken and published by the EPA show quite extensive groundwater contamination by pesticides. It's not just farmers, it's the Chemlawn Company in suburbia, as well.

While we search for alternatives to blanketing pesticides, we have to make sure that pesticides which move most readily down into ground water are either restricted in use or banned entirely. But it will be a long time before we can control pests without using chemicals.

I say this as someone who is personally involved in many lawsuits to remove chlorinatedhydrocarbon pesticides from use, while the research establishment looks for other chemical approaches and farmers seem wedded to a technology that inevitably leads to materials getting into the water. Then you have the federal EPA recognizing that contaminants are there. Yet, to ban the contaminants would impose an impact on the farming community that the EPA is not prepared to face. They simply say levels are safe and allowable. Levels which are, in my view, extremely high.

The EPA has done very little in the federal drinking water program, which sets the minimum requirements for drinking water contamination nationwide. The states have had a free hand to do much more than the federal government was doing, but many states simply adopted EPA's drinking water standards. Under the leadership of your own Senator (Dave) Durenberger, Congress this summer passed very strong amendments to the safe drinking water act.

Congress told EPA that the drinking water program was disgraceful, disturbing and discouraging, and gave them a list of 83 substances which had been found in ground water or which are likely to be found in ground water. A third to one-half of them were pesticides. The EPA is to set standards for those substances within the next three years.

The list of substances was EPA's own list and the EPA had been moving on that list. But the numbers that EPA is coming out with for minimum requirements are extremely high numbers--depending upon your point of view. New York is a major agricultural state and has had its share of ground water pollution problems from pesticides. The health department there looked at the EPA numbers and was shocked.

New York uses the general scientific judgment that if there are more than 50 parts per billion of a single organic chemical, they will close the well. If there are more than 100 parts per billion of two or more, they will also consider closing the well level. So when EPA hands out a regulation which says 750 parts per billion of dichlorobenzene is the safe level, the New York state health department follows its own guidelines.

However, many states, by law, are required to adopt the federal numbers. Those numbers for ground water, to me, are a license to pollute the groundwater way over the smell and taste threshold. Yet, states must either accept these numbers by law or because its difficult to justify a lower number than EPAs safe levels; or, accept a degree of ground water contamination which I don't think the public is willing to accept.

We were involved through our California office in Proposition 65, which says that citizens there have a right not to be exposed to cancer-causing and reproductively-toxic substances in drinking water. It passed by 2 to 1 margin, although a big fight about it indicated the public's frustration with the federal and state agencies' inability to provide adequate protection. California is talking about no detectable level of these substances in the drinking water. I think the problems of implementation are going to be legion, but again, California in some ways leads the country in crazy and visionary ideas. However, I think they are representative of the public's attitude -- that they have a right to clean air and clean drinking water and that those rights have really not been recognized in federal law or generally in state law and so they are taking matters into their own hands. I really do believe that Proposition 65 is a classic example of that attitude.

The other difficulty is the right not to have offending facilities located in virtually any community in the country. We recognize that there have to be waste disposal facilities. We also have to find a way to reduce the volume of waste being generated. Even though we hear the success stories of 3M and a number of other companies, in the country as a whole, we are not reducing the amount of waste generated. The figures tabulated under hazardous waste programs in every state show an increasing volume of hazardous waste to be disposed of every year, not a decreasing amount. The question of solid waste isn't even being seriously asked. People are concerned that landfills are closing and we need other alternative technologies. Many such communities are looking at incineration, which they call resource recovery, but it is basically just garbage burning.

The hard issue, the big question, is what are people prepared to do when they succeed in preventing a facility from being sited? I'm sure you've heard other speakers talk about the phenomena, which is

"not in my back yard." It's true in every community across the country, when hazardous waste facilities don't have a good track record for being clean operations, and don't respect the rights of the citizens in the communities where they exist.

If there are success stories, people haven't heard them. They've heard about Love Canal and Times Beach. The prospect of a facility coming in and opening is not something that's greeted very warmly. Citizens tend to get very upset about it and organize to oppose the siting. They have actually been very successful in many places. Success is short-term because the material still must be disposed of properly.

Educating people as to what that really means is one of the toughest problems that we face. It means not just singling out Union Carbide or some other company and saying to them reduce or eliminate the amount of waste that you produce by recycling or by retooling your process. It's a matter of getting everyone to understand that the "throw away everything" mentality cannot be continued unless we want an incinerator built in every town.

Waste minimization needs to be elevated as a high priority on the agenda of every state regulatory agency. In the past we really haven't had to confront that issue. We've tackled the easier issues first. It was always the polluters out there somewhere who were responsible. Get the regulatory agencies to deal with them, to clean up their act. We still need to do that because obviously we haven't achieved great success, although we are moving in the right direction.

But in terms of the intrusion into everyone's daily life -- separating your garbage into four different bags, for glass, cans, organics, and paper -- it's not the routine way we live. Many communities do have some amount of separation. But most of the material that goes into the municipal solid waste systems remains an amalgam of some very toxic substances joined by small-generator hazardous waste. These wastes are technically out of the hazardous waste management system and go into landfills which aren't required by federal law to meet many requirements, including liners, citing or monitoring for impacts on ground water.

If you look at the federal Superfund list of almost 900 sites, a solid 20 percent of the sites are sanitary landfills, municipal landfills. They are not all hazardous waste disposal facilities.

This is a problem that has to be dealt with at the state and local level because it's a matter of educating people. I mean, we're not going to go back to the 1840's and do without air conditioning and do without a lot of the modern conveniences, which people don't view as conveniences anymore -- they're viewed as necessities.

But it may mean that we don't get our individually plastic-wrapped cheese slice or a variety of different plastic objects that everybody's used. If we don't stop these practices, I don't see how we're ever going to decrease the amount of waste we dispose. The volumes are monumental -- hundreds of millions of tons of hazardous waste and more in solid waste.

I've been working with a citizens group out in a Long Island community where an incinerator is being proposed. They are being told it will generate electricity and they just don't want it. They are talking about a community effort to do some kind of source separation that will help to break down the waste into categories so that some of it can be recycled and some of it handled in other ways.

We all need to do this. We need to go to the top in a serious way, to some entity of government, and say that this is a product we don't need. We never ask, "Do we need this?" We look at whether it's going to harm anybody. But in our system we don't say, "Do we need this product?" It's not the sort of thing the free enterprise system questions. Nor do regulators. They've never been in a position or even wanted to have to make a decision about need.

But again, requiring companies to reduce the amount of material they produce for somebody else to dispose, I think, involves more than just telling them where they can properly dispose of it and charging a high enough price so that there is some financial incentive to reduce it, recycle it, or change it. Looking towards the year 2000, we ought to articulate some goals legislatively - goals for waste minimization - and reduce hazardous waste by 50 or 75 percent by the year 2000.

We've seen this in other areas. For example, during a water shortage, people are told to conserve water, industrial users must meet a percentage reduction, and residential consumers are charged more for the amount that they use. But we really haven't taken that same approach with waste.

No state is seriously doing anything about waste minimization. There's a lot of thinking going on and there are public education programs, industry education programs, and voluntary activity. Pollution-prevention-pays programs are here and there -- North Carolina and 3M are active in it.

Our office has studied these efforts, but we're also looking at a combination of regulatory requirements and incentives to reduce the volume of waste generated. We need to carry over to the solid waste field as well.

We need to look at what's incinerated, what goes down the sewer, and what goes out for disposal relative to what came in the pipe through the front door. We need to make companies really account and see about changing their processes. Many companies have done this successfully. After the initial investment, it pays its own way very well. It's not being widely adopted, partly because it's not required and partly because it's expensive up front.

But unless we begin to put the brakes on the amount of waste generation that society apparently is willing to accept (because all we are trying to do is manage and control what comes out the other end), we're going to see more citizen agitation and proposition 65 types of proposals.

Actually, it's a good development for people to be that involved. The traditional ways of dealing with it may not be as effective. The NRDC approach has been to go to the Congress and get the law passed - go to the agency, get involved in the process, comment on the proposals, then to the court if we don't like the ultimate decisions,

That system works reasonably well but it requires pretty vigorous activity on the part of regulatory officials at the federal and especially at the state level because enforcement responsibility is usually delegated to the state level.

But it doesn't work well enough to keep people feeling that toxics issues are being handled adequately. What we've really seen is citizen enforcement in place of state and federal enforcement. NRDC and a number of other organizations have enforcement actions going on under the Clean Water Act. We have a whole program that does nothing but go to state agencies, read the monthly discharge reports by the permitees, find patterns of violation, and take them to court. There have been times in recent years where NRDC had more enforcement cases on its docket than the federal EPA had on its.

We are also trying negotiation, which is a technique that has always been used in the settlement of lawsuits but hasn't really been used to resolve disputes in the environmental area. The recent effort to amend the federal pesticide law was the result of a negotiation by the principal interested parties - the pesticide manufacturers, the farm organizations, environmental groups, some labor organizations.

Grassroots activity is the one I find the cause for the greatest optimism because it goes back to democratic values. People--who in many other situations are alienated from the process--actually get involved, and get their elected officials to be responsive to what they want.

Consumer boycotts are another indication of that. For example, when daminozide, the apple pesticide which is carcinogenic, left residues in apple products -- when the evidence came out about that, the EPA initially was going to take a pretty drastic step and ban its use. Then the data they were relying on were attacked and the apple growers who depend very heavily on the use of this particular pesticide came in and talked about the adverse economic impact.

A lot of consumer organizations began to put pressure on the supermarket chains saying we're simply not going to buy apple products if these pesticide residues remain. After all, some of the major consumers of apple products in this country are children who have the least capacity, based on their size to really absorb the toxic substances and not be adversely affected by them.

Four of the major food chains in the country concluded that they were not going to accept daminozide treated apple products after this year. That was an example of democratic process working and people actually saying I'm not going to wait for the federal or state agency to deal with this. We're simply going to organize and get something done about it ourselves.

That same attitude is being reflected in the bond issues that have been passing in many states for environmental cleanup. My own sense is that people are willing to pay for this, because polls show that people are willing to pay for safe drinking water and clean ground water and cleaning hazardous waste sites even though the cost is very high. It's certainly there in the $2 billion dollars a year now being spent on bottled water and home water filter devices.

We are seeing ever increasing calls for federal preemption of state efforts to take matters into their own hands and solve their own problems. New York tried to enact restrictions on the movement atomic materials through New York City or on various roads. But they've been preempted and the federal interest has been upheld as predominant in that area. It hasn't been considered in other health and safety areas to be predominant.

The state interest was always recognized as a predominant one, but now we're seeing calls by the grocery manufacturers and by the chemical industries for preemption of the states because it's difficult to do business nationwide when there are 50 conflicting and different sets of requirements to meet.

We're seeing calls for preemption on food tolerances, on PCB regulation, on appliance standards. In fact, a federal law creating uniform appliance standards which would preempt the states was passed although the President vetoed it. That was again a negotiated agreement and one that I think that the state representatives involved were satisfied and happy about. But as a general matter, I'm not comfortable with federal preemption where the federal government wants to do less than the states do to protect.

In closing, I want to reiterate again that one of the things that I think we really need, that we haven't seen in federal law that I do think exists to some extent in states, is an articulation of goals. Goals help you, as a regulator or someone participating in the process, to have an opinion on what the choice should be or what the decision should be.

What I would like to see, my own view again and speaking for NRDC, are goals established in state law and in federal law that create a right to a clean and healthy environment and that recognize that individuals have a right not to be harmed for the general good. If stated in a different way, this is something that plays a very big role in risk assessment and evaluations that are being made by regulators all over the country.

Some federal statutes have goals in them. The Clean Water Act has a goal that says no toxic discharges in toxic amounts by a certain date. I think that has helped drive decisionmaking and the push for better technologies. Other statutes simply leave it to the regulators to decide whether a risk is unreasonable, whatever that means.

We need to remember the stewardship idea -- the fact that we're only here for a certain amount of time and that all of what we have and use and see in the land and air and water has to be here for other people to be able to use. It's not all right for us to do whatever we want because we'll be gone and have had our fun with it. As trite as that sounds, I don't think that ethic is widely accepted across this country anymore.

Stewardship was a popular idea in the early years of the conservation movement, the early 1900s. But we've moved away from it and gotten bogged down in numerical equations in trying to figure out whether we should protect health or protect certain resources.

We need preventive approaches -- which are much cheaper than simply reacting -- and we need again some government regulation, as bad as the word regulation is to many people these days. We need some of that to reduce things like pollution, which the market simply doesn't provide for. That contradicts the example I just gave you of daminozide, which is an example of the market working. But, historically the market doesn't make the people who are polluting incur the total cost of it. We need incentives on that and I'm hoping that gatherings of this kind are indicative of the spirit prevalent in many parts of the country. I'm glad to see it's alive and well in Minnesota.

Thank you.

A CITIZEN'S PERSPECTIVE ON WATER RESOURCES ISSUES
BY MARTHA BRAND

My name is Martha Brand. I am pleased to be here this morning to participate in what I anticipate will be an exciting and productive two days.

I have been a citizen member of the Environmental Quality Board for two and one half years. However, my interest in environmental policy issues and particularly water issues goes back to my college days which coincided with the first Earth Day. This interest led me to take some time off and attend the University of Michigan School of Natural Resources, to Law School, to teaching Environmental Law for a brief time and most recently to the EQB.

During the next 10 minutes, I am going to wear several hats. First, I am going to put on my EQB hat, and particularly my hat as chair of the EQB's water resources committee, and tell you why water will be an important topic for the EQB for the next 15 years.

Then, I will replace that hat with my concerned citizen hat and talk about a few topics that I think will be particularly important as we move toward the year 2000.

I will finish, as I am sure others will this morning, by soliciting your help during the next two days in focusing the EQB on the key issues in water resource management for the next one and a half decades.

I would now like to turn to why water is an important topic for the EQB.

In 1983, the Water Planning Board was combined with the EQB. After this merger, the EQB was assigned major responsibilities for water resource planning and coordination and particularly the statutory job of:

- Initiating, coordinating and continuing to develop comprehensive water resource planning in futherance of the June 1979 Water Planning Board Plan, and

- Coordinating the water planning activities of local, regional, and federal entities with state plans.

Concern about the growing importance of this task led the EQB in November 1985 to establish a water resource committee.

The committee is composed of the heads of the state agencies with water related responsibilities--i.e., Health, Pollution Control Agency, Department of Natural Resources and Agriculture, one other citizen member, currently Robert Dunn, plus representatives from the Soil and Water Conservation Board, the Water Resources Board, the Southern Minnesota Rivers Basin Council, and starting this month, the University of Minnesota.

The Board charged the committee with the simple task of developing a comprehensive water strategy for the state. "Comprehensive Water Strategy" rolls off the tongue--but what does it mean?

After much discussion and valuable input from staff, plus a review of what other state entities like--the Water Planning Board--had done when confronted with a similar task, the committee drafted a set of priority recommendations which it feels should constitute the backbone of the state's water policy for the next biennium. We transmitted these recommendations to the Governor last month.

I will not take the time to review the priority recommendations with you today except insofar as they coincide with my personal views as to where Minnesota should be going in the water area in the next 15 years. Basically, the recommendations cover the areas of groundwater, toxics, local water planning, coordination of water programs, water quantity, flooding, drainage, data collection, and, of course, financing. The Water Fact Sheet discusses the priority issues. In addition, the Committee will publish the priorities in pamphlet form in the near future.

I consider these priority recommendations a first step. We--the EQB--need your help to get on top of the water issues confronting Minnesota. A one-shot effort, and particularly one aimed at the next biennium, is simply not a complete answer to our water management needs. We have probably failed to recognize key issues. And, decision makers in the next two years may fail to carry out some of the recommendations that we have made. That's where all of you come in.

I would like to turn now to what I personally feel are several of the key water resource issues in the next decade and a half.

Water has been called "our next national crisis" and "the key natural resource issue of the 1980s."

It would be easy for us to think that these labels stem only from problems in the arid West or the crowded eastern seaboard. But while we enjoy abundant water resources in Minnesota and have nationally recognized resource protection programs, we tend to forget that we do have water problems.

Flooding and drought still plague us. Pollution from urban life and agriculture and wastes of all kinds threaten our lakes, streams, wetlands and groundwater.

If we do not alter some of the ways that we manage our water resources, water could become Minnesota's crisis of the 1990s.

But where to begin?

I would say first by reviewing our goals for water management. Traditionally, I think these goals have been:

- To safeguard the public health,
- To preserve the quality and quantity of water for future generations, and
- To ensure that adequate quantities of high quality water are available for continued growth and development in the state.

I think we need to think about which of these goals we should emphasize in the next 15 years. Meeting all of them in all areas of water management is impossible.

My own opinion is that public health will play a very dominant role in the next fifteen years. That is probably why I think we are going to need to focus increasing resources on toxic contamination of the state's ground water.

I had not thought too much about the importance of ground water until several years ago. My concerns had focused on pollution and particularly point source pollution of rivers and streams and lakes.

However, ground water has now captured my interest as I am just beginning to understand about this resource and our minimal understanding of it and its vulnerability.

It may surprise you to learn how dependent we Minnesotans are on ground water. Seventy-five percent of all Minnesotans--urban and rural--get their domestic water supplies from ground water. Ninety percent of the water used for irrigation comes from the ground.

The quality of this ground water is threatened by things we hardly thought about at the time of the first Earth Day.

Present hazardous waste disposal practices are impacting ground water. Minnesota has hazardous waste regulations. We need, through public education and state enforcement, to increase compliance with these regulations.

We also need to accelerate our clean-up of abandoned hazardous wastes sites that are impacting ground water. Recently we have become all too aware of how past disposal practices can adversely affect community water supplies. The well contamination in St. Louis Park and St. Anthony and other communities comes immediately to mind.

Clean up of these sites presents tough problems. There are a lot of sites to clean up. Minnesota has 38 sites on the EPA National Priorities list and 133 on the Minnesota Permanent List of Priorities. These only represent the worst. Furthermore, often the entities responsible for the site are no longer in existence and with them, gone the knowledge of what was done and a source of funds to clean-up the site. Add to this the fact that clean-up is extremely expensive, and in some cases, the technology for effective clean-up is yet to be found. You then begin to get an idea of the problem.

So what are we to do? The recent amendments to the federal Superfund Act may help a little by supplying continued funding and perhaps more incentives for private clean up. But the major responsibility for cleaning up these sites and others that are yet to be discovered and for stopping this source of ground water pollution is ours. Somehow we will have to meet the challenge--find the financing, find the human resources, and get it done.

But our task as far as ground water is concerned does not end there. There are at least three other topics that I think we need to focus on in the area of ground water.

Data gathering and data compatibility are the first. In order to make sound ground water management decisions, we must have more information on hydrology, ground water quality, quantity and distribution. Particularly, we need information concerning ground water near public water supply systems, near landfills and in deeper ground water formations.

Equally important to gathering this information, is making sure that it is collected and maintained in a form readily usable by planners and decision-makers at all levels both in the public and private sector and that it is compatible with other water-related data.

We also need to address the problem of lack of standards. State and/or federal standards only exist for a relatively small number of toxics that we are finding in our ground water. Where there is no legal toxicity standard, or the standard is not applicable, we rely on the Department of Health to do a health risk assessment for the toxic in question and then for Health and PCA to set guidelines and standards. These efforts require a tremendous amount of resources--both staff resources and sophisticated laboratory resources--the growth of which has not kept pace with the discovery of new toxic substances in our ground water.

We need to meet the challenge of finding increased stable funding for these efforts. Without these resources, we cannot develop the data necessary to evaluate or, even in some cases, detect toxics in our ground water nor can we begin to think about how to clean up contaminated sites.

Finally, I am concerned about the presence of pesticides in the ground water of the state. In a cooperative study, the Departments of Agriculture and Health found low levels of pesticide in 38 percent of the wells surveyed as of September 1986. Yet, information on the amounts and types of pesticides used within specific areas of the state is lacking.

In my opinion, we need to find ways to support accelerated efforts to monitor and evaluate health risks for pesticides in the ground water, particularly in areas sensitive to ground water pollution. We further need to mount a public campaign to educate the public about safer methods of pesticide use.

It will be a challenge in the next 15 years to find out about, in some cases clean up, and in other cases just preserve our precious ground water resource. This is not going to be an era of excess state or federal funds. All of the projects that I have described are very expensive. However, this is one area where if we do nothing or too little, we may severely impact public health and ruin one of our most valuable resources for generations to come. I am confident that we will not let this happen.

The other area that I think we need to pay close attention to in the next 15 years is comprehensive local water planning.

Discussing this issue makes me feel old. As I recall in the 1970s, at least where I was, the trend was away from local units of government in favor of regional or state planning.

Minnesota is at a cross-roads in thinking about the roles of state and local government in water management. We have realized that state government alone is not the complete solution to our water problems. One needs only to look at some of the areas that I have talked about--i.e., waste disposal, pesticides and data collection to see the potential involvement of local governments in water-related problems. Local government has a profound responsibility to participate in the protection and management of water. Land use management is key in the protection of water resources. It is by and large locally controlled. Concern and knowledge is also prevalent at the local level.

Management must, however, be a partnership. The state has the responsibility to facilitate local government's acceptance of this new role. Somehow, the state will need to devise a financial program to help local units of government pay for and implement comprehensive water plans. If we do not find a way to do this, comprehensive planning will not be done.

We also will need to provide coordinated technical assistance to local units of government involved in comprehensive planning. By and large we don't have enough resources to answer the questions and meet the needs of local units of government trying for the first time to formulate and implement local water plans.

There are long term goals. There are many other short term projects to be accomplished in this area. What is important in the long run, however, is that we develop a partnership with both levels of government having significant roles to play.

I would like to close by addressing some remarks to those who plan to attend the small group sessions on water.

I urge you to do two things. First, constructively criticize the Water Resource Committee's ideas about what is important in the next biennium. What have we missed that has implications for water policy from now until the year 2000?

Second, I've described for you very briefly areas where I think we will need to concentrate our water efforts in the next 15 years. What topics do you feel are important? What changes will need to be made? This is your challenge. The EQB's challenge is then to figure out what role, if any, it can play in making those changes happen. Be creative and bold in putting new ideas on the table for discussion and presentation to the Board. We will then try to be the same. Together we can help ensure that water is not Minnesota's crisis of the 1990s.

Water

Clean, clear water is a precious thing to Minnesotans. We count on it for drinking and bathing. We appreciate more than most its importance to our outdoor experiences. And many of our jobs depend in one way on another upon its existence.

Water has traditionally been perceived as an unlimited resource, always pure, and available for any need at any time. Although water resources do renew themselves through precipitation, much is used that cannot be renewed. Sometimes, the way we use water leaves it less desirable for other uses.

While Minnesota is rich in water resources and has noteworthy resource protection programs, the state does have water resource problems. Both flood and drought plaque the state. Pollution from urban and agricultural activities, and disposal of wastes of all kinds threaten our lakes, streams and wetlands, and our ground waters.

Continuation of Minnesota's high quality of life, its vibrant tourist industry, its agricultural production, and its opportunities for growth depends on the wise management of Minnesota's water resources. Without steps to wisely and efficiently manage this resource, water may well become Minnesota's crisis of the 1990's.

The Headwaters State

Minnesota is at the headwaters of three major North American watersheds: the Great Lakes basin to the east, the Souris-Red-Rainy Rivers basin to the north, and the Mississippi River basin to the south. While we often characterize our state as water rich, in fact, Minnesota does not have the access that many states do to great amounts of water originating from outside of the state's boundaries.

In another very real sense, the state's location at the headwaters of the major basins carries with it a special responsibility to protect the quality and quantity of water leaving the state.

Water Availibility

Overall Estimate of Supply. Estimates put the total available surface water supplies at 11.3 trillion gallons, and the available ground water supplies at between 1.1 and 2.0 trillion gallons. The figure for ground water is a limited "best guess"; only covering surficial and bedrock aquifers that discharge water into streams. Not enough is known about the deeper bedrock aquifers to estimate the amount of water available from this source.

Streamflow Fluctuation. Streams in southern and western Minnesota show the most variability from average flows. About two-thirds of the state's watersheds have recorded low flows of zero. Yet, flooding causes an average of $60-70 million in damages annually.

Lake Distribution and Fluctuation. Lakes are most numerous in the northeast and central portions of the state. The northwestern, extreme western, and southern part of the state are only sparsely covered by lakes. This distribution influences regional water-based recreation demand, as well as the relative importance of isolated lakes in the lake-scarce regions of the state.

Like streams, lakes may also cause problems by fluctuations in level. Thirty-eight landlocked lakes have severe flooding problems. While likely forgotten for the moment during the current period of high water, many lakes have also caused problems because of low water levels.

Wetland Distribution and Function. Wetlands are most scarce in the steeply sloped southeastern portion of the state and the extensively drained, intensively farmed south central and northwestern-border regions. Distribution of wetlands varies across the state not only by standard measures like wetland type, frequency, and size, but also by importance of the wetland functions provided. For example, complexes of small wetlands in the prairie pothole region provide nationally important contributions to production of waterfowl, as well as significant contributions to local economies. While not so important for waterfowl production, wetlands in other areas of the state, such as the eastern portion of the Red River basin, may provide a significant flood control function.

Ground Water Availability. The yields of ground water available from unconsolidated and bedrock aquifers vary considerably throughout the state. Ground water cannot be relied upon as the source for municipal, irrigation, or industrial uses in the hard rock areas of the northeast, the dense clay areas of the Red River Valley, and scattered areas where bedrock occurs at the surface. Ground water is an adequate source of water in most other areas of the state.

Inter-connections. Finally, while we tend to view these resources as if surface and ground water, or streams, lakes, and wetlands, were separable components, these resources are interconnected. This fact frequently has profound effects on water and the way it and related land resources must be managed.

Water Use

Economic Importance of Water. The availability of adequate supplies of water of acceptable quality is essential to the economy of Minnesota. Agriculture, the heart of the Minnesota economy, directly or indirectly accounts for 40 percent of Minnesota's employment. Agriculture is vitally dependent upon reliable supplies of good quality water at all production, processing, and distribution levels. For example, in 1976 the Minnesota Department of Agriculture estimated drought-related losses at $1.5 billion. Water shortage problems can affect the costs of other businesses as well, as shortages affect output, profits, employment, and earnings.

Table 1. Water Needs for Food Production

ITEM	GALLONS OF WATER NEEDED
Egg	120
Loaf of Bread	300
Hamburger, Fries and Cola	1,500
Holiday Turkey Dinner for Eight*	43,000

*including 20,lb turkey, potatoes, corn beans, carrots, bread, salad, margarine, pumpkin pie, milk, wine, and ice cream.

Source: The Journal of Freshwater, Vol 9, 1985

Prepared by the State Planning Agency with the assistance of the Minnesota Pollution Control Agency and the Minnesota Department of Natural Resources for the Minnesota Environmental Quality Board

Another way to look at the economic value of water is to consider the number of gallons needed to produce various products. Table 1 shows estimates for several items. A general rule of thumb for irrigated crops is that two gallons of water are needed for each calorie of food produced.

Finally, tourism is a major factor determing the economic importance of water. In Minnesota, water is the focal point for a wide variety of outdoor recreation activities. Annual fishing and hunting expenditures, alone, amount to an estimated $1 billion.

Withdrawals. The electricity utility industry is by far the largest withdrawer of water supplies in Minnesota, accounting for one-half of total withdrawals in 1982. The majority of this water is used for power plant cooling. The mining industry accounted for about 10 percent of total withdrawals in 1982, with nearly all of these withdrawals concentrated in northeastern Minnesota. Other major users were public water supplies (19 percent), manufacturing (eight percent), agriculture (six percent), and self-supplied domestic (five percent).

Consumption. When water is viewed in terms of the amount actually consumed, the picture is very different. Agriculture is the most substantial consumer of water, accounting for 30 percent of estimated water consumption in 1982. Agriculture leaps from a relatively minor withdrawer to a major consumer, largely because all of the water withdrawn for livestock use and 95 percent of the water withdrawn for irrigation are estimated to be consumed. Although electric power production is responsible for one-half the withdrawals, this use accounts for only 15 percent of water consumed in the state (since most of the water is returned to its source).

Surface Water Uses. Seventy-three percent of all water withdrawals in the state comes from surface water sources. The largest volume of water appropriated in Minnesota is withdrawn from lakes, impoundments, and river pools. These are primary sources of water for mining and other processing activities, and for power plant cooling.

Ground Water Uses. Ground water appropriations are significant when individual sources are considered. For example, over 60 percent of the water appropriated by waterworks comes from wells, with the rest evenly distributed between lakes and streams. When looking at the sources of individual systems, the figures are even higher. Over 90 percent of the public water supply systems and 75 percent of all Minnesotans get their domestic water supplies from ground water. In addition, about 90 percent of the water appropriated for agricultural irrigation comes from ground water.

Water Quality

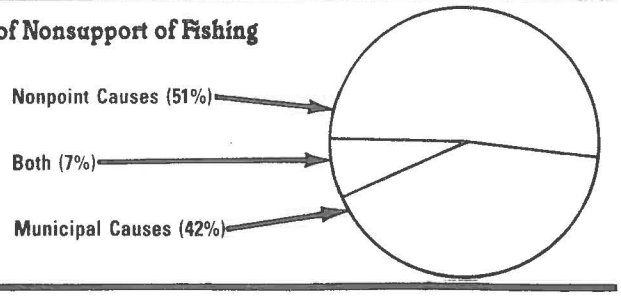
Surface Water Overview. In general, quality of the state's surface waters is quite good. The data from nearly 2,000 miles of rivers and streams show that 83 percent meet the fishable use designation. The causes of partial and non-support were found to be pollution from non-point sources (51 percent), point sources of pollution (42 percent), and combinations of point and non-point sources (7 percent). A ten-year trend analysis conducted by the Pollution Control Agency indicates that water quality effects of point sources are declining as a direct result of improved wastewater treatment.

Non-point Pollution. Non-point sources of pollution continue to degrade water quality, particularly in highly agricultural areas of the state. An assessment of nearly 28 percent of Minnesota's lakes found that most (63 percent by area of those tested) were nutrient rich, or eutrophic, and are considered to only partially support designated uses. Nine percent are considered excessively rich and not supportive of designated uses.

Toxic Contamination. Tissue analyses of fish from 968 miles of rivers indicates that 30 percent of the assessed mileage supports designated uses. Forty-five percent partially support uses while 25 percent do not support uses designated. The major cause of non-support are PCB contamination, particularly downstream from large population centers. Importantly, a recent PCA trend analysis of PCB concentrations in Mississippi River fish species showed a decline over the last ten years.

From 1975 to 1984, fish tissue analyses used to identify toxics problems in lakes have shown that 55 percent of the assessed acreage only partially supported designated uses, and necessitated fish consumption advisories.

Causes of Nonsupport of Fishing



Acid Rain. While no lakes in Minnesota have acidified so far, monitoring indicates that some may be losing their buffering capacity because of acid rain. The PCA estimates that between 2,500 and 3,700 of Minnesota's 12,000 lakes are susceptible to acid rain. The acidity of rain in northeastern Minnesota is now at or above the levels that caused lake acidification in Scandinavia, an area geologically similar to Minnesota.

Over 700 of Minnesota's 3,000 fishing lakes may be susceptible to acidification. Loss or reduction of fish populations could eliminate resorts, decrease tourism expenditures, and reduce jobs in the industry. The PCA has estimated that failure to control acid rain could cause a loss of $40 million per year in tourism revenue and 3,000 jobs in and around the Boundary Waters Canoe Area Wilderness.

Ground Water Quality Overview. The natural quality of Minnesota's ground water is generally quite good, usually meeting all health-related drinking water standards. Non-health (e.g., for taste) standards for iron and manganese (0.3 mg/1 iron and 0.05 mg/1 manganese) are commonly exceeded in up to half of the samples tested statewide. In the southwestern part of the state, sulfates are frequently in excess of standards.

Land Use and Ground Water Quality. The influence of land use activities on ground water quality—also a form of non-point pollution—can be seen in the high nitrate concentrations found in southwestern Minnesota (attributable in part to feedlots) and southeastern Minnesota (attributable to land uses in the vulnerable Karst areas having little protection from overlying soils). The shallow, surficial aquifers which supply water in the central areas along the Mississippi River basin also occasionally exceed nitrate standards.

Recent studies supported by the Legislative Commission on Minnesota Resources have shown evidence of contamination of ground water and public water supplies by volatile organic chemicals and by pesticides. The Health Department found that over eight percent of the community water systems sampled were contaminated with volatile organic chemicals. In a cooperative pesticide survey conducted by the Minnesota Departments of Agriculture and Health, pesticides have been detected at low levels in 38 percent of the wells surveyed (as of September 1986). Low levels of pesticides were found in 22 percent of the public water supplies located in agricultural areas throughout the state, and 52 percent of the private wells sampled.

Ranked Threats to Ground Water Quality

Contaminant Source	Rank	Contaminating Substances
Industrial/Manufacturing (On-site spills, illegal or uncontrolled disposal, industrial impoundments)	1	Metals, Pentachlorophenol, PAH Compounds, Industrial Solvents, Pesticides
Solid Waste Landfills and Dumps	2	Leachate: Organic Chemicals, Metals
Storage and Transportation of Petroleum and Other Products	3	Gasoline, Fuel Oil and Breakdown Products, Other Materials
Agricultural Activities	4	Nitrites, Pesticides
Municipal Impoundments and Land Treatment Facilities		Priority Pollutants, Nitrites
Individual Septic Systems		Priority Pollutants, Nitrites
Road Salting/Salt Storage		Salinity

Issues

Protecting the Public Health. Protecting the public health is the foremost goal of government involvement in the management of water resources. In a world where synthetic chemicals have skyrocketed in use over the last three decades, and cancer has become a personal experience, we must ask ourselves if we are doing all that is necessary to keep disease derived from water sources in the year 2000 to the absolute minimum. The following public health issues warrant consideration: current recommendations (or issues directly related to a current recommendation) of the EQB and its Water Resources Committee (WRC) described in the report ***1987-1989 Water Resources Priority Recommendations*** are indicated in parentheses.

Ground Water Protection and Management. Should efforts be accelerated to protect and manage ground water resources? Strengthening state health laws concerning well abandonment and gaining a better understanding of Minnesota's ground water are two apparent needs. **(EQB/WRC priority recommendations).**

Toxic Substances Management. Do we need greater understanding and control of the use of toxic substances? Amendments to the Minnesota pesticide control laws and the establishment of disease registries to better understand the health effects of hazardous substance exposure might be considered. **(EQB/WRC priority recommendations).**

Genetically Engineered Organisms. An increasing amount of research has been directed toward the genetic engineering of organisms for use in cleaning up ground waters contaminated by hazardous waste. Since it is unclear whether such organisms can be regulated as toxic or hazardous materials, new laws may be needed to assure their safe and proper use.

Land Use Versus Water Use. In some parts of the country, ground water has become so contaminated that officials have given up on efforts to clean it up, instead recommending alternative sources of supply. Could this happen in Minnesota?

Maintaining and Enhancing Environmental Quality
Environmental quality is a key factor influencing quality of life, especially in Minnesota.

Non-point Pollution. Is a comprehensive approach to managing non-point pollution warranted to protect both surface and ground waters? Such an approach might involve state financial and technical assistance to local units of government for the prevention and correction of non-point pollution problems. **(EQB/WRC priority recommendations).**

Lake Management. Should the state consider the management of lakes comprehensively so that government decisions affecting the use, protection, and enhancement of lakes will all fit together in the best overall interests of the state? **(EQB/WRC priority recommendations).**

Drainage. Should the Drainage Code be "reformed" in order to provide: 1) equity in assessments, procedures for establishment of and withdrawal from petitions that better protect the rights of individual property owners, and determinations of damages and benefits by trained individuals; and 2) better integration of specific requirements relating to state environmental laws? **(EQB/WRC priority recommendations).**

Acid Rain. While the state has taken major steps through the Acid Deposition Control Act of 1982 and the acid rain standard adopted by the Pollution Control Agency in July, 1986, the following issues have not been resolved: 1) the effects of acid rain on streams and wetlands; 2) the relationship between acidification of lakes and the bioaccumulation of mercury in fish and wildlife; and 3) the control of emissions in other states, such as Texas, Missouri, Iowa, and Illinois in order to meet the acid deposition standard in Minnesota.

Economic Development. Wise economic development is another factor important to the quality of life in Minnesota.

Flood Damage Reduction. Should the state establish a program to reduce flood damages associated with existing flood prone structures? An expanded, comprehensive flood damage reduction program would be necessary to address the significant economic, social, and environmental losses from recurrent flooding of lakes and streams. **(EQB/WRC priority recommendations).**

Key Laws

Federal Legislation

1968	Federal Wild and Scenic Rivers Act.
1969	National Environmental Policy Act of 1969
1972	Amendments to Federal Insecticide, Fungicide, and Rodenticide Act. Clean Water Act
1974	Safe Drinking Water Act.
1976	Toxic Substances Control Act (TSCA).
1980	Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (Federal Superfund).
1985	Farm Security Act (Denies federal farm benefits to anyone who converts wetlands to cropland or who tills highly erodible land without applying conservation measures and establishes the Conservation Reserve Program.)

State Legislation

1883	Minnesota Supreme Court establishes Riparian Doctrine as governing common law for water in state.
1885	Water Supply Pollution Preservation Act (First law to prevent pollution of rivers and other sources of water supplies.)
1945	Pollution Control Act (First law to require dischargers to obtain permits.)
1947	State Water Conservation Program mandated.
1967	Pollution Control Agency created.
1969	Flood Plain Management Act (Guides development of the state's flood plains; emphasizes reduction of flood damages through flood plain management.) Shoreland Management Act (Provides guidelines for shoreland development to preserve and enhance the quality of surface waters; preserve economic and environmental values; and wisely use water and land resources.)
1973	Minnesota Wild and Scenic Rivers Act.
1976	Pesticide Control Act
1977	Safe Drinking Water Act.
1979	Protected Waters Act Amendments (Direct DNR to inventory state protected lakes, streams, and wetlands.)
1980	Minnesota Waste Management Act
1982	Metropolitan Surface Water Management Act.
1983	Minnesota Environmental Response and Liability Act (Minnesota Superfund). Acid Deposition Control Act (Policy to mitigate or eliminate acid deposition by curbing sources of acid deposition within the state.)
1984	Soil Loss Limits Law (Encourages counties, cities, and towns with planning and zoning authority to adopt standard soil loss limits ordinances.)
1985	Comprehensive Local Water Management Act (Provides for removal of marginal agricultural lands from crop production or pasture to protect soil and water quality and provide fish and wildlife habitat.)
1986	Reinvest in Minnesota Resources Act (Provides for removal of marginal agricultural lands from crop production or pasture to protect soil and water quality and provide fish and wildlife habitat.)

Protection of Available Supplies. Should the state take steps to make sure that Minnesotans are assured sufficient supplies of clean water before agreeing to interstate diversion of supplies?

Do we have a sufficient understanding of the presence, availability, and movement of ground water? **(EQB/WRC priority recommendations).**

Governmental Support Systems. The way government supports, organizes, and manages its water-related research and management programs is a key factor in their success.

Financing. Stable funding of water resources programs and projects is a key factor in their success at protecting public health and environmental quality, and enhancing economic development. While funding for the Re-Invest in Minnesota initiative has captured much attention, funding for several somewhat less glamorous items, like data collection and information systems development, is considered a necessity.

How can stable funding be secured for such unglamorous, but important, programs? How can we assure that a "balanced" funding plan is developed to address the mix of state water needs? **(EQB/WRC priority recommendations).**

Information Systems Development. Are we doing enough to assure that data collected by various state and local agencies are available and readily accessible to all interested persons? Minimum data compatibility standards might be needed to ensure that data collected by different agencies and levels of government are compatible and easily automated. Improvement in the quality of data collected may also be necessary. A program for state certification of laboratories might help address this concern. **(EQB/WRC priority recommendations).**

Local Water Planning. Because water management so often requires sound land use decisions, and because many water management actions must be taken at the initiative of local government, comprehensive water planning at the local level of government might be considered an activity of the greatest significance to sound water management.

To foster a local-state partnership in managing the state's water resources, financial and technical assistance to local governments might be warranted to promote the development and use of comprehensive local water plans for the protection and wise use of surface and ground waters. **(EQB/WRC priority recommendations).**

Water Resources Coordination. Are improved coordination of state agencies and better communication with the public necessary for effective protection and management of Minnesota's water resources? How should these be accomplished?

Four items that warrant consideration are: 1) development of strong budget and legislative initiative review functions through the EQB: 2) preparation of biennial reports to the governor and legislature evaluating the state's water resources strategy; 3) development of a water resources communications strategy; and 4) merger of small state water boards to provide a stronger focus on local government issues and the related activities of state agencies. **(EQB/WRC priority recommendations).**

Other ways to improve water program coordination may warrant consideration:

1) coordination could be improved by re-constituting the Environmental Quality Board with a majority of citizen members and by making board staff independent of the State Planning Agency; 2) the EQB could be required to develop a "report card" on agency performance to produce a comprehensive picture of the effectiveness of state programs; and 3) responsibility for regulation of agricultural chemical use could be transferred from the Department of Agriculture to the Pollution Control Agency. (Citizens League recommendations)

In addition, options for major re-organization of the state's water resources agencies have been discussed. These have ranged from creating a "Department of Waters" (making the DNR Division of Waters an independent agency and combining it with the Water Resources Board and Soil and Water Conservation Board) or a state "Environmental Protection Agency" (by combining the Division of Waters in DNR and the Division of Environmental Health in MDH with the Pollution Control Agency), to creating a "super Department of Natural Resources (through merger of the DNR and PCA).

Are such options worthy of consideration or should our current approach of agency advocates for certain water functions (e.g., a PCA to advocate pollution control and a health department to promote water-related health concerns) be preserved?

Minnesota...Year 2000

Choices are being made now that will determine what the condition of our water resources will be in the year 2000. In the past, people and government did not understand the consequences of many actions, and occasionally chose a course of action not realizing the harmful effects on our water.

Today, we better understand that actions affecting land and air also affect water. We also understand that we must look at water quality and quantity, and surface and ground waters, as inter-related systems.

Our understanding of the consequences of our actions and inactions is still incomplete. We have much to learn about the distribution and quality of our water resources, the inter-relationships between land, air, and water, and the characteristics that govern the response of water to environmental perturbations. We also have to learn how to make water information available to those making decisions about related land, water, and air resource matters.

We need to ensure that water-related choices are made today with a view to protect public health and quality of life in the future. We will be judged on those decisions in the year 2000.

These choices will determine the answers to questions like the following concerning the year 2000:

- Will we have written off use of our shallow ground water aquifers for drinking water?
- Will water-related exposure to pesticides and hazardous wastes become recognized as a major source of disease in Minnesota?
- Will hundreds of lakes in northern Minnesota be unable to support desirable fish populations because of acid precipitation?
- Will Minnesotans still suffer preventable loss of life and property from floods?
- Will we have preserved available supplies for all needed uses within the state?

For Further Information

Acid Rain in Minnesota, Acid Precipitation Awareness, Department of Education, Pollution Control Agency, and the Acid Rain Foundation, Inc., 1985.

Agriculture and Water Quality, Citizens Panel-A-Project of the Center for New Democratic Processes, January 1985.

A Citizen's Guide to Lake Protection, Freshwater Society and Pollution Control Agency, 1985.

Minnesota Water: A Geographical Perspective, University of Minnesota, Water Resources Research Center, May 1986.

1987-1989 Water Resources Priority Recommendations, Environmental Quality Board, September 18, 1986.

Pesticides and Groundwater: A Health Concern for the Midwest, Department of Health, Department of Agriculture, Freshwater Foundation, 1986.

Protecting Minnesota Waters: The Land Use Connection, Pollution Control Agency, Fall 1986.

WATER
ACCOMPLISHMENTS

INCREASED AWARENESS AND UNDERSTANDING

- Greater public awareness -- toxic pollutants/risk, nonpoint source pollution, groundwater pollution, cost of pollution, aquatic ecology, aesthetic cost pollution
- Recognize waterborne toxicity, problem and need for state/local actions
- Identification of economic value of water
- Hydrogeologic information expanded
- Institutionalized environmental forums
- Discourage unwise developments -- uranium, peat, copper-nickel mining
- Recognized value of wetlands
- Groundwater recognized as an important resource
- Addressing acid rain prior to complete crisis
- Recognition of water as an issue -- quality and quantity
- Beginning to terminate use of landfills even though they have only been around for 15 years
- Development of a comprehensive environmental outlook
- Development of funding and commitment to problems
- Increased education
- Awareness of connection between surface and groundwater systems
- Awareness of groundwater contamination from landfills, farming practices
- Ecological education in schools
- Environmental elementary education act

LEGISLATION

- State/federal legislation and regulation
- Federal and state superfund legislation
- Clean Water Act of 1972, Federal Insecticide, Fungicide, and Rodenticide Act, Safe Drinking Water Act, Resource Conservation and Recovery Act, Toxic Substances Control Act
- Creation of Water Planning Board
- 1985 farm bill conservation provisions
- Creation of Environmental Quality Board
- Establishment and growth of Minnesota Pollution Control Agency,
- Environmental legislation -- Minnesota Environmental Policy Act, Reinvest in Minnesota, Water bank
- Soil loss limits legislation
- Agriculture land preservation act

GOVERNMENTAL

- Wetland preservation and restoration programs -- e.g., protected waters program, wetland tax credit
- Regulation of well drillers, water supply operators and sewage treatment plant operations -- includes education
- Resolution of major environmental problems
- Funding and construction of waste water treatment plants
- Seagrant
- Phosphate detergent ban

GOVERNMENTAL ACCOMPLISHMENTS, Cont.

- Better inter/intra agency coordination and communication -- state-state and state-local
- St. Paul and Minneapolis sewer separation
- Point sources identified and remedies applied
- State landuse programs related to shoreland, wild and scenic rivers, floodplain
- Well code
- Leaking underground storage program
- On-land disposal of taconite tailing and sewage sludge
- "WPC40" regulations pertaining to on-site sewage treatment systems
- Establishment of "protected flows" for rivers and streams
- Increasingly proactive programs

IMPROVED WATER MANAGEMENT

- Recognize local ability/responsibility thru passage of local water planning legislation -- Metro and County
- Define priority pollutants
- Improved water quality planning
- Improved public water supplies
- Improved monitoring/analytical techniques
- Better data collection and management
- Control of water appropriation
- Managing water on a watershed basis rather than a political district basis -- natural vs. arbitrary
- Improved networking of interest groups, agencies, local units of government, and public
- Solve pollution problems across jurisdictional boundaries
- Improved waste identification, collection and processing
- Various initiatives in flood damage reduction

SCIENTIFIC/TECHNOLOGICAL

- Water research groups funding and sampling
- Improved capability to detect pollutants
- Improved capability to predict environmental impact
- Developed standards for water quality
- Establishment of Freshwater Biological Institute
- Scientific studies and technological advances
- Establishment of automated water data base -- "Systems for Water Information Management (SWIM)" group

BUSINESS/INDUSTRY

- Clean water accepted as a industrial responsibility in business development

CITIZEN

- Improved tillage and land management practices
- Control of feedlot pollutants
- Public participation stimulated by state and federal environmental legislation

WATER SESSION ONE
ISSUES/PROBLEMS

Please Note: Numbers in parentheses represent participants "votes". Other parenthetical material inserted for clarification. Otherwise, text is copied verbatim from participant's lists.

PARTICIPANT'S ISSUES OF GREATEST CONCERN

- Groundwater degradation -- improper appropriation of fertilizers, herbicides, pesticides, existing/abandoned landfills; abandoned wells (12)
- Education -- elementary and on (12)
- Adequate funding for water resources issues (10)
- Control of nonpoint sources -- air, water, ground and surface; and develop state policy (9)
- Changes in farming practices -- ag chemicals, erosion, nutrients (7)
- Better identify value of water resource to society - set comprehensive goals and priorities (7)
- Create local - state - federal clean water partnership (6)
- Federal pre-emption of state's rights (5)
- Understanding processes of contaminates migration in groundwater and surface water (4)
- Flood damage reduction (4)

OTHER ISSUES OF CONCERN

- Need for better data management -- gathering, storage and dissemination (3)
- Keep water issues high on political agendas (3)
- Better understanding, methods, relationships and prediction of water resource systems (3)
- Who's in charge of Minnesota water? (2)
- Non-pollution means of dealing with solid and hazardous wastes (2)
- Expanded RIM (Re-Invest in Minnesota) and similiar types of programs (2)
- Separate funding and regulatory functions (2)
- Don't negate accomplishments (1)
- Decreasing construction grant funds (1)
- Who pays? taxpayer or consumer? (1)
- Is there a plan for Minnesota's water? (1)
- Who speaks for agriculture water needs? (1)
- Who's protecting public health? (1)
- Who's protecting eco-systems? (1)
- Public involvement (1)
- Groundwater protection and cleanup/restoration (1)
- Recreation/aesthetics (1)
- Drought or emergency water supply (1)
- Better coordination both vertically and horizontally (1)
- Develop data base system consistent with goals (1)
- Detecting pollutants and setting practical standards (1)
- Develop and identify legal and political ownership to water resources (1)

ISSUES OF CONCERN, Cont'd.

- Water supply issues -- quantity, quality and distribution (1)
- Better communicate status and accomplishments to the public (1)
- Better understanding and predictions and interactions between biota, geology, etc. (1)
- Lack of environmentally sound federal farm policy (1)
- Record individual property impacts on abstracts -- wells and sewers
- Inadequate regulation of underground storage and no safe method of storage
- Outside demands for Minnesota water
- Toxic regulation/enforcement
- Land use planning/controls
- Increasing public awareness and support
- Regulation of use of genetically engineered organisms
- Roles of federal, state, local and private organizations
- Use of chemicals - better living thru chemistry
- Legal requirements of CWA (Clean Water Act) unmet.
- Protection of natural water bodies
- Proper water allocation
- Establish energy values of water
- Acid rain
- Complete resolution to point - source pollution
- Wetland protection
- Flood control responsibilities
- Worldwide desertization
- Too many water quality cooks
- Increase in nitrate levels
- Test all private wells
- Adopted controls are not adequately enforced
- EQB become overseer of Minnesota environmental policy
- Incompatibility of data bases
- How to attain environmental goals

WATER SESSION ONE
RECOMMENDATIONS FOR ACTIONS

ISSUE: GROUNDWATER

- Need for federal legislation and funding
- Develop expanded data base on existing quality and quantity
- Catagorize resource value of groundwaters
- Establish comprehensive standards -- apply to both quality and quantity
- Expand research on both groundwater and pollutant movement
- Identify and prioritize primary sources of pollution
- Public information and education on issues
- Need for cooperation of industry in all of above
- Identify sources (inventory)
- Identify fate and transport of contaminants (modeling)
- Public awareness program
- Develop conprehensive groundwater quality standards
- Local clearinghouse for overseeing implementation/technology assistance
- Coordination of agencies involved in groundwater regulations
- Review of quality effects of withdrawal
- Risk assessment
- Total recycle waste products and byproducts
- Inventory and properly abandon wells
- Establish standards for groundwater protection
- Is non-degradation a feasible alternative?
- Legislation for futher watershed district involvement in groundwater degradation planning and control
- Outlaw land disposal of waste
- Legislature develop water use policy
- Household hazardous waste management program -- simplify
- More research and data gathering and monitoring
- Cancer registy to link contaminants with water
- Application of pesticides that are only biodegradable
- Funding
- Collect more and better organization of water data
- Source reduction -- waste volumes, etc.
- Adequate surcharge on pesticides for research and education
- Criteria for accceptable levels of contaminants
- Control of land-use
- Encourage individual well testing -- possible legislature mandate
- Develop better understanding of groundwater systems
- Identify aquifers and recharge areas
- Develop new on-farm practices
- Pro-active hydrogeologic aquifer evaluation and monitoring
- Recharge groundwater with Lake Superior excess
- Phase out terrible landfills
- Better and more complete data management and dissemination to decision makers and public

WATER SESSION ONE
RECOMMENDATIONS FOR ACTIONS

ISSUE: EDUCATION

- Create a sense of responsibility
- Orientation of new officials to environmental education
- Environmental Education at primary and secondary levels
- Establish more nature centers
- Redirect U of M and extension information and research to farming practices which do not degrade environment
- Create coalitions -- e.g., farmers/consumers/environmentalists
- Training for agencies and groups to develop expertise to deal with new issues
- Visible demonstration projects
- General public and elected officials
- Funding
- Prepare Environmental Education curriculum (add to education requirements for teachers)
- Fund MEEB at adequate levels and mandate water quality topics
- Cradle-to-Grave ongoing education for all ages
- Environmental groups should define priorities
- Environmental curriculum in elementary schools be required
- Involve all environmental groups in process
- Educate as to value of using recycled products
- Generate or develop new curricula
- Hands on experience in education
- Greater variety of informal education -- e.g., television
- Mandate agencies to initiate education programs -- coordinate through MEEB
- Education of public of need for legislation/regulation/enforcement
- Support for elected officials to undertake and continue programs
- Graduate degree in water resource management

ISSUE: FUNDING

- Develop industry processing awards for recycling products
- Dedicated funding
- Deposit bill
- Research funding for biological, mechanical and industrial processing
- Define real costs of water and pass them on to users
- Government lets people know how their taxes pay for an improved quality of life through resource protection and conservation
- Individuals stop voting for lower taxes
- Identify new/novel funding sources for water issues
- Need for state to fund basic and applied research
- Establish water development fund for infrastructure
- RIM approach - reinvest portion of taxes from a specific use of resource into the protection/improvement
- Tax Ag chemicals
- Funds from penalties
- Endowments as funding mechanism
- Increased general fund support
- Target funding towards priority problems
- Raise taxes
- Better information out to the public -- costs and accomplishments
- Relate stable funding to revenue from water related activities

FUNDING RECOMMENDATIONS, Cont'd.

- Consider innovative ways of spreading costs to all levels of government
- Educate the policy makers
- How much is water worth?
- Pass costs of clean-up to comsumers and/or polluters
- Innovative funding mechanisms -- surcharge on products that pollute

ISSUE: NON-POINT SOURCE POLLUTION (NPS)

- Funding
- Compulsary farm conservation program -- i.e., Iowa
- Statewide water quality management planning with local controls and involvement
- Expand role of local Health Department
- Expand water quality monitoring efforts
- Integrated agency strategy
- Executive and legislative branches agree on this as a priority
- Focus research on farm chemicals
- Mandatory soil conservation
- Identify and implement BMPs (Best Management Practices)
- Training for staff, elected and appointed officials
- Include sfc (surface) and groundwater
- Include atmospheric deposition in NPS programs
- Need to develop forums to monitor progress and refine
- Source reduction through education involvement
- Greater incentives for soil and water conservation than for increased production
- Find creative way to get business and farmers to cooperate in reducing non-point (economics)
- Cross - fertilization of professionals -- broaden, continuing education
- Create federal/state/local partnerships -- legitimize cooperation
- Flexible solutions/regulations/financial incentives/technical assistance
- Specify leadership at appropriate levels
- Update land-use, soils, and hazardous construction. Use information
- Integrate data and activities relative to non-point pollution
- Implement non-point issue report
- Utilize local land use control measures to minimize pollution
- Develop/incorporate "best management" practices
- Manufacture disclosure of product effects on environment
- Develop new farm practices

WATER SESSION TWO
ISSUES/PROBLEMS

PARTICIPANT'S ISSUES OF GREATEST CONCERN

- Failure of enforcement and monitoring at all levels and evaluation of programs and decisions (13)
- Groundwater protection - landfills, pesticides (11)
- Adequate funding for state/local agencies -- e.g., to meet Class II water standards (11)
- Clear delineation of powers, financing for water programs and a state commitment to same (10)
- Greater coordination/partnership between local, state, federal agencies -- interstate/international (9)
- Non-point pollution -- surface and ground (9)
- Wetland protection, restoration management (5)
- Farming practices that degrade water quality, e.g., fall plowing, streambank breakdown (5)
- Information and Education -- water literacy, public education regarding local water supplies (4)
- Maintain/update/improve water data -- make it accesible (3)
- Better management of floodwaters -- reduce erosion, reduce pollution, reduce flood damages -- rural and urban (3)

OTHER ISSUES OF CONCERN

- Drainage (2)
- Continued decline in lake quality from ag and urban runoff (2)
- Identification, control, prioritizing problems from poor environmental practices, e.g., landfill dumps (2)
- Pesticides and fertilizers usage and impacts on water quality
- Assessment of health risk information (2)
- Comprehensive lake management -- tieing land, recreational, biological, hydrological management together; lake and wetland restoration (2)
- Greater initiatives in rehabilitation of existing wastewater treatment systems (1)
- Municipal point source (1)
- Long distance transport of air pollutants -- acid rain, metals (1)
- Most productive use of available research dollars (1)
- Public support to effect change (1)
- Buried aquifer research/identification, higher level of geo-hydrologic information (1)
- Landfill closure and cleanup
- Standards for toxics
- Radioactive contamination
- WPC-40 not statewide
- Lack of adequate knowledge about farm and household chemicals
- Trade offs between costs/benefits of point vs non-point pollutants
- Balancing economic development and water quality issues
- Allocation of water surface and use
- Water level control
- Inadequate control of lake shore development
- Erosion, Sediments (ag area, urban area, forest/mineland related)
- Great lakes water levels, diversion
- Bottled water not regulated, recycled water -- purifiers
- Surface water quality
- Abandoned wells
- Long range water allocation - "who gets to use the water?" (1)
- Reauthorization of Clean Water Act

WATER SESSION TWO
RECOMMENDATIONS FOR ACTION

ISSUE: FAILURE OF ENFORCEMENT AND MONITORING

- Secure "stable" funding source for activities
- Require increased assessment and monitoring of existing programs -- annual report and audits by and to oversite agencies and legislature
- Comprehensive study of the issues including specific recommendations to 1988 legislature
- Education and increased awareness of need for enforcement and monitoring
- Establish incentives to promote better enforcement
- Evaluate the current governmental framework to identify problems and gaps
- Educate the public on agency roles/procedures and penalties
- More funding
- Expand public awareness through EQB -- mass media
- Make violaters liable - assign responsibility
- Evaluation of state programs by neutral professionals (leg. auditor)
- Mandate evaluation of programs within a certain time period
- Funding/technical training assistance for local implementataion
- Better information for state legislature, elected officers, county commissioners (seminars, workshops)
- Effective public education and technical assistance to develop local support/understanding. Include direction specifically to legal and enforcement officials
- Mass media public service information - more accurate
- Broader understanding and agreement on standards
- Periodic evaluation and recommendation by ? -- EQB, Legislative auditor

ISSUE: GROUNDWATER PROTECTION

- Adequate funding for groundwater protection
- Greater enforcement of groundwater legislation
- Assign the governmental units responsible for groundwater protection
- User fees
- Penalty for contamination
- Adequate inspection of major users
- Research in hydrology -- basic and applied
- Well inventory
- Identify sources
- Moratorium on nuclear power generation until disposal solution is found
- Delegation of responsibility
- Address household hazardous waste problem
- Educate potential polluters best management practices
- Research - for treatment of contaminants in groundwater; aquifer delineation (hydro-geology); health effects
- Data collection/organization/dissemination
- Develop state groundwater strategy/plan
- Establish groundwater standards for toxics

WATER SESSION TWO
RECOMMENDATIONS FOR ACTION

GROUNDWATER PROTECTION ACTIONS, Cont'd.

- Education and public awareness of the need for groundwater protection
- Continue expanded efforts in delineating and defining groundwater systems -- including research
- Integrated approach, rather than current compartmentalized approach to agriculture/groundwater relationships -- has application to other relationships

ISSUE: FUNDING

- Public awareness of needs and benefits which will enhance dollars
- Some type of user fee system
- Fund based on priority and reallocation
- Fee/tax on products that pose pollution risk
- Consumption tax, e.g., user of radioactive material
- User fees for waste water treatment
- Reprioritizing
- Dedicated sales tax of water
- Efficient use of funds through effective intergovernmental planning and coordination
- Effective prioritizing of needs
- Establish dedicated, stable fund for water resource management - state wide water tax, sales tax on water related equipment
- Need to establish value of water - it warrants a greater share of tax revenues
- Better prioritization in budget planning -- Legislature and Administration
- Container deposit (product control) batteries, pesticide containers
- Dedicated expanded sales tax
- Dedicated excise tax
- Increases permit fees
- Dedicated fines for public education purposes
- Standardized water values and cost
- Provide incentives to private sector for water stewardship
- Tax water bills for groundwater research
- Efficient bills collection

ISSUE: CLEAR DELINEATION OF POWERS

- Develop local government alternative models, e.g., joint powers - MOUs (Memorandums of Understanding)
- Reform local zoning statutory authority for consistency; include incentives; consider "use it effectively or lose it" concept
- Consider mandatory watersheds for major watershed areas
- Centralize water related data collection and management
- Mandatory laboratory certification and standards at all levels
- Identify coordination unit within state government, e.g., EQB, Government Cabinet -- give power to act
- Re-code all state water statutes
- Organize on resource boundaries rather than political
- Professionalism at all levels -- especially political appointments

HAZARDOUS MATERIALS/TOXIC SUBSTANCES
BY TOM KALITOWSKI

Good Morning. I appreciate this opportunity to briefly discuss the issue of toxic substances in the environment as a prelude to more comprehensive discussions that will follow when we break into smaller groups. Much of what I will touch on here is covered in greater detail in the fact sheet titled "Hazardous Materials/Toxic Substances", so I will limit these remarks to some key facts and perspectives which I hope will generate productive give-and-take in the sub-group.

The problem of exposure to Toxic Subtances is staggeringly broad and complex. We generate 125,000 tons of hazardous waste in this state each year, and only about one-third of the 15,000 generators are in compliance with the "cradle-to-grave" hazardous waste rules designed to protect public health. We somewhat irresponsibly "export" most of our waste to other states, because there are no major commercial recycling, incineration or treatment facilities for hazardous waste in Minnesota. These gaps have resulted in 130+ sites needing investigation and clean-up under the Superfund program. More will be found, including many associated with solid waste landfills.

There are between 5,000 and 10,000 underground storage tanks estimated to be leaking petroleum products into the soil and ground water. Every month, over 50 spills of hazardous materials and toxic substances are reported to the MPCA. Some are only a few gallons, but even small spills and leaks can ruin a drinking water supply. Some are catastrophic, as we vividly remember from the tradegy in Mounds View last summer.

Those are the more dramatic kinds of toxic and hazardous substance exposure. But that's not the whole story by any means.

We are increasingly exposed to toxic pesticides and fertilizers in ground water used for drinking. We are exposed to toxic organic compounds, such as dioxin, and toxic metals, such as mercury, in the air we breathe, in the water we drink, and in the food we eat. We are exposed in the outdoors, in the workplace, and in the home. Plants and animals are exposed to toxic substances as well. In short, all life on the planet has a stake in what we decide to do about toxic substances and hazardous materials.

We know all this because we have witnessed a tremendous surge in our ability to test for and to detect different toxic substances in the minutest of concentrations--parts per trillion and quadrillion. But these advances have left us in many cases experiencing our own form of "future shock." Our ability to interpret the data has not kept pace with our ability to collect the data. We find ourselves frequently unable to answer the obvious question: So what? So what if there's five parts per trillion of ethylmethyl-umptyglop in my water, or in the fish I caught, or in the soil in my backyard? And another troubling reality: it is often very expensive to test for something in parts per quadrillion.

Toxic substances and hazardous materials obviously pose many scientific and regulatory challenges. We know that we're surrounded by toxic substances, but our knowledge of their health effects is imperfect, to say the least. There is often little human-health information on which to base regulatory decisions. There is never enough time or resources to do the kind of conclusive research needed to make decisions. We are forced to act in a climate of scientific uncertainty, where our actions have tremendous health and cost implications.

By the year 2000, we will know much more than we do today about the health effects of toxics and what levels of exposure are safe and unsafe. But obviously we will need to devote significant resources--staff and money--to build that knowledge we need. And at the same time, we need to take action on the toxic substance and hazardous materials threats we know enough about today. By 2000, we should be able to say that we've done all we reasonably can to protect our people and our environment from harmful exposure to toxic substances.

That means continuing our efforts against known sources of harmful toxic substance exposure, such as old hazardous waste dumps and leaking underground tanks, while taking on new challenges in the areas of toxic air pollutants and less-prominent threats to our drinking water and our lakes and streams.

Specifically, we need to aim at the following targets:

- Minimizing landfills of solid waste through balanced landfill alternatives -- recycling, composting, incineration,
- Vastly improving our management of hazardous wastes in-state, through recycling, treatment and incineration, and establish a system to collect household hazardous wastes which are now ending up in landfills,
- Establishing health standards and emission standards for toxic air pollutants, such and organic chemicals and metals, and then attaining those standards, and
- Widespread use of polluted runoff control-practices in cities and on farms to keep nonpoint-source pollutants out of our lakes, streams and groundwater.

The list could go on and on. I submit these as just some of the issues to be considered in the panel discussion.

In considering <u>how</u> to get us from 1986 to 2000, I would like panelists to keep in mind three important points. First is the need for interagency cooperation, and that is why we as EQB members are here today. Take for example the complicated issue of pesticides in Minnesota. The Department of Agriculture regulates the use of pesticides in Minnesota. The MPCA gets involved if there is a spill or ground water contamination. The Department of Health is responsible for determining safe levels of exposure to pesticides in drinking water. And the Department of Natural Resources could be involved as either a user of herbicides or in assessing impacts on fish and game if a spill occurs. This illustration is typical of the inter-agency nature of toxic substance issues, and points to the need for close cooperation to make sure our time and money are spent wisely.

The second key point to bear in mind is the need to strive for excellence in our analysis of both the technical issues and the costs involved with toxic substance control. We have to remember that toxic substances are a by-product of countless activities that are beneficial to society, such as growing food for our tables and producing all the goods and services we demand to live, work, and enjoy life. We have to develop a solid, defensible information base to justify that our recommendations and their costs are both needed and reasonable.

The third point I want to emphasize is the critical importance of education, and of doing a good job communicating our analysis and recommendations. We need to improve public understanding of how toxic substance exposure occurs and how individuals and organizations can help minimize their own contributions to the problem. There's no question that more resources are needed to conduct research, develop standards and meet those standards.

But it's not enough to just say give us more money and we'll fix this problem. Remember, these needs are competing for dollars with other worthy causes, and the supply of money is often very tight. We have to make sure that we flawlessly articulate our needs for staff and money, so that elected officials understand what we're asking for and why.

Minnesota is obviously not alone with these problems. Lee Thomas, Administrator of the U.S. Environmental Protection Agency, recently gave his version of the nation's top five environmental goals for fiscal year 1988. They are, paraphrased:

1) Reducing risks of exposure to pesticides and toxic chemicals;

2) Reducing exposure to hazardous air pollutants indoors and out, including toxic air pollutants, ozone and radon;

3) Preventing ground water contamination and other risks form hazardous waste sites;

4) Improving protection of aquatic life and suitability of surface waters for human uses; and

5) Improving EPA's management of risks, i.e. improving risk assessment, defining exposure levels of concern, and developing cost-effective technical solutions to environmental risks.

As you can see, each one of these is tied to toxic substance and hazardous materials exposure, so we're on the same track.

But Minnesota is set apart in one important sense: the nation and the states are watching us carefully, looking to us for leadership, which we have so often provided in the past on difficult environmental problems. So I look with confidence to the group of committed citizens and officials gathered at this Environmental Congress to help outline a course of action, to get us from where we are today to where we want to be in the year 2000. Thank you for being here.

Hazardous Materials/Toxic Substances

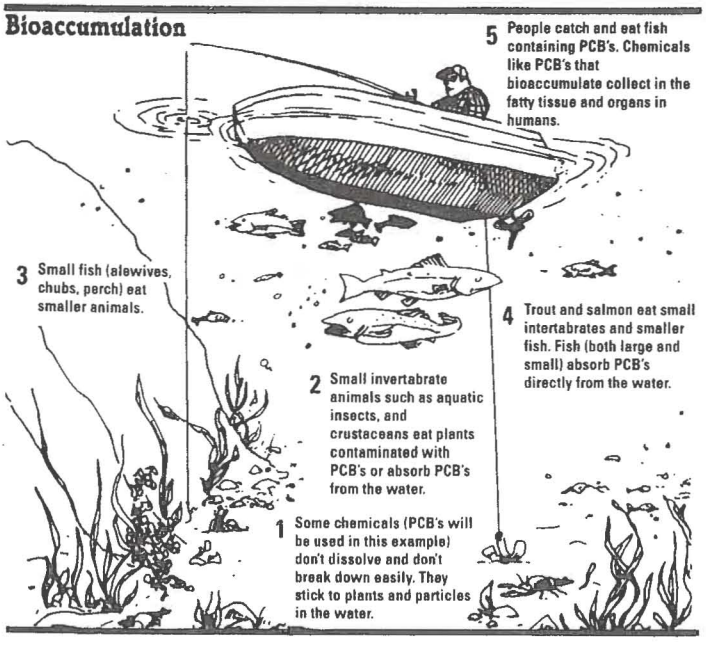
Hazardous materials and toxic substances are commonplace in our modern, industrialized society. These materials are used widely by industry, agriculture, and individuals. Such common items as household cleaners, paints and gasoline, as well as waste from nuclear power plants and industrial processing are all considered hazardous materials. They can pose considerable risks which must be assessed and controlled in order to protect public health and environmental quality.

Problems arise from both present and past practices of use, transport, storage, and disposal. The impacts of these problems include the pollution of surface and ground water drinking supplies, accumulation in sediments and soils, bio-accumulation in aquatic and terrestrial life, toxicity to aquatic life, and the potential for human toxicity effects.

To protect the public health and welfare, and the quality of our environment, the state must: control transportation, storage, usage and disposal practices; establish environmental standards; identify existing and potential problems, risks, and solutions; identify, investigate and ensure the clean-up of hazardous waste sites; and respond quickly and appropriately to emergencies.

Scope

Hazardous materials and toxic substances are found throughout the environment. Despite their low concentrations, they may have serious long term effect on public health and the environment. They may be inhaled or absorbed through the skin. They may directly contaminate the water we drink. They may be accumulated by crops, livestock and fish, or may enter the natural food chain. Over time, these substances may accumulate in high concentrations in human fatty tissue and breast milk. A number of these substances can cause birth defects, cancer and reproductive disorders, and can affect the immune system.



Due to the interconnectedness of ground water, surface water and air, hazardous and toxic substances often have the potential to pollute all three. However, for discussion purposes, activities and pollution problems have been divided into these three areas.

Ground Water Contamination

Ground water can be contaminated by hazardous materials and toxic substances from numerous sources. The most commonly thought of source is hazardous waste handling and disposal. Approximately 15,000 hazardous waste generators produce a total of about 125,000 tons of hazardous waste per year. It is estimated that only one-third of these generators are presently in compliance with Minnesota Hazardous Waste Regulations. In a recent household waste collection effort, 4600 gallons of waste oil and 324 drums of hazardous wastes were collected from 2800 households.

Problems also arise from past disposal sites, where wastes were disposed of without proper pollution control measures. As of September, 1986, 38 hazardous waste sites were listed in Minnesota on the U.S. EPA National Priority List; 133 were listed in the Minnesota Permanent List of Priorities (MPLP). Of the 133, 46 are sanitary landfills. Each year, additional sites are identified and added to these lists. Clean up at most of these sites will be very expensive and take years to complete.

Residuals (ash) from municipal solid waste incinerators can also pose problems. These residuals require disposal or further treatment and may contain toxic substances which could leach into the ground water.

Underground petroleum storage tanks pose an additional threat. It is currently estimated that there may be approximately 60,000 underground tanks in Minnesota with approximately 10 percent leaking their contents.

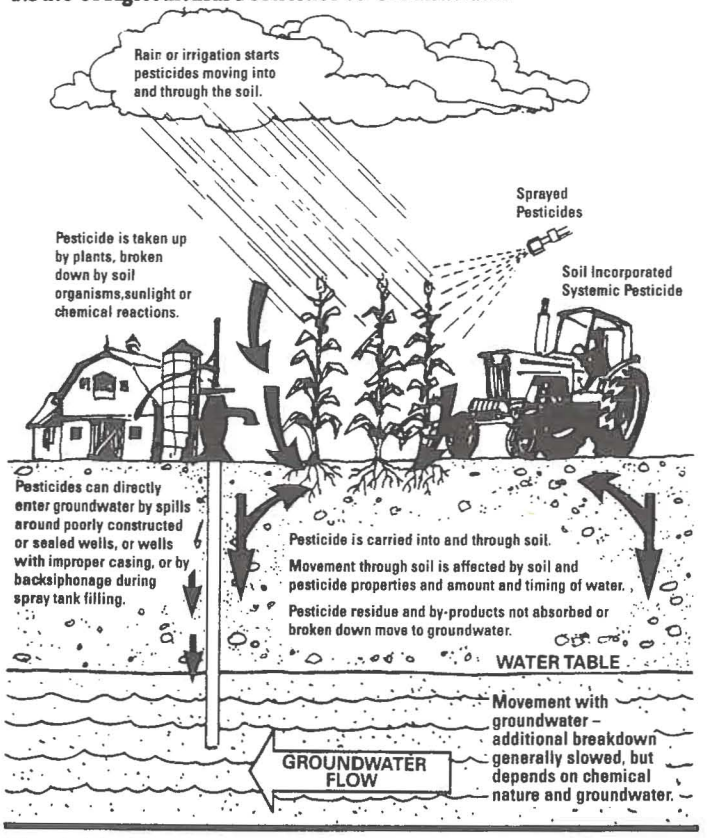
In 1983, a survey of Minnesota community public water supply wells was conducted for synthetic volatile organic chemicals. Eight percent of the systems surveyed had detectable levels of these chemicals, with 1.7 percent exceeding acceptable drinking water levels.

An additional source of ground water contamination arises from the use of pesticides and fertilizers. Problems have occurred due to improper disposal of containers and residues, lack of protective devices in the application of chemicals through irrigation equipment resulting in the direct flow of pollutants to waters, improper storage, and improper application timing and rates. Recent studies, however, have revealed that contamination problems are arising from normal use as well.

Preliminary findings of a survey of state drinking water supplies have revealed pesticides in 52 percent of the private wells surveyed and 22 percent of the public wells surveyed. However, no results exceeded the current recommended drinking water limits. Preliminary findings of a survey of non-drinking water wells in agricultural areas have yielded similar results, as have studies in sand plains in Minnesota, and studies in Iowa and Wisconsin of areas similar to Minnesota.

Studies have also revealed nitrate problems. In the above mentioned survey, 46 percent of private wells surveyed exceeded the maximum contaminant level for nitrates. Similar results have been previously noted in studies of the SE Minnesota karst region and portions of Iowa adjacent to Minnesota. Problems can result from malfunctioning septic systems, feedlots and fertilizer usage.

Route of Agricultural Pesticides to Groundwater



The sink holes of the karst region provide direct conduits for pollutants to ground water. Improperly constructed and abandoned wells also provide a direct route for surface contamination to enter ground water acquifers. It is estimated that there are 800,000 abandoned wells in Minnesota.

Surface Water Contamination

Many of the same activities that can lead to the contamination of ground water can also contaminate surface waters, and vice versa. For example, pesticides or hazardous wastes may have been disposed of in or near surface waters, resulting in contamination. Likewise, the interconnections between surface and ground waters dictate that contamination of one can result in contamination of the other.

Direct discharges to surface waters can result in contamination. Through the National Pollutant Discharge Elimination System (NPDES) permits, 710 industrial and 598 municipal wastewater treatment facilities are permitted to discharge effluents to surface water. Some of these discharges are potentially toxic.

Bioassays are utilized to determine the acute toxicity of effluents discharged to state waters. All municipal wastewater treatment plant discharges in Minnesota (excluding pond systems) and most industrial systems, have been evaluated with either a screening or definitive bioassay. These bioassays have shown that approximately 30 percent of the discharges appear to be toxic and that ammonia appears to be the most common cause of the toxicity.

Past unregulated disposal practices have caused lake, stream and sediment contamination. As a result, advisories have been issued limiting fish consumption from certain lakes and streams. In Minnesota, advisories have been issued due to contamination by polychlorinated biphenyls (PCBs), mercury, and 2,3,7,8 tetrachlorodibenzo- para-dioxin (TCDD). As of May 1986, there were 169 lakes and parts of 21 rivers or streams for which fish consumption advisories had been issued.

Hazardous material spills can also result in surface water contamination, and ground water contamination if clean-up does not occur in a timely fashion. From August, 1985, to June, 1986, 484 incidents of hazardous material spills were reported, of which 176 occurred during transportation of these materials. Failures of equipment and storage tank failures accounted for an additional 123 incidents. Petroleum products were the commodities most frequently involved (270 incidents). Other materials include PCB-containing transformer oils, agricultural chemicals, corrosives and industrial solvents.

Air Contamination

In Minnesota, 34 toxic air pollutant sources have been identified based upon the magnitude of their potential emissions and the toxicity of the pollutant. Facilities which may emit toxic air pollutants include manufacturing plants, paint applicators, chemical plants, refineries, and electronics manufacturers. Principal toxic air pollutants emitted by such facilities include toluene, xylene, methylene chloride, phenol, trichlorethylene, perchloroethylene, formaldehyde, methyl chloroform, ethylene oxide, and metals.

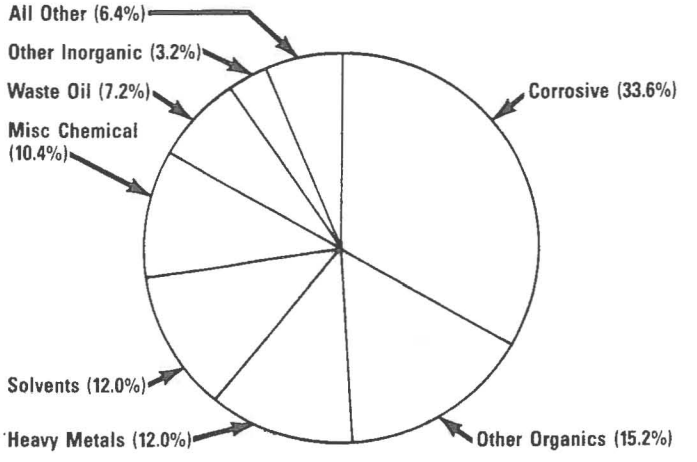
In addition, combustion facilities also can emit hazardous contaminates. Currently in Minnesota, five permitted municipal solid waste incinerators burn an estimated 469 tons per day of solid waste. Eight additional facilities are under development and will burn an additional 4,394 tons per day of solid waste. Potential emissions from these facilities include cadmium, chromium, lead, mercury, beryllium, arsenic, and organics such as PCBs, PAHs, dioxins and furans. One hazardous waste incinerator, the 3M Company Chemolite facility, is presently permitted in the state. The increasing need for final disposal strategies for hazardous waste may result in an increase in incinerators.

Combustion of coal and other fossil fuels also results in the emission of toxic substances such as lead, mercury and arsenic, as well as low levels of radiation. Twenty-five Minnesota power plants utilized 12.3 million tons of coke and coal in 1984 and emitted 72 tons of lead in that year.

Automotive exhaust emissions have historically been a source of toxic materials, mainly lead and carbon monoxide. With the reduction in the use of lead as a fuel additive, improved auto emission requirements, and transportation system planning, these sources are expected to diminish.

Finally, air emissions can result in the deposition of toxics into waters. Most notable is acid precipitation. (For further information on acid precipitation, see the "Water" paper in this series.)

Disclosed Hazardous Waste Generation – 1984



Total Waste Generation – 125,000 Tons Per Year

Key Laws

Federal Legislation

1972	Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Clean Water Act (The MPCA administers the act in Minnesota.)
1974	Safe Drinking Water Act
1976	Toxic Substances Control Act (TSCA) Resource Conservation and Recovery Act (RCRA)
1977	Clean Air Act (Amended)
1980	Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (Federal Superfund) Low Level Radioactive Waste Policy Act (Authorizes regional compacts to site low-level radioactive waste disposal sites.)
1982	Nuclear Waste Policy Act (Establishes a national policy of deep geological disposal for high-level radioactive waste)

State Legislation

——	Minnesota Pollution Control Agency Act
1976	Pesticide Control Act (Establishes the authority of the Department of Agriculture to regulate the use of pesticides.)
1980	Minnesota Waste Management Act (Created the Minnesota Waste Management Board)
1982	Acid Rain Control Act
1983	Minnesota Environmental Response and Liability Act (ERLA) (Minnesota Superfund)

History

Numerous strides have been made in the management of hazardous materials and toxic substances since 1970. Regulatory programs have been established to control use, treatment and disposal, and have been continually reviewed and amended to more effectively address issues as knowledge increases. Major advance in analytical capabilities have enhanced pollutant detection, impact assessment and compliance tracking.

Advances in Solid and Hazardous Waste Management

The need for better management of solid and hazardous waste was recognized in 1980 with the passage of the **Minnesota Waste Management Act.** The Act created the Waste Management Board and assigned it responsibility for 1) hazardous waste management planning; 2) promoting better hazardous waste management practices; 3) promoting and establishing waste facilities; and 4) hazardous waste facility development and siting.

Waste disposal requirements have also been tightened through revisions to the Minnesota Pollution Control Agency's (MPCA) solid waste rules. Liners and leachate detection and collection systems are now common requirements for new landfills to insure that pollutants do not migrate to surface or ground waters.

Hazardous waste management has also been greatly enhanced through the federal **Resource Conservation and Recovery Act (RCRA)**, adopted in 1976, and the **Minnesota Pollution Control Agency Act**, amendments of 1974. These Acts are designed to regulate and manage active hazardous waste generators. Through the acts, generators are legally responsible for their wastes from generation to final disposal (cradle-to-grave). The Environmental Protection Agency (EPA) authorized the State of Minnesota to operate the federal RCRA program within the State in 1985.

Efforts to clean-up past problems have also been enhanced. The implementation of the federal **Superfund** program **(Comprehensive Environmental Response Compensation and Liability Act of 1980)** and the state **Superfund** program **(Minnesota Environmental Response and Liability Act of 1983)** had resulted in the initiation of clean-up activities at 73 hazardous waste sites as of September, 1986.

Advances in Water Quality Protection

The federal **Clean Water Act**, amendments of 1972, established basic authority for the regulation of discharges of pollutants, including toxics, into surface waters. This Act is administered in Minnesota by the MPCA, and together with state statutes, provides the framework for the development of standards, enforcement of discharge limitations, and ensuring that the quality of the state's waters are suitable for the designated uses. Through this Act, discharges for pollutants from municipalities and industries and resultant toxic impacts have been greatly reduced.

The federal **Clean Water Act** also provided for the regulation of industrial wastes being discharged to municipal wastewater treatment plants. The concern was that toxics being discharged by industries into municipal plants were not able to be removed by domestic wastewater treatment processes. Industries were, therefore, required to pretreat their wastes to remove these toxics prior to discharge to a municipal wastewater treatment plant. The program is administered by the State of Minnesota and authorized wastewater commissions or cites. Under this pretreatment program, most industrial discharges are presently being regulated or are now constructing their own pretreatment plant.

Technical assistance and training efforts have also been increased to ensure that waste treatment facilities are effectively designed, installed and operated. Considerable technical expertise has been gained in the area of emergency response to hazardous material spills. Equipment and staff are available from a variety of state and local agencies. However, expertise at the local level, particularly among fire departments and other first responders, is frequently not sufficient to deal with the myraid of chemical substances present in the work place.

The federal **Safe Drinking Water Act**, adopted in 1974, provided for EPA regulation of the quality of public drinking water supplies. Administered in the state by the Minnesota Department of Health, this Act, together with state statutes, enables the department to establish standards for drinking water and ensure that public drinking waters meet those standards. Additionally, through the state Water Well Construction Code, requirements are imposed to insure that new and abandoned wells do not serve as conduits of surface or subsurface pollution.

Water quality protection was also advanced through the passage of the federal **Insecticide, Fungicide, and Rodenticide Act amendments** in 1972, and the state **Pesticide Control Act** in 1976. Through these acts, EPA and the Minnesota Department of Agriculture regulate the distribution and use of pesticides. The acts require pesticide registration and applicator training and certification. Traditionally, concern was focused on direct exposure and residues on foods. While emphasis on ground water quality is growing, few standards for pesticide concentrations in water currently exist.

Efforts in addressing problems associated with underground storage tanks are just getting underway. In 1985, the Legislature directed the MPCA to prepare an inventory of underground storage tanks, develop and implement a data management system for underground storage tanks, and initiate development of technical standards and a regulatory program for underground tanks. The inventory is now being completed, and work on the data management system, technical standards and regulatory program has begun.

Inter-regional efforts for dealing with hazardous materials and toxic substances have also emerged. The United States and Canada first entered into the **Great Lakes Water Quality Agreement** in 1972. By this agreement and its 1978 revisions, both parties agreed to protect the water quality of the Great Lakes and regulate discharges. In March 1986, Canada and Ontario renewed their agreement to protect Great Lakes water quality by the adoption of more effective measures to control the discharge of toxic substances, including providing financial assistance for construction of wastewater treatment plants and increasing monitoring and surveillance.

Finally, in 1986, the **Great Lakes Governors' Council on Toxicity** was formed and has provided impetus for the evaluation and elimination of direct and indirect toxic discharges. The **Memorandum of Understanding for Control of Toxic Substances in the Great Lakes**, signed in 1986, will foster coordination and cooperation among Great Lakes states and provinces in permitting of discharges, monitoring, issuance of fish consumption advisories, and policy development.

Advances in Air Quality Protection

The federal **Clean Air Act** was established to provide authority for air pollution control programs. It required the promulgation of standards, including those for hazardous air pollutants, the delineation of areas of the state not attaining standards and the development of clean-up plans. Through emission source permits, improvements in existing sources and control of new sources have enabled attainment of air quality standards in almost all areas of the state. However, standards have been developed for only a few toxic or hazardous air pollutants.

The state's **Acid Rain Control Act**, adopted in 1982, has also provided a step forward in the control of toxic air pollutants. Through the Act, the state has developed an acid rain deposition standard and control plan. Work in the development of these, however, has highlighted the national and international aspects of the issue and the need for controls and standards beyond state boundaries.

The state is currently exploring development of a comprehensive toxic substances program to adequately regulate emissions of toxic compounds including carcinogenic, mutagenic and teratogenic agents into the environment. The program will include development of emission inventories; ambient air, water and soils monitoring of toxics; establishment of new source review procedures; establishment of a toxics data bank; and implementation of a regulatory program.

Issues

While numerous advances have been made in the past years toward improvement of our management and control of hazardous materials and toxic substances, many issues remain. In a general sense, issues deal with defining the problem (monitoring), defining the safe or acceptable/desirable situation (standards or guidelines), and defining how to get from the problem to the safe situation and how to prevent future problems (enforcement). In order to improve management and control, the following issues must be addressed:

Standards

- How do we approach the control of toxics without the benefit of federal standards or definitive cause and effect relationships?
- How do we determine how clean is clean enough?
- How do we determine where to apply a standard; for example, for agricultural chemicals, do we apply standards directly under fields, adjacent to use areas, or only to waters being used for drinking?
- Should standards be absolutes (For example, when a level is reached an activity is stopped and remedial actions begun.), or tiered (For example, one level where activities or behavior is modified to prevent further degradation and a second where activities are stopped.)?
- How do we approach the control of impacts from multiple sources and compounds, some of which may originate far from the source being immediately evaluated, given limited scientific information?

Enforcement

- How do we move forward in the face of federal inaction where the problem is beyond our geographic scope of control (For example, in acid rain control), and where development without federal action may be beyond our monetary ability (For example, pesticide ground water standards)?
- How do we ensure that substances used by individuals, such as household hazardous materials/wastes, used oil and pesticides, are used and disposed of properly, given that control may involve changing individual behavior rather than activities and discharges of industry?
- How do we strike a balance between reducing the use of hazardous/toxic materials and the production of hazardous/toxic wastes on the one hand and personal freedom on the other?
- How do we ensure that solid waste disposal strategies do not result in the introduction of toxic substances into the environment; that is, that we are not exchanging one problem (landfills/ground water) for another (incinerators/air)?

Funding

- How do we fund necessary monitoring, research and regulatory activities? Who should pay: the producer of the product or waste; the user of the product; or society as a whole (all those that benefit from clean air and water)?

Minnesota...Year 2000

In the year 2000, the situation with hazardous materials and toxic substances should be greatly improved. Given adequate funding for research, our ability to detect pollutants and to assess impacts will be far beyond today. Continuation of our cradle to grave hazardous waste tracking systems and knowledge of proper treatment and disposal practices should preclude the proliferation of new hazardous waste sites. Continuation of the state and federal Superfund programs will lead to the alleviation of past disposal problems.

The strides to be made in such areas as recycling, reuse, use of less toxic products, and reduction of use to only necessary levels remains to be seen. Success will depend upon changing individual behavior. Success will also depend upon evaluating the problems from a holistic stand point, so that immediate solutions do not lead to future problems. We must develop approaches in which the use of toxic chemicals for the common public good is not prohibited, but where the use is made in a manner which provides for the protection of the environment and public safety.

For Further Information

MPCA publications in MPCA Public Information Office, including ***Hazardous Waste Primer***, MPCA, July 1986

Hazardous Waste & Toxic Substances, EPA Region V, Office of Public Affairs, 1985.

Environmental Progress & Challenges, An EPA Perspective, EPA Government Printing Office, June 1984.

Hazardous Waste Management, Goldman, B.R., Hume, J.A., & Johnson, Council of Economic Priorities, Island Press, 1986.

Pollutants and Their Ecotoxicological Significance, Nuernbers, H.W. (ed.), John Wiley and Sons, 1985

Periodicals of Interest:

Archives of Environmental Contamination and Toxicology, Springer-Verlag.

Bulletin of Environmental Contamination and Toxicology, Springer-Verlog.

EPA Journal — U.S. EPA, Government Printing Office.

Hazardous Materials and Waste Management

Hazardous Waste News, Business Publishers.

Journal of Environmental Health, National Environmental Health Association.

Journal of Hazardous Materials, Elseirer Science Publishers.

HAZARDOUS MATERIALS/TOXIC SUBSTANCES
ACCOMPLISHMENTS

AWARENESS AND EDUCATION

- Increased public awareness, education, response and participation
- Increasing sophistication regarding understanding of risk/benefit balance
- Environmental education accomplishments
- Public awareness that all aspects of technology are not good
- Recognition that public health is an environmental issue
- Knowledge and standards of health and environmental risk
- Public awareness of connection between land use and pollution
- Education on use of chemicals

LEGISLATION

- Allocation of resources (funding)
- Liability allocation to generator and disposer
- Establishment of regulatory agencies:
  - EPA (Environmental Protection Agency),
  - PCA (Minnesota Pollution Control Agency),
  - WMB (Minnesota Waste Management Board),
  - DOH (Minnesota Department of Health),
  - MnDOT (Minnesota Department of Transportation),
  - NIH (National Institute of Health)
- Federal and state legislation, regulation and guidelines for:
  - control of hazardous materials/toxic substances
  - hazardous waste siting
  - pesticide applicator certification
  - federal and state superfund
  - underground storage
  - right to know laws
- CWA (1972 - Clean Water Act)
- FIFRA (1972 - Federal Insecticide, Fungicide and Rodenticide Act)
- MEPA (1973 - Minnesota Environmental Policy Act)
- OSHA (1973 - Occupational Safety and Health Act)
- RCRA (1976 - Resource Conservation and Recovery Act)
- TSCA (1976 - Toxic Substances Control Act)
- Minnesota Pesticide Control Act (1976)
- CERCLA (Superfund) (1980 - Comprehensive Environmental Response, Compensation and Liability Act)
- Acid Rain Control Act (1982)
- MERLA (1983 - Minnesota Environmental Response and Liability Act)
- Minnesota Comprehensive Local Water Management Act (1986)

GOVERNMENTAL

- Establishment of acid deposition standard
- Identification and bans on some hazardous materials -- PCB's, lead, asbestos, Mirex
- Identification of generators (of hazardous wastes)
- Waste-facility siting

GOVERNMENTAL ACCOMPLISHMENTS, Cont'd.

- Identification and cleanup of hazardous waste sites in Minnesota
- New state agencies and programs -- emergency response
- Interagency cooperation in permit issuance for bog land development and other projects
- Interagency/interstate cooperation
- Emergency tracking/cleanup
- Beginning of ground water monitoring (pesticides and others)
- Metro council

TECHNICAL

- Identification of specific environmental problems/issues, improved monitoring, detection and analysis capabilities
- Scientific advances in identifying toxic chemicals
- Reassessment of contaminant flow and transport mechanisms
- Technological improvements in detection, management, prevention, education
- Improved information/database (health evaluation)
- Use of computer technology to define and examine problems
- Recognition of primary airborne and water borne contaminants
- System development, testing protocols, SPCC plan guidelines
- Toxicology -- identification of health risk
- Technology to evaluate problem
- Research into proper disposal
- Established data base on existing hazards/problems

BUSINESS/INDUSTRY

- Increased awareness and commitment by corporations
- General movement away from below ground disposal options
- Waste minimization
- Waste disposal practices (toxic substance disposal)
- Public/corporation acceptance of management
- Hazardous waste collection
- Industrial/technological -- waste reduction, treatment, analysis/interpretation, awareness, sensitivity, identification and evaluation of toxics

CITIZEN

- Increased recycling of waste materials

HAZARDOUS MATERIALS/TOXIC SUBSTANCES SESSION ONE
ISSUES/PROBLEMS

PLEASE NOTE: Numbers in parentheses denote participant's "votes". Other parenthetical material added for clarification. Otherwise, text is copied verbatim from participant's lists.

PARTICIPANT'S ISSUES OF GREATEST CONCERN

- Inadequate education and dissemination of information (9)
- Development of alternative waste treatment technologies (9)
- Inadequate health risk research, lack of standards/acceptable risk, need for uniform health risk, assessment/management policy (10)
- Pesticide use/control/disposal (8)
- Need for waste disposal sites and delivery systems (7)
- Lack of consumer and generator responsibility, throw away lifestyle (6)
- Need for better data and research (6)
- Integrating environmental concerns into product development, advertising, manufacture (5)
- Continue identification and cleanup (3)
- Adequate enforcement of existing laws (3)

OTHER ISSUES OF CONCERN

- Household hazardous chemical use and disposal (1)
- Money on study vs cleanup (1)
- Trading problems -- e.g., air pollution control, sludges generation (1)
- Inadequate staffing and equipment in labs, or lack-of labs, charged with monitoring environmental quality (1)
- Transport of hazardous waste (1)
- Affordable analytical and cleanup/disposal services (1)
- Public - private sector cooperation (1)
- Coordination of state agencies hazards (right to know) (1)
- Rules - regulation: simplification (understandable) (1)
- Liability/insurance issues (1)
- Non-point sources (2)
- Development of alternative waste treatment technologies (2)
- Interagency toxics task forces (lack of) (2)
- Long-range planning "growth vs. regulation", e.g., air pollution (2)
- Funding (2)
- Lack of air toxics program
- Agency prioritization
- Funding methods/bankruptcy
- Regulatory layers
- Burning of refuse derived fuel/mass burn
- Expenses of chemical identifications of monitoring
- Knee-jerk, "Not in my back yard" syndrome
- Is the public really willing to pay more? -- Research?

HAZARDOUS MATERIALS/TOXIC SUBSTANCES SESSION ONE
ISSUES/PROBLEMS

- Complacency
- Unsafe use of products
- Leaking underground storage tanks
- Getting at small generators: dry cleaning, machine shops, service stations
- Separation of trash
- Economic trade-offs
- Siting problems -- goal-oriented, sacrifice science to meet goal--long-term solutions
- Difficulty of public agencies to deal with complex issues
- Understanding contaminant migration
- Completing superfund programs
- Sites not feasible for clean-up
- Auto emissions
- Acid deposition
- Technical public participation
- More federal standards and guidance/state standards
- Citizen right to know
- Disposal practices at landfills
- Positive incentives for proper management

HAZARDOUS MATERIAL/TOXIC SUBSTANCES SESSION ONE
RECOMMENDATIONS FOR ACTIONS

ISSUE: INADEQUATE EDUCATION
- Coordinate efforts
- Funding -- need legislation
- Start early; make mandatory for secondary education
- Involve industry, public participation, community
- Charge disposal or education fee at purchase
- Money awards
- Media blitz on source reduction/safe disposal/alternatives to hazardous products
- Better product labels, include proper disposal
- Use of U of MN extension and other existing programs
- Information resource center and hot line
- Producers should provide disposal methods on labels

ISSUE: DEVELOPMENT OF ALTERNATIVE TREATMENT TECHNOLOGIES
- Central clearinghouse to provide information on proper treatment/ disposal
- Allow free market to determine appropriate disposal within limits of standards. Keep process apolitical
- Require development of treatment/disposal technology prior to marketing of product
- Encourage federal Research and Development programs
- Waste minimization through legislation
- Adequate enforcement to assure application of new technology
- Build incinerator for hazardous waste, further economic incentives for site development
- Fund Research and Development pilot projects, through indirect/direct subsidy, reduction of liability

ISSUE: INADEQUATE RISK ASSESSMENT
- Federal responsibility
- Increased state monitoring
- Fund health research
- Standardize risk assessment
- Avoid duplication of efforts
- Determine what level of risk is appropriate/acceptable, especially in light of background risk level
- Develop interagencey task force for risk assessment policy and standards for specific substances

ISSUE: PESTICIDES
- More control on manufacturers labels incentives for biodegradability
- Education of users and consumers
- Pesticide container recycling - deposit on containers
- Conference of pesticide regulation - industry, users, experts, citizen groups, etc.
- Develop means to reduce application rates and frequency
- Educate farmers re: calibration techniques to reduce runoff
- Promote integrated pest management -- use of biological and other agents
- Application certification or registration mandatory - education
- Tax on non-biodegradable pesticides or other "bad" pesticides
- Develop alternatives to pesticides

HAZARDOUS MATERIALS/TOXIC SUBSTANCES SESSION TWO
ISSUES/PROBLEMS

PARTICIPANT'S ISSUES OF GREATEST CONCERN

- Lack of research for new/revised TLV (Threshold Limit Value). Insufficient funding (10)
- Lack of education and awareness at all levels of society; cancer phobia (10)
- Difficulty in siting hazardous waste disposal facility (6)
- Sacrifice of environment quality for standard of living (6)
- Household/small generators (5)
- Inadequate disposal and treatment technology (4)
- Ag chemical use (4)
- Research needed for effects on ecosystem (4)
- Non-point source pollution (3)
- Economic and regulatory disincentives; competition in world national and regional market place -- inconsistent regulations and applications (2)

OTHER ISSUES OF CONCERN

- Development of effective site remedial actions/compliance failure (1)
- Illegal dumping (1)
- Leaking land fills (1)
- Human health (bioconcentration) (1)
- Need for improved regulation based on best available technology (1)
- How can toxics management be institutionalized? (1)
- Expense of technical analysis (1)
- Identify all generators and disposal sites (1)
- Generation and disposal of nuclear waste (1)
- Validity of Cost/benefit analysis (2)
- Generation abatement (2)
- Reliability of government agencies
- Cross media pollution
- Indoor air pollution
- Variety of contaminants, numbers, complexity
- Federal/state/county/other relations/actions improve and coordinate
- Interactions of unrelated problems
- Lack of participant responsiveness
- Alternative technologies, development/use
- LUST (Underground Storage Tanks)
- Human health -- relationship of toxics to human disease
- Export of toxins to third world countries banned for use by U.S. and other high tech nations -- white collar midnight dumping
- Lack of financial incentives, i.e., subsidies, taxes, surcharges
- Past practices and associated liability questions
- Incinerators of waste and fossil fuels
- How to deal with transportation impacts
- Existing toxins often not retrievable
- Enforcement

HAZARDOUS MATERIALS/TOXIC SUBSTANCES SESSION TWO
RECOMMENDATIONS FOR ACTIONS

ISSUE: LACK OF RESEARCH FOR NEW THRESHOLD LIMIT VALUES (TLVS), ETC., INSUFFICIENT FUNDING

- Prioritize problems, focus research on same, use technical review board
- Pass costs to users
- Legislate funding
- Foster cooperation among researchers, academia, agencies
- Establish technical data base on contaminant levels, public health effects
- Expand agency in-house research
- Priorities should be:
  - Toxic STD's (standards)
  - TLV's (Threshold Limit Values)
  - Radon
  - Multiple exposure, synergism
  - Toxicity categorization

NOTES FROM DISCUSSION

- Actual studies are sometimes hard to obtain.
- Need free flow of information from government to general public.

ISSUE: LACK OF EDUCATION AND PUBLIC AWARENESS AT ALL LEVELS OF SOCIETY / "CANCER-PHOBIA"

- Support Waste Education Roundtable approach
- Put leadership for Environmental Education in one state agency
- Identify products that produce hazardous and toxic by-products and encourage boycott of these products. What are alternatives?
- Scientific literacy to graduate from high school -- curriculm development
- Establish state funded environmental education specialists in major pollution centers
- Offer college, extension, community courses on toxics and hazardous waste
- Identify and communicate true costs of hazardous waste disposal
- Establish a forum of adult public information and education
- Environmental Education -- re: hazardous waste in primary and secondary education
- Call specific attention to media education

NOTES FROM DISCUSSION

- Formal education is very important
- Solid waste disposal is also important and should be added when hazardous waste is discussed. Source of hazardous substances.
- Need increased agency involvement in formal education program
- Need media education of hazardous waste issues

HAZARDOUS MATERIALS/TOXIC SUBSTANCES SESSION TWO
RECOMMENDATIONS FOR ACTIONS

ISSUE: DIFFICULTY IN SITING A HAZARDOUS WASTE DISPOSAL FACILITY

- Provide incentives to local government: jobs; payment to local government; payment to impacted landowners. Also provide adequate mitigation
- Develop alternative technologies for waste handling; reduce disposal need by recycling, treatment
- Site near generation (areas of)
- Identify technically sound site, buy it with a buffer
- Improve isolation technology
- Public education, citizen participation
- Do baseline studies
- Allocate responsibility to generators at all levels
- Establish credibility of siting process
- Provide legislative authority to siting agency
- Provide greater technical assurance that given host community will not be adversly impacted

ISSUE: SACRIFICE ENVIRONMENTAL QUALITY FOR STANDARD OF LIVING

- Establish real costs of resources, e.g., water
- Enforce existing standards
- Encourage recycling and repackaging -- financial incentives, legislative actions
- Visible risks associated with standards of living -- will help make decisions about standards of living
- Public campaigns on water resources, energy awareness, how to conserve
- Use appropriate technology -- not necessarily cost effective
- Comprehensive Environmental Education Program at all levels
- Higher user fees to promote alternatives and discourage use of toxics
- Household hazardous waste programs establish, promote and make economical and sustainable decisions

NOTES FROM DISCUSSION

- Appears like an education focus
- Need to raise public awareness
- Meet existing standards now in all areas before more rigid standards are developed

HEALTH AND THE ENVIRONMENT
BY SISTER MARY MADONNA ASHTON

Health and environment are closely related. As you well know, exposure to harmful substances at home, work, or at play can significantly affect our health. Both commercially-made and naturally occurring substances in the environment can cause health problems. Consequently - since health is connected to all areas of the environment - it overlaps the other five topic areas that are part of this Environmental Congress. In fact, potential, adverse, human health effects are often the driving force behind many of our environmental regulations.

As State Commissioner of Health, the law holds me responsible for the development and maintenance of an organized system of programs and services for protecting, maintaining, and improving the health of the citizens of Minnesota. Because water quality, air quality, and hazardous materials can adversely affect the citizens of our State, environmental issues must be included in programs established by my Department.

Our early emphasis on regulation of environmental contaminants was for pollutants that caused short-term or acute health effects. We were concerned about outbreaks of food-borne or water-borne diseases such as botulism or typhoid fever. Today we require that commercially sold foods must be prepared and stored in a manner that will minimize the risk of contracting a food-borne disease. Public water supplies must be disinfected to kill pathogenic organisms to prevent the spread of water-borne diseases. The federal Community Air Pollution Control Program was enacted in response to several European and American air pollution catastrophes.

Since the mid 1970s, we have become increasingly concerned about the possible long-term or chronic health effects of exposure to environmental contaminants. The Toxic Substances Control Act was enacted in 1976 "to regulate commerce and protect human health and the environment by requiring testing and necessary use restrictions on certain chemical substances." This Act requires that testing for both short-term and long-term health effects must be conducted. Initially, the potential for chronic effects focused on the possibility that a chemical caused cancer. More recently, we also have begun to test contaminants for reproductive and birth defects, as well as behavioral and mutagenic causes.

Our regulation of outdoor air and water contaminants again demonstrates the changing attitudes we have had about acute and chronic health effects. Our earliest concerns were for pollutants that caused short-term health problems, such as nitrates in drinking water supplies and sulfur dioxide in outdoor air. Within the past five years, Minnesota and other states have been struggling with the need for regulation of toxic contaminants in both air and water. While some of these toxic materials cause acute problems, our biggest challenge is trying to establish guidelines or standards for exposure to toxic materials that may cause chronic health problems.

Frequently, we have a difficult time trying to determine the health effects of an environmental contaminant. Exposures to these chemicals often occur at very low levels. The data we are using may have gaps because information is not available for all exposure levels; and we are forced to conduct our risk assessments based upon animal data that must be applied to the human popualation. Certain chemicals have different effects depending upon whether the exposure to that chemical is acute or chronic. For example, exposure to high levels of PCBs over a short period of time may cause adverse effectsto the skin; chronic, low-level exposures may cause adverse effects to the liver.

Within the human population, there is wide variation in the type and extent of adverse health effects that occurs as a result of exposure to an environmental contaminant. In this regard, we deal with three basic groups of individuals within the population: hypersensitive, normal and resistant people. As public health professionals, we attempt to know at what level of exposure the hypersensitive population reacts so we can set appropriate standards or guidelines. This sensitive segment of the population generally includes very young children, elderly people, and individuals with pre-existing health problems. As we learn more about human exposures to pollutants, we are able to improve the advice we give to hypersensitive people. For example, during outdoor air pollution alerts, we have been recommending that people with existing respiratory or heart problems remain inside their homes. However, evidence has accumulated recently which demonstrates that many air contaminants inside our homes are much higher than outdoor levels of the same pollutants.

Early environmental health concerns were related to drinking water supplies and sanitation issues. In recent years, we have taken a broader view of health and the environment to include exposures to contaminants that may occur in all aspects of our lives -- workplace, home and public areas. As all of you know, Minnesota has been a pioneer in the regulation of smoking in public buildings and workplaces, and in assuring the right of workers to obtain information about hazardous materials used on the job.

In the past, we have often taken a very narrow view of the potential impacts that our activities can have on the environment. For example, between 1929 and 1977, over 1.2 billion pounds of PCBs were manufactured in the United States. Since PCBs are poor conductors of heat and electricity, and do not break down readily, they were used as insulation fluids in electrical transformers. However, PCBs also are relatively insoluble in water and have a high solubility in fats; as a result, they tend to accumulate in the food chain. So, in 1977, the U.S. Environmental Protection Agency banned the manufacture, processing, distribution, and use of PCBs. Ten years after the ban, we still have PCBs in the environment. The Mississippi, Minnesota and St. Croix Rivers are examples of Minnesota rivers that contain fish that are contaminated with PCBs. Some of the fish in these rivers even now have enough levels of PCBs that our Department recommends limits on the quantities of fish consumed by individuals; and, for certain types of fish, we recommend no consumption.

Environmental problems must be viewed from a holistic point of view instead of from the perspective of single issues. Since people are exposed to many toxic substances through several pathways (such as air, food, water and skin absorption) information on the total exposure to these substances is necessary to determine the need for protection and possible regulation.

Unfortunately, we do not always view our environmental problems by looking at the total picture. One example of our failure to do this in Minnesota is our management approach to the disposal of solid wastes. Many years ago, our garbage was hauled to the city dump where it was usually burned. Since this practice frequently resulted in air quality problems, open burning was banned in Minnesota in 1970. The city dump was then replaced with sanitary landfills. Solid wastes are transported to a landfill where they are dumped and then covered with a layer of soil. Landfills have become an unpopular method of disposing of solid wastes because of the generation of chemicals which pollute the groundwater. Our concern for groundwater has now resulted in legislation which mandates that no unprocessed wastes will be allowed in Twin Cities' metropolitan area landfills after 1990. This new deadline has prompted plans for several incinerators in the State which will likely cause some further pollution of outdoor air quality. We are concerned because these incinerators can release toxic air contaminants including metals, organic compounds, and dioxins. Dioxins are a group of compounds that appear to be highly toxic and carcinogenic, and are similar to PCBs in that they do not break down readily and can also accumulate in the food chain. Our shift from open burning, to landfills, to incinerators has only moved the contaminants from the air, to the water, and back to the air again. We have not solved our problem of solid waste disposal; we have only transferred the problem from one location in the environment to another location.

We are just beginning to understand the need for a more holistic approach to environmental problems, and I would hope that by the year 2001, we will have advanced this concept considerably. Minnesotans will know more about the types and quantities of contaminants in ground and surface waters, and steps will be taken to minimize the health effects of exposures to these pollutants. Since the urban population typically spends 80 to 90 percent of its time indoors, we will include exposure to indoor air contaminants when we address the potential health problems of exposure to air toxics in the environment. One goal that I trust we are all working hard to achieve, is a smoke free society by the year 2000.

In summary, let me say that we should be encouraged by our many accomplishments in the environmental health area. We are finally beginning to take a holistic view of how health is affected by the environment. We know, for example, that exposure to organic compounds can occur from drinking water, outdoor air, food, and indoor air, and we are trying to consider all of these routes of exposure when analyzing possible health effects. Minnesota has taken great strides in the protection of our drinking water supplies.

However, there are some areas that need additional attention. We have not done enough to educate the public about the relative risks of different contaminants. We need better educational efforts,

especially for exposures that are affected by the behavior of people. We also need to address the costs and benefits of the clean-up of contaminants. In some cases, the cost of the clean-up has far exceeded the likely health benefits. We are becoming increasingly aware that government cannot do everything for the citizens of Minnesota. But, we do need to identify sources of assistance for the public, especially when faced with environmental problems that will adversely affect their health.

For example, my Department investigates the occurence of cancer in the State. Of the four million Minnesotans alive today, about one third will eventually develop some form of cancer. A lack of baseline information on the types and numbers of cancers that occur in different regions of Minnesota makes it impossible for us to respond to public concerns about cancer and its relationship to environmental exposures. Because of this and other concerns you may have about carcinogens, I strongly encourage each one of you to support the Cancer Surveillance Law that will be introduced during Minnesota's 1987 legislative session.

Historically, Minnesota has been a leader in the protection of both our environment and the health of our citizens. As we approach the 21st century, the environmental health challenges facing our state will increase; but it is unlikely that the financial resources available to government agencies will keep pace with these new challenges. All segments of our society, including government, industry, non-profit organizations, and private citizens, must work together to protect the quality of health and environment we have come to expect in Minnesota.

Health and Environment

Health and environment are closely related. Exposure to harmful substances at home, at work, or at play can affect our health. Both man-made and naturally occurring substances in the environment can cause health problems.

The scope of environmental health is very broad because it encompasses all those activities and factors outside the body which can affect human health. Traditionally, environmental health has meant a combination of programs to address issues such as drinking water and food safety, sanitation, proper disposal of solid and hazardous waste, nuisance abatement, control of radiation sources, occupational health, both indoor and outdoor air quality, and the investigation of disease outbreaks.

Addressing the effects that the environment has on health is a three step process. The first step involves identifying the scope or extent of the health problem. If illness is not immediately obvious, this first step often includes the use of risk assessment techniques. Second, possible solutions to the problem must be identified, i.e., is the exposure controllable? Once a solution has been selected, the last step is implementation of the solution. This should be an ongoing process. As we learn more about health effects, as new solutions become feasible, and as evaluation of solutions indicates the need for new or better solutions, the approaches taken to address the health problems will change.

Determining the extent of an environmentally-related health problem is further complicated by the nature and location of a suspected exposure source. Human exposure to harmful substances may be purely voluntary (saccharin in foods), or controlled but inescapable (car exhaust), or purely involuntary (a spill of chemicals resulting from an accident). Exposures may also be very localized or ubiquitous.

Two examples of environmental contaminants that currently concern Minnesotans are volatile organic chemicals (VOCs) in drinking water supplies and exposure to tobacco smoke.

VOCs are synthetic chemicals which normally would not be expected to be in groundwater. However, a survey of community water supply wells conducted by the Minnesota Department of Health in 1984 and 1985 found that approximately six percent of the wells had VOCs, and one percent of the wells contained VOCs in excess of acceptable drinking water levels.

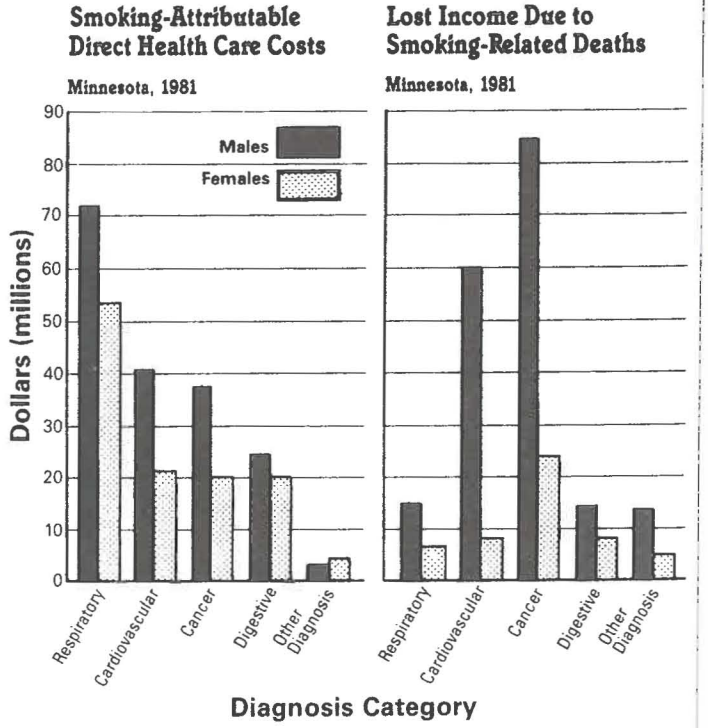
Even though seven out of ten persons over the age of 18 are nonsmokers, some researchers believe that nonsmokers may be at risk of developing health problems from exposure to "passive" or second-hand smoke. Smoking accounts for about 3 out of every 20 deaths in Minnesota. The following graphs show some of the costs attributed to smoking in our State.

History

Early federal laws emphasized water, outdoor air, and food products. In 1906, Congress passed the Pure Food Law which required that foods transported in interstate commerce must be pure and wholesome. This law was later amended to control the use of insecticides and fungicides. The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) passed in 1947 required the registration of pesticides before they could be marketed in interstate commerce. The 1972 ammendments to FIFRA required the registration of all pesticides, prohibited the use of pesticides in a manner inconsistent with the label, and required extensive testing of pesticide toxicity to humans prior to their approval.

Outdoor air pollution was first recognized as a public health problem in the United States in 1948. Meteorlogical conditions trapped air pollutants emitted by industries in Donora, Pennsylvania. As a result, visibility was limited to about 20 feet and 60 percent of the town's population became ill. The Donora episode helped show that exposure to outdoor air pollutants is a problem, and that contaminants other than smoke particles can cause adverse health effects. In reponse to the Donora episode, the Community Air Pollution Control Program was enacted in 1955. This law was later amended by the Clean Air Act.

Prior to 1970, the U.S. Public Health Service established standards for water use in interstate commerce. Surveys conducted in the early 1970's by the U.S. Environmental Protection Agency (EPA) showed that many water supplies were not meeting the Public Health Service standards. The Safe Drinking Water Act was passed in 1974 and it directed the EPA to adopt standards for all public water supplies.



Source: Minnesota Department of Health

Prepared by the Minnesota Department of Health and the State Planning Agency for the Minnesota Environmental Quality Board

Minnesota's early environmental statutes regulated municipal water supplies, food services, sanitation, hotels, restaurants, and other public accommodations. In response to public demand initiated by the organization of the United Commercial Travelers, Minnesota enacted legislation to control itinerant lodging establishments. By 1919 this legislation was expanded to include lodging homes, boarding houses, and places of refreshment.

Minnesota's environmental statutes governing outdoor air, workplaces, pesticides, and clean-up of hazardous waste sites are patterned after federal legislation. Other state legislation such as the Clean Indoor Air Act (smoking), the Community Health Services Act, the formaldehyde and lead statutes, and the cancer surveillance legislation were enacted to address specific environmental health concerns of Minnesotans.

While the early laws emphasized "traditional" environmental concerns, recent statutes and regulations have tried to address more specific exposures to contaminants in the workplace, home, and public areas. Minnesota was a pioneer in regulating smoking in public buildings and workplaces, in controlling the use of formaldehyde in building materials, and in assuring the right of workers to obtain information about hazardous materials used on the job.

Minnesota, along with other states, has taken an active role in the enforcement of federal environmental legislation. Similarly, Minnesota has transferred some of its enforcement activities to local governmental units. One example is the 1976 Community Health Services Act. This statute allows qualified local community health service organizations to enforce regulations governing food, beverage, and lodging establishments in Minnesota. Other laws require the development of local solid waste plans.

Key Laws

Federal Legislation

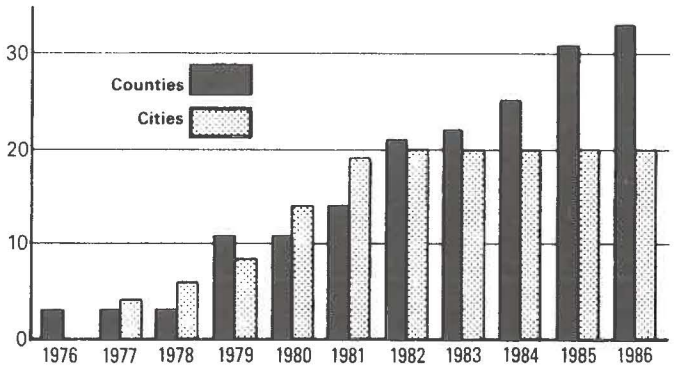
1947	Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)
1955	Community Air Pollution Control Program
1964	Clean Air Act
1965	Solid Waste Law
1970	Occupational Safety and Health Act
1972	Clean Water Act Federal Environmental Pesticide Control Act
1974	Safe Drinking Water Act
1976	Resource Conservation Recovery Act
1980	Comprehensive Environmental Response Compensation and Liability Act (Superfund)

State Legislation

1878	Municipal Water Supply Controls
1919	Sanitation in hotels, restaurants, and other public accommodations
1929	Surface Water Pollution Control
1958	Radiation Protection Legislation
1971	Water Well Construction Contractor Licensing Law
1973	Occupational Safety and Health Act
1975	Clean Indoor Air Act (Smoking in public buildings and workplaces)
1976	Community Health Services Act Pesticide Control Law
1977	Safe Drinking Water Act
1980	Waste Management Act Formaldehyde Act
1983	Minnesota Environmental Response and Liability Act (Superfund) Employee Right to Know
1985	Lead Act Victim Compensation Law Hazardous Substance Information Act Comprehensive Local Water Planning Act)

Qualified Local Health Departments

Delegation of Food, Beverage and Lodging Establishment Regulation to Local Health Departments



Environmental laws frequently protect public health by regulating the emission of contaminants released by specific activities. However, some laws regulate the behavior of individuals whose activities may affect the environment. Examples of these types of regulations include the licensing of plumbers, water well contractors, pesticide applicators, and operators of water treatment plants.

Issues

Responding to environmental exposures which have an impact on health can involve the examination of specific issues or broad public policy questions. Examples of a few specific issues that are of concern include:

- The safe siting of solid and hazardous waste disposal facilities in Minnesota;
- The shipment of radioactive wastes to facilities in other states;
- Protection of groundwater sources from spills and non-point source pollution;
- Indoor air contaminants, e.g., radiation, smoking, asbestos. How do we identify contaminants that create a public health concern?
- The adequacy of the existing data network.

While many of these problems can be solved in the coming years, the public policy issues listed below are not as easily addressed.

- What is the appropriate role of different levels of government in responding to environmental problems? When should government intervene? Should government only respond to issues that affect a substantial number of people?
- What is the role of government and educators in identifying sources of assistance for the public, both information and financial resources?
- Should government regulate exposures in private residences; for example, indoor air quality or indoor emissions of wood stoves? Government regulates public water supplies and outdoor air because they benefit all of society. Should we expend money and effort to regulate contaminants in a private setting?
- How do we resolve the problem of the uncertainty of health effects caused by contaminants? Do we wait until all of the evidence is available or should we react immediately when possible adverse health effects are identified?

- On what basis should we set priorities and inform the public about the relative importance of environmental hazards? If we try to educate the public about every risk, will people tend to think that "everything causes cancer" and therefore ignore all warnings, even for the most critical risks?
- How do we deal with anecdotal health information and how do we ascertain its relationship with data from controlled research settings?
- How should we address health risks arising from potential exposure to levels that are above state or federal contaminant guidelines? Should we permit the development of a project even though mathematical models predict the facility will cause violations of standards or exposure guidelines?

Minnesota...Year 2000

More information will be available on the quality of drinking water in Minnesota. The state has surveyed all public community water supplies for a variety of volatile organic compounds (VOCs). Other types of water supplies are being surveyed for VOCs and surveys for other contaminants will continue (e.g., pesticides). As more contaminants are identified in groundwater, measures will be undertaken to minimize the health impacts of these contaminants or to find safer supplies of drinking water.

In recent years concern about indoor air quality has increased. More information will become available on the relationships between building design and operation, occupant behavior, and the levels of contaminants found indoors. The health effects of exposure to passive smoke will be better understood. Several organizations have joined resources to make Minnesota "smoke free by the year 2000."

The Minnesota Legislature has mandated that no unprocessed wastes will be allowed in landfills in the Twin Cities Metropolitan Area after 1990. As a result, incinerators have been promoted as an alternative. While the move away from landfills was prompted by concern over groundwater contamination, the move toward incinerators may cause some degradation of outdoor air quality. Air quality standards already in place focused on the criteria pollutants such as sulfur dioxide and carbon monoxide. In the future, Minnesota will have to place more emphasis on regulating toxic air contaminants. One likely outcome of the increase in incinerators is the adoption of emission standards for dioxin and other toxic air contaminants.

For Further Information

Most environmental data are collected as part of Minnesota's regulatory and enforcement activities. The information is frequently used to detect trends which can signal an improvement or degradation in the quality of the environment. Examples of the types of data collected by State agencies include:

Minnesota Department of Health

Licensed establishments in state such as:
- food, beverage and lodging facilities
- recreational and children's camps
- mobile home parks
- community public water supplies

Occupational health inspections

Contamination of public water supplies

Groundwater quality surveys

Environmental disease investigations

Environmental radiation monitoring

Minnesota Department of Agriculture

Quantities of pesticides used on agricultural land.

Licensed pesticide applicators

Data on pesticide misuse

Inspection of food manufacturers, grocery operations, and bakeries

Minnesota Pollution Control Agency

Contamination of surface waters and groundwater

Quantities of hazardous wastes generated in Minnesota

Generation and disposal of solid wastes

Levels of pollutants in outdoor air

Minnesota Department of Natural Resources

Appropriation of groundwater

Impacts of environmental contaminants on fish and wildlife

Organizations

American Lung Associations of Hennepin County, Ramsey County, and Minnesota

Coalition for a Smoke Free Society

Freshwater Institute

Minnesota Environmental Health Association

Minnesota Medical Association

Minnesota Public Health Association

HEALTH AND ENVIRONMENT
ACCOMPLISHMENTS

AWARENESS AND EDUCATION

- Increased public awareness and education
- Both formal and popular and politization of issues
- Concept of system -- global/local
- Public-private cooperation
- Indoor air quality
- Educational activities
- Growing awareness -- tie between Environment & Health
- Public awareness/education
- Improved fitness?
- Food-Health
- Public Response -- Industry, Environmental Groups, Individuals
- Community awareness/respect for environment
- Public Acceptance of Minnesota Indoor Clean Air Act (CIAA)
- Awareness of bioaccumulation -- fish advisories
- Public awareness - commitment to environmental value
- Emphasis on prevention rather than cure
- Increased public awareness of environmental health as an issue
- Recognition of smoking as environmental rather than just personal hazard
- Recognition of chemical contamination of water supplies as concern

REDUCTIONS IN CONTAMINANT LEVELS

- Air quality -- criteria pollutants, regulation and control
- Air and water quality improvements
- Lead products reduction
- Conversion to unleaded fuel for autos

LEGISLATION

- Federal legislation: clean air act, clean water act, safe drinking water act, super fund, toxic substances, resource recovery, FIFRA, NEPA/MEPA
- Acid rain legislation
- FDA (Federal Drug Administration)
- Minnesota Acid Rain Law
- Occupational safety -- Right to Know
- Occupational Health (OSHA, NIOSH) (Occupational Health and Safety Act)
- Creation of Clean Indoor Air Act
- Establishment of environmental protection agencies, laws and regulations - state and federal
- Indoor air pollution laws/regulations, e.g., formaldehyde, wood burning stoves, smoking, radon
- Establishment of institutional framework to identify and deal with environmental health problems -- NEPA

HEALTH AND ENVIRONMENT
ACCOMPLISHMENTS

GOVERNMENTAL

- Environmental Impact Assessment
- Institutionalization of environmental concerns/awareness
- Emergency planning
- Landfill abatement
- Superfund
- Point sources - water
- State-local cooperation -- CHS Act (Community Health Service)
- Combined sewer separation
- Noise standards
- Risk assessment
- Solid waste policy
- Development of regulatory processes
- Closing of open dumps

SCIENTIFIC/TECHNICAL

- Research technology -- Standards, Techniques
- Health risk assessment
- Research
- Data collection
- Technology -- verification of problems
- Environmental monitoring
- Improved environmental medicine
- Technology to address health issues
- Engineering advances, e.g., water, sewage systems
- Identification of new problems -- lead, groundwater contamination, ozone layer, acid rain
- Improved analytical capability

BUSINESS/INDUSTRY

- Withdrawal of toxic substances from market place
- Improving land use practices
- Accountability -- cost/profit
- Reduced emissions -- noise, air pollution
- Improved sanitation in public facilities -- local partnership

HEALTH AND ENVIRONMENT SESSION ONE
ISSUES/PROBLEMS

PLEASE NOTE: Numbers in parentheses represent participants "votes". Other parenthetical material added for clarification. Otherwise, text is copied verbatim from participants' lists.

PARTICIPANTS' ISSUES OF GREATEST CONCERN

- Attitude/Education (9)
- Lifestyle (8)
- Funding at all levels (7)
- Cost and lack of resources (6)
- Risk assessmemt (4)
- Coordination (3)
- Crisis Mentality (3)
- Uneven allocation of resources (2)
- Unknown risk -- public perception vs. scientific uncertainty

OTHER ISSUES OF CONCERN

- Lack of holistic view (1)
- Impact on environment of war over population (1)
- Research insufficient (1)
- Red tape (1)
- Lack of incentives not to pollute (1)
- Incomplete understanding of problem (1)
- Procrastination (1)
- Communication gaps (1)
- Resource limitations (1)
- Fossil fuel use (1)
- High cost of goals, vested interests (2)
- Uneven distribution, allocation of resources (2)
- Vested Interests (2)
- Societal goals vs. individual rights (2)
- Inability in problem solving (2)
- Unknown risk -- public perception vs. scientific uncertainty (2)
- Societal goals/individual rights (2)
- War related research funded
- Reforestation
- Ozone depletion
- Water quality
- Waste recycling
- Species extinction rate
- Food and hunger -- policy effect
- Greenhouse effect
- Communicable diseases
- Old line and Aids
- Profit now
- Deferred costs -- heritage
- Industry resistance
- Lack of stewarding citizenship

HEALTH AND ENVIRONMENT SESSION ONE
ISSUES/PROBLEMS

- Culpability for pollution
- Rate of technological advances
- Magnitude
- McDonalds minds
- Liability -- throw away mentality
- Shortage of trained personnel
- Air quality
- Apathy -- public and bureaucratic
- Two or four year mentality
- Lack of information
- Lack of enforcement
- Too many actors at state level
- High cost of responsive action
- Ignoring cost benefits -- over-reaction
- No responsibility taking
- Technological limits
- Lack of government incentives
- Participation resistance
- Cost-Benefit analysis from whose point of view
- Continued use/manufacture of hazardous toxic substances

HEALTH AND ENVIRONMENT SESSION ONE
RECOMMENDATIONS FOR ACTIONS

ISSUE: ATTITUDE/LIFESTYLE

- Education -- grassroots organizing, schools, formal education, advocate/ombudsman, case history for successful examples, citizen responsibility
- Legislate -- corporate responsibility
- Business -- tourism, exchange tours
- Man/environment
- Mission/rationale
- Incentives (rewards) / disincentives (costs)
- Anthropological research
- Coordination of goals

ISSUE: RESOURCE FUNDING

- Legislation -- impacted industry, public sector must pay for regulatory costs
- Business/Industry -- user fees, foundation funding
- Government -- reallocate existing resources, increased efficiency
- Cooperative approach -- government, industry, public, labor, business
- Enabling legislation
- Increased volunteerism
- Incentives and disincentives
- Licensing

ISSUE: RISK ASSESSMENT

- Research -- consistent criteria, toxicological base line
- Government -- statutory authority
- Increase research
- Training/education of technical/professional people and criterion structure -- scientific
- Require assessment
- Liability for damage -- bonding requirement

NOTES FROM DISCUSSION

- Develop overall plan
- EQB define agency roles
- Financial incentives -- bottle deposit; disincentives -- tax
- Simplify (state agency's) regulatory matrix
- Alternative solutions
- Motivational research
- Promotional campaign -- state agencies, private, non-profits
- Information Clearinghouse
- Provide funding authority and technical assistance to local government
- Empower and enable
- Grassroots solutions
- Regional models lower costs
- Pilot projects need seed money versus mandated role

HEALTH AND ENVIRONMENT SESSION TWO
ISSUES/PROBLEMS

PARTICIPANT'S ISSUES OF GREATEST CONCERN

- Funding -- who pays and how -- surcharges, taxes, incentives (6)
- Vested & personal interest in preserving the status quo -- individuals, agency turf, lobbies, business (5)
- Incomplete and conflicting knowledge base (4)
- Inability to readily quantify risk from identified problems (3)
- Questionable/conflicting/duplicative responsibilities for addressing problems among agencies and scientific community (2)
- Need for "multiple exposure" data (2)
- Educating public and media -- citizen apathy (2)
- Develop economic markets -- service support systems for individual participation in environmentally sound practices, e.g., recycling (2)
- Dioxins in the environment -- need for determining baselines, routes of exposure, sources and significance of body burdens (1)
- Toxic chemical contamination of water (1)

OTHER ISSUES OF CONCERN

- Inadequate testing of newly-introduced chemicals for environmental effects (1)
- No national effort on acid rain (1)
- Pollution tradeoff problems -- overall risk management
- Poorly-defined indoor air problem
- Appropriate public notification -- when, how, media reaction
- Lack of standards for air pollutants, water contaminants
- Drugs and abuse
- Health promotion and risk management -- more coverage of corporation and government efforts

HEALTH AND ENVIRONMENT SESSION TWO
RECOMMENDATIONS FOR ACTIONS

ISSUE: FUNDING

- Proactive prevention instead of reactive cure
- More financial incentives for individuals, industry, and organizations
- User fees -- water, sewage, waste disposal (based on volume)
- Dedicated funds for programs
- Use must be clearly defined and need justified
- User fees and penalties
- State universities provide research for state agencies use in regulatory actions
- Tie revenue generation to activities related to risk
- Better identify a framework of health issues and prioritize
- Better inform public of cost of efforts and past accomplishments
- Creative funding approaches through incentives aimed at prevention

ISSUE: VESTED AND PERSONAL INTEREST

- Develop and implement a comprehensive state environmental policy -- communicate
- Increased cooperation between governmental agencies and private organizations to counter lobbying efforts by established organizations, e.g., tobacco lobby, and to produce public service announcements aimed at attitudes and lifestyles
- Better coordination among government units
- Realistic expectations -- vested interest as reality
- Focus on facts versus rhetoric

ISSUE: INCOMPLETE AND CONFLICTING KNOWLEDGE BASE

- Encourage a commitment to basic research within agency, industry, educational institutions
- Efforts to obtain better quality data; lab. certification
- Formalize risk assessment and risk management
- Additional research
- Educate decision makers and public on safe vs. risk free
- Acceptable, tolerable

NATURAL RESOURCES MANAGEMENT
BY JOE ALEXANDER

The Minnesota Department of Natural Resources is charged with protecting, conserving, regulating and managing the lands, water, timber, minerals, fish, wildlife and related natural resources of the State of Minnesota. That is a large order of business. It is a complex business and it is often controversial. It certainly is never dull. Distributing 150,000 antlerless deer permits to 300,000 applicants sometimes becomes more critical than managing the land that the deer call home. I only have to mention Lake Pulaski, Reserve Mining, Lake Minnetonka public access and immediatly most of you recall the issues. You may have even heard of the problem of relocating about 35 elk 35 miles. You may have a suggestion on how to accomplish this simple task. Relocating an elk is like making tiger soup, first you catch an elk.

You have asked me to report to you on "The State of Minnesota's Resources". I might respond that as a DNR Commissioner that is extremely proud of his department, I may not be capable of giving you an objective response, but I will try.

A wise historian once observed: "If we are to know the present, we must understand the past!" Past accomplishments, past mistakes, all of these comprise our sense of history and this kind of historical perspective is certainly important to understanding Minnesota's natural resource legacy. To report on the state of our resources, I'd like first to remember that legacy and some of the historical highlights in resource conservation.

Let's look back 128 years to a time when this 84,068 square miles that we know and love officially became the State of Minnesota. In that year of our Statehood, 1858, our wetlands legacy was awesome. Literally thousands of prairie potholes, cradled by vast marshlands, stretched across our North Star State. Historians recorded "great flights of waterfowl that were wondrous to behold..." Surely, the early settlers thought there could be no end to this wildlife abundance -- a perspective considerably different from that known by our generation! Waterfowl offered a ready source of protein for pioneer tables and great racks of waterfowl and prairie chicken were commonplace in the butcher shops of towns and villages. It was the age of token regulation, of no bag limits. It was the time of the market hunter and the resource exploiter. It was a time in which settlers sought to rid Minnesota lands of surplus water and timber, to open up acreage for agriculture. The first drainage efforts were crude then, but toward the turn of the century techniques improved. It was a time we experienced uncontrolled cutting of a vast timber resource, the start of successful mineral exploration and mining without reclamation.

In the late 1880s, we began to hear the first faint voices of early Minnesota conservationists concerned about legal protection for fish and wildlife populations, the on-slaughts of the timber barons and preservation of park lands.

In 1887, motivated by flagrant destruction of wildlife by market hunters and poachers, the Minnesota State Legislature created the Office of Chief Game Warden with support staff. This office was the

foundation of our present Division of Enforcement. They will be celebrating their 100th birthday next year.

In 1889, the Office of Chief Fish Warden was established.

In 1891 there where three significant conservation developments:

1) Minnesota's first Board of Game and Fish Commissioners was formed;

2) The first codification of Minnesota Game and Fish laws was formulated by the Game and Fish Commissioners; and

3) Our first state park, Itasca, was founded. Sixty-three more were to be added over the years. The most recent is Tettegouche.

By the turn of the century, alarm over the deterioration of Minnesota's forests and the increasing frequency of wild fires led to other historic events in Minnesota conservation.

- 1911 saw the creation of the Minnesota Forest Service and the beginning of the forest management practices that we know today.

- In 1931, the Department of Conservation was born, merging fragmented elements of resource conservation.

In the drought years of the 1930s, in the midst of the Great Depression, voices were raised about the horrors of the dust bowl and the staggering loss of top soil from the nation's farm lands. The Soil Conservation Service was born. Wind breaks were planted. Good farming practices were preached.

The advent of World War II brought accelerated demands for food production. In Minnesota and across the nation, our farmers responded. More sophisticated equipment was employed to dry up the marshes and shallow lakes, to convert these areas to crop production. Tile laterals and ditches rushed water to the nearest river system. There was a noticeable increase in the frequency and the damage of floods.

Minnesota has long proclaimed itself as "The Land of Sky Blue Waters", "The Land of 10,000 Lakes". In fact, we have not 10,000 lakes, but over 12,000 lakes and some 92,000 miles of rivers and streams. But despite the wealth of our treasured water resources, we must remember what part of this legacy we have lost. Over the last 128 years:

- We have drained over 13 million acres of prairie, transition and forest wetlands. Of these, nine million acres were prairie potholes.

- We have lost over 3,000 lakes to drainage.

- Drainage ditches, exclusive of tile laterals, if stretched end to end would stretch 35,000 miles, almost 1 1/2 times around the circumference of this planet.

Yes, we recognize that agriculture is a major Minnesota industry-vital to the food and fiber needs of a world population that now exceeds four billion people. But in a very real sense, Minnesota's farming community has been too successful as have its counterparts across the nation. Our farmers have produced bumper crops and staggering surpluses. There is no profit in $1.00 a bushel corn. As my friend and fellow Commissioner Jim Nichols has often said, "There is not an international food shortage, there is a distribution problem."

The result of this success story is a tragic crises which has sent shock waves to all levels of the farm economy. Some early conclusions and prediction resulted in Earth Day 1969. Earth Day 1969 was a testimony to our citizens' concern for their environment. The 17 years that have passed since Earth Day have brought significant action to ensure wise and continued protection of Minnesota's and the nation's natural resources.

Today, changes in our economy and society, coupled with increased demand for use of resources, environmental threats and shifts in responsibility for funding, pose new challenges in resource management. To maintain our natural resource heritage, we must respond to emerging issues with the same commitment that has been shown in the past.

I must say a word about Minnesota's conservation and environmental organizations, some 500 in all. They range from relatively small groups to larger organizations with thousands of members. Over the years, they have been consistent, ever willing and ready supporters of good conservation. Believe me, we value them. We could not exist without them.

Minnesota citizens are always ready to commit themselves to a good cause. Witness our relatively new Non-Game Program. Minnesota taxpayers, by voluntary tax checkoff, last year gave over $700,000 in contributions to this program!

One of the most significant actions affecting fish and wildlife management is the Reinvest in Minnesota (RIM) Program passed by the 1986 legislature. RIM put in place a mechanism for taking marginal lands out of production, developing lands for wildlife habitat, and improving fish habitat. It also provided additional funding for fish and wildlife enhancement. The continued success of this nationally-recognized program depends on adequate future funding. This came about through the recommendation of a citizen committee appointed by Governor Perpich and supported by concerned resource-conscious organizations. This committee found that fish and wildlife and native plant resources are of tremendous recreational, economic and scientific value to the state. Fishing is the most popular outdoor recreation activity of Minnesotans, and more fishing licenses are sold per capita in our state than in any other. A total of 2,500,000 anglers with their expanded techniques and mobility keep us hard pressed to maintain programs that will ensure reasonable angler satisfaction.

In 1985, Governor Rudy Perpich formed the Commission on Minnesotans Outdoors, a citizen commission chaired by Lieutenant Governor Marlene

Johnson. Its purpose was to assess Minnesota's future outdoor recreation needs. In its report to the Governor and to the President's Commission on Americans Outdoors, the Minnesota Commission identified eight areas of critical importance to the future of outdoor recreation in Minnesota. I will summarize these issues:

- Resource Protection. Natural resources provide the base of opportunity for outdoor recreation, and the quality of our air, waters, forests, fish and wildlife populations and other resources must be protected to ensure high-quality outdoor opportunities in the future.

- Funding. In recent years, there has been decreased federal support for outdoor recreation and movement to replace broad-based funding with narrower sources such as user fees. A stable, long-term source of funding is needed.

- Acquisition. Continued acquisition of recreational lands is needed to meet outdoor recreation needs in developing key areas and to provide opportunities close to people's homes. Existing recreation facilities must also be protected and retained for recreational use.

- Changing Demand. Innovation and diversity in programs and facilities is needed to respond to increasing and changing user demands and provide all segments of our society access to the out-of-doors.

- Marketing. To make the best of our recreation resources, we need better information on what outdoor opportunities people desire and we need to better inform people of available opportunities.

- Liability Costs. High costs of liability insurance have caused closure of some recreation operations and threaten closure of others. The issue needs national attention.

- Coordination. Better coordination among outdoor recreation providers is needed to foster a common state perspective on our outdoor recreation system.

- Environmental Education. Continued commitment to environmental education is key to building a conservation ethic among Minnesotans.

At this point, I would like to pause and summarize a most significant aspect of department operations and their implications.

There are those that view the department as just a "caretaker" of Minnesota's resources or a heavy-handed regulator. They fail to grasp the enormous economic and social significance of our various programs. They refuse to believe that renewable resources can be destroyed - that "non-renewable" means just that and once used they are gone forever.

In some manner or form, DNR activities and authorities affect every Minnesota citizen - everyone of those who are here today and those who are not yet born.

It is important to provide for you a brief perspective of the department's considerable contributions to the economy and to that quality of life that we Minnesotans hold so dear. By the most conservative estimates, for every dollar allocated to our department, $12 is returned to the Minnesota economy. Yet, the DNR's portion of the state budget represents less than two percent of the whole.

You have requested that I look into my "crystal ball" and forecast natural resource concerns over the next 20 years. Forecasting is a hazardous exercise - ask any economist, election pollster or Canterbury Downs horseplayer. I will venture a few personal views and concerns, and I would suspect they are also yours. I have already addressed concerns about our waters, and fish and wildlife.

All of you here are aware of the frightening implications of soil erosion. It is a serious national problem. Here in Minnesota we have already lost from one-fourth to one-third of our topsoil in agriculture regions. In addition to obvious soil productivity consequences, erosion is a problem which adversely impacts our wildlife populations, our lakes, rivers and streams and the aquatic life they support.

Acid rain is a problem which should concern all Minnesotans and has grave implications for the northern tier of states. Acid rain is a problem we must be concerned about, particularly where our Minnesota lakes and forests are concerned.

Our park trails and waterways system, the finest in the nation, cannot continue to serve the needs of our public by being faced with constant cutbacks and threatened closures.

In the department, we are very concerned over the loss of commercial forest land to various types of development. We estimate that we are losing 50,000 to 70,000 acres of commercial forest land annually. This trend is expected to continue until the year 2000. Our forest industries - a very big Minnesota business - are alarmed. Our legislators are aware of the problem. We have the ability and we have the knowledge to effectively manage and protect these forests. It takes money and it takes concerned support.

We must diversify our mineral efforts. Declines in the steel and iron industries have cut the production of taconite by more than one-half. To offset this loss, efforts must continue to be directed toward gaining stability in new markets and new techniques.

Regulations to be effective must have universal acceptance or they must be strictly but reasonably enforced. Our Division of Enforcement is a highly-trained, visible field unit. They, too, are facing changes brought on by restrictive court rulings and budgetary concerns. Again, we have the "know how", but dedicated funds for both fish and wildlife management and enforcement are becoming dangerously short.

We have looked at some mistakes -- probably a negative theme. My time allocation is about used, but just for the moment I am counting our current Minnesota resource blessings. For over 40 years I have been privileged to share in the natural resource bounty of this magnificant state. For almost 30 of those years I have been a very proud member of this department. From game warden to commissioner, I have seen almost every conceivable approach used to either preserve or destroy a part of our resource heritage. I have seen various stategies, laws, rules and regulations implemented with a wide range of success and failure. We have been studied, reorganized, condemned and praised through 55 years since we became the Department of Conservation in 1931.

With the assistance of a concerned public and a cadre of well-trained, dedicated employees, we stand tall and we stand proud - head and shoulders above our sister states in the management and care of comparable resource treasures.

We also know there is a future and a time when we will have to resort to a far different management strategy to properly protect our resources. Perhaps we are starting that process today.

I thank you for the opportunity to share these concerns.

Natural Resources Management

Minnesota has a rich and diverse natural resource heritage. Our waters, forests, wildlife, fisheries, and mineral deposits are integral to the health and diversity of the state's economy and key to our quality of life. Management of these resources is designed to perpetuate and enhance resources for the benefit and enjoyment of present and future generations.

In the past 17 years, significant action has been taken to ensure wise use and continued protection of Minnesota's and the nation's natural resources. Changes in our economy and society, coupled with environmental threats, increased demand for use of resources, and shifts in responsibility for funding, pose new management challenges. To maintain our natural resource heritage, we must respond to emerging issues with the same commitment that has been shown in the past.

Fish, Wildlife, and Native Plant Resources

Fish, wildlife and native plant resources are of tremendous recreational, economic and scientific value to the state. Fishing is the most popular outdoor recreation activity of Minnesotans; more fishing licenses are sold per capita in our state than in any other.

Over the last twenty years, thousands of acres of habitat have been lost to agricultural, shoreland, residential and industrial development. Natural ecological succession and environmental contamination are also changing habitat availability. All of these effects on fish, wildlife and native plant populations are occurring at a time when demands on the resources are increasing.

A number of new and innovative programs have been instituted to maintain fish, wildlife and native plant resources and enhance opportunities for their enjoyment. These include programs to restore and diversify our fisheries; restore the state's deer population; acquire and develop wetlands and wildlife management areas; inventory biological resources; and cooperatively manage these resources with public agencies and private landowners. A nongame wildlife program funded through a voluntary income-tax checkoff has also been put in place; expanded habitat programs for waterfowl, pheasants and trout are financed by sale of special license stamps.

One of the most significant actions affecting fish and wildlife management is the Reinvest in Minnesota (RIM) program passed by the 1986 legislature. RIM put in place a mechanism for taking marginal lands out of production, developing lands for wildlife habitat, and improving fish habitat. It also provided additional funding for fish and wildlife enhancement.

The comprehensive planning for fish, wildlife and native plant resources currently underway in the Department of Natural Resources will lead to more coordinated management of our state's biological resources, drawing on the involvement of both resource managers and citizens statewide.

Forest Resources

Eighty percent of Minnesota's 16.7 million acres of forest land are commercial forest, providing about half the wood required by Minnesota's forest products industry, the third-largest manufacturing industry in the state. Primary and secondary production from this industry contributed an estimated $2 billion to the state economy in 1980. Ownership of commercial forest land is about equally split between public agencies and the private sector.

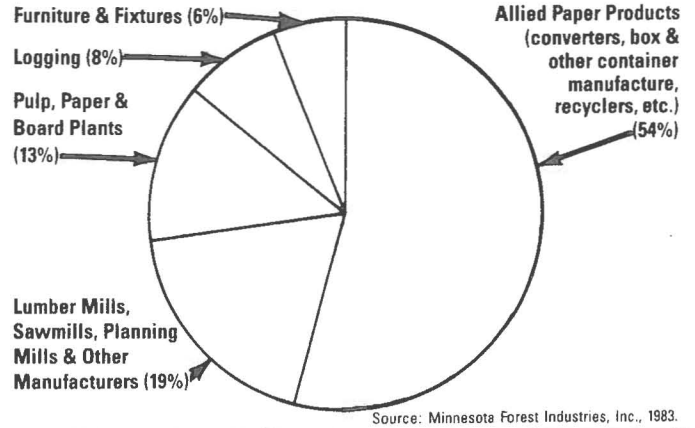
Along with their timber resource value, our forests are of great noncommercial value. For example, the availability of suitable forest habitat is key to populations of numerous wildlife species; the quality of the forest environment is closely related to quality of other resources, such as water and air. Roads, trails, campgrounds and other recreation facilities within forests provide opportunities for many outdoor pursuits.

During the 1970s, markets for Minnesota forest products expanded and new markets were developed to utilize the increasing potential annual timber harvest. Resulting growth in the industry increased demand for forest products, and this demand is expected to continue to increase in the future.

While demands for forest products are increasing, the amount of commercial forest land is diminishing as a result of urban and agricultural development. Our forests are also increasingly exposed to a variety of environmental stresses (such as acid rain, fire, insects and disease, and soil erosion) that are causing gradual and subtle changes in forest metabolism and species growth and composition. Consequently, it has been necessary to improve the quality and quantity of our timber resources through reforestation, nursery production, and other management activities. Road construction and maintenance have been needed to access timber stands.

Demands for noncommercial forest resources are also increasing and becoming more diverse. There has been increased emphasis on providing forest wildlife habitat and on developing a range of forest recreation opportunities to meet the needs of diverse groups of users. Severe fires in 1976 and 1980 have led to renewed emphasis on the role of fire control. In 1982, the Minnesota Legislature passed the Forest Resource Management Act, requiring comprehensive planning. This effort has provided direction for forest management programs.

Employment in Minnesota's Wood-based Industry – 1983



Source: Minnesota Forest Industries, Inc., 1983.

Mineral Resources

Minnesota's primary mineral resources include the iron-ore deposits of the Mesabi and Cuyuna ranges, copper-nickel and other minerals of the Duluth Gabbro Complex and the Greenstone formation, and 6 million acres of peat. The Duluth Gabbro Complex is the largest known nickel sulfide deposit in the United States. Our peat resource is the largest in the contiguous United States.

The Department of Natural Resources regulates exploration and development of the state's mineral resources. Approximately $3 million is generated annually through rental and royalty payments, with the major share coming from royalties on ferrous leases. In 1969, the Mineland Reclamation Act was passed, providing controls to prevent adverse environmental impacts from mining and to encourage planning for future land use.

Until recently, mineral activity in the state has focused primarily on production of iron ore and taconite. Declines in the United States steel and iron industries led to decreasing taconite production, which has fallen from 65 million tons of pellets in the late 1970s to currently about 30 million tons annually.

Exploration for copper-nickel deposits began in the mid-1960s. Between 1974 and 1981, there was a moratorium on new lease sales for copper-nickel and associated minerals, pending completion of an environmental impact statement on copper-nickel mining. Although new leases were at a standstill during this period, intense exploration continued. Substantial copper-nickel reserves were identified, but interest in copper-nickel mining has declined as a result of falling metal prices.

The drop in exploration and production of these minerals brought greater interest in other mineral resources. In the mid to late 1970s there was increased interest in uranium exploration and development. However, little interest remains due to discouraging drilling results and falling uranium prices. Gold and other precious metals have been a focus of attention since 1982.

Interest in the state's peat resources has also grown. In 1976, DNR undertook a major planning effort to identify the state's peat resources and establish guidelines for their management. DNR is currently working with industry to locate peat sources close to prospective users and help develop a peat industry.

The decline in taconite production, exploration and development has had a significant impact on Minnesota's minerals industry. To offset this loss, management efforts are being directed at diversifying the state's mineral industry and gaining stability in the iron-ore industry through innovative technology and development of new markets.

Minnesota's Iron Ore/Taconite Industries

	1979	1985
Employees	15,000	6,500
Pellet Production (10^6GT)	56.233	33.093
Taxes Collected ($ million)	133.7	98.0
Royalties Paid (state leases, $ million)	2.333	1.879

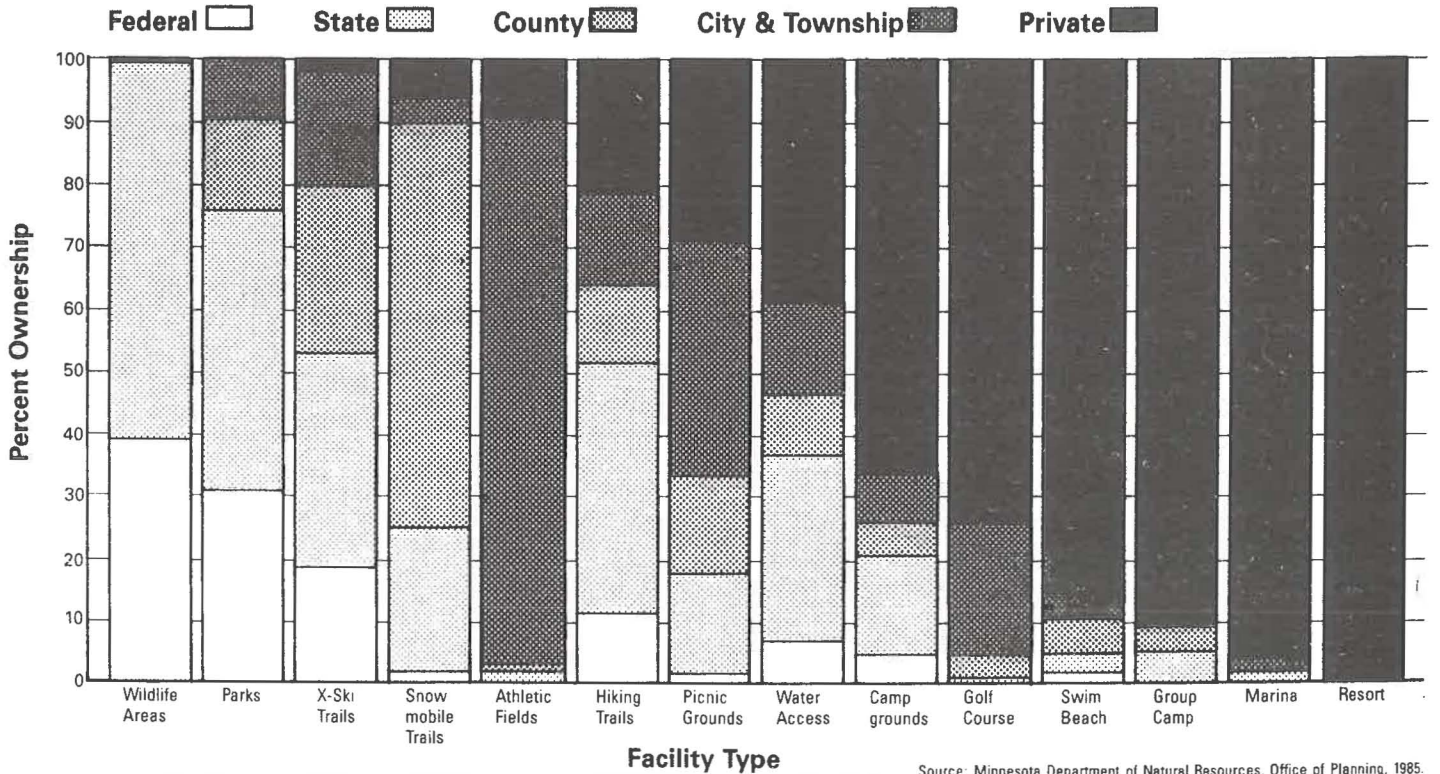
Recreation Resources

The availability of high-quality outdoor opportunities is a valued part of the Minnesota lifestyle. Our residents, on average, spend close to ten percent of their leisure time (over 100 hours/year) engaged in some form of outdoor recreation. In a recent opinion poll on quality of life indicators, 90 percent of Minnesotans interviewed cited recreational opportunities as a positive factor affecting quality of life. Annual travel-related expenditures for outdoor-recreation tourism in the state are estimated to be $702 million.

Over the last 18 years, key legislation has been passed regarding acquisition and development of recreational lands and facilities. This helped accelerate development of a statewide system of state parks, forests, trails, water accesses, recreational waterways, scientific and natural areas, wilderness areas and wildlife management areas. This system is nationally recognized as being of outstanding quality.

Today, a growing and increasingly diverse population is demanding not only more outdoor recreation, but also greater variety of opportunity. Social changes and technological developments have also created new demands. For example, interest in health and fitness has brought demand for physically challenging opportunities. There are demands to accommodate such activities as all-terrain vehicle use, long-distance skiing, hiking and bicycling. The rise in dual-income households and our growing senior population, among other social factors, are also creating new outdoor recreation needs.

Providers of Minnesota Recreation Facilities



Source: Minnesota Department of Natural Resources, Office of Planning, 1985.

In 1985, Governor Rudy Perpich formed the Commission on Minnesotans Outdoors, a citizen commission chaired by Lieutenant Governor Marlene Johnson, to assess Minnesota's future outdoor recreation needs. In its report to the Governor and the President's Commission on Americans Outdoors, the Minnesota Commission identified eight areas of critical importance to the future of outdoor recreation in Minnesota (discussed in the issues section).

Water Resources

Water Resources are vital to Minnesota's economic and natural resource base. The availability and quality of waters affects our agricultural, timber, mining and tourism industries, our fish anc wildlife populations, and recreation opportunities.

With more than 21,800 protected waters and wetlands and 92,000 miles of rivers and streams, Minnesota has long been viewed as a water-rich state. Issues of water quantity and quality are, however, rapidly making water management one of the most crucial natural resource concerns of this decade.

Since 1969, key legislation has been passed supporting efforts to protect and manage the quality and availability of Minnesota's water resources. Among these initiatives are guidelines for development and use of shorelands and floodplains; groundwater investigations and analyses; comprehensive local water plans; water allocation; and reducing or eliminating impact of acid rain.

Present water management activities are focused at issues relating to water allocation, flood control and management of lakes, rivers, streams and groundwater. There is also concern for the environmental degradation that is resulting from development, soil and shoreline erosion, toxic contamination and heavy or inappropriate water use. Many of these issues are addressed in greater detail in the fact sheet **Water**.

Issues

Fish, Wildlife, and Native Plant Resources

Habitat Changes. Natural succession and intensified uses of land and water are altering habitats and reducing carrying capacity for appropriate fish, wildlife and native plan species.

User Demands. Demands for opportunities to use and appreciate fish, wildlife and native plants and their communities are accelerating, resulting in increasing levels of competition and conflict among users and stress upon resources.

Environmental Contamination. Environmental degradation and contamination pose a threat to fish, wildlife and native plants, in some cases, reducing opportunities to appreciate and use these resources.

Key Laws

Federal Legislation

1968	Wild and Scenic Rivers Act
1969	National Environmental Policy Act of 1969 (Provides a framework for decision-making based on study of environmental consequences and actions that protect, restore and enhance the environment.)
1973	Endangered Species Act
1976	Minnesota Valley National Wildlife Refuge Act (Established a national wildlife refuge along the lower Minnesota River Valley.)
1977	Executive Order No. 11988 for Floodplain Management (mandates federal action to reduce the risk of flood loss; to minimize the impacts of floods on human safety, health and welfare; and to restore and preserve the natural and beneficial values of floodplains.)
	Executive Order No. 11990 for Protection of Wetlands (Mandates federal action to minimize the destruction, loss or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands.)
1978	Boundary Waters Canoe Area Wilderness
1980	Comprehensive Environmental Response, Compensation and Liability Act (Superfund)
1985	Farm Security Act (Conservation Sections) (Denies federal farm benefits to anyone who converts wetlands to cropland or who tills highly erodible land without applying conservation measures and establishes the Conservation Reserve Program.)

State Legislation

1969	Mineland Reclamation Act (The Act was extended to peat mining in 1983. Provides for reclamation of mine lands.)
	Shoreland Management Act. Minimum standards for counties and municipalities added in 1970 and 1978. (Provides guidelines for shoreland development to preserve and enhance the quality of surface waters; preserve economic and environmental values; and wisely use water and land resources.)
	Flood Plain Management Act (Guides development of the state's flood plains; provides state coordination and assistance to local government units in flood plain management; emphasizes reduction of flood damages through flood plain management.)
1971	Environmental Rights Act (1971). (Requires regulatory agencies to examine if there is a prudent and feasible alternative before authorizing actions which may result in pollution, impairment or destruction of natural resources.)
1973	Minnesota Environmental Policy Act (Minnesota's companion to NEPA. Emphasizes interdisciplinary decision making on actions affecting the environment. Rules and Regulations to implement the environmental review provisions of MEPA in effect since 1973.)
	Minnesota Wild and Scenic Rivers Act
1975	Outdoor Recreation Act (Established an outdoor recreation system on state lands to preserve representation of Minnesota's natural and historical heritage and provide an adequate supply of recreational lands and waters.)
1977	Soil and Water Conservation Cost Sharing Program (Provides cost sharing for erosion control and water management.)
1979	Protected Waters and Wetlands Inventory (Instituted a statewide inventory to map protected waters and wetlands regulated by DNR permit program.)
1980	Non-Game Wildlife Checkoff (Provides for designation, on state income tax returns, of $1 or more to a fund for non-game wildlife management.)
1981	Minnesota Threatened and Endangered Species Act
1982	Forest Resource Management Act (Mandates preparation of a comprehensive forest resource management plan and policies to guide management of state forest lands.
	Acid Deposition Control Act (Policy to mitigate or eliminate acid deposition by curbing sources of acid deposition within the state.)
1983	Omnibus Fishing Act (Surcharge on fishing licenses to be used for development and improvement of fishing resources; designates experimental and specialized fishing waters; mandates changes in commercial fishing operations.)
1985	Comprehensive Planning for Fish and Wildlife Resources (Mandates preparation of a statewide management plan for fish and wildlife resources.)
1986	Reinvest in Minnesota Resources Act (Provides for removal of marginal agricultural lands from crop production or pasture to protect soil and water quality and provide fish and wildlife habitat.)

Forest Resources

Resource Management and Protection. The focus of forest management needs to be broadened and management activities intensified to respond to increasing demands for use of forest resources, maintain a high-quality forest environment, and provide long-term supplies of forest resources.

Forest Resource Productivity. Minnesota's forests have potential to supply greater levels of goods and services to meet increased demands for wood products, fuel and recreation opportunities.

Forestry Resources Information. Authoritative and comparable information on forest resource conditions and trends is crucial to effective forest planning, management and industrial development. More and better information, information systems and information coordination are needed.

Mineral Resources

Precious Metals Exploration. Opportunities exist to increase exploration in an environmentally sensitive manner for precious metals such as gold, platinum and silver through development and distribution of geological information and the leasing of state-owned mineral rights.

Ferrous Mineral Mining. There is a need to work to retain Minnesota's important ferrous mining industry through cost-cutting measures, process efficiency gains, technology improvements and promotion of value-added processes.

Industrial Minerals Industry. Growth of Minnesota's industrial minerals industry requires accelerated industrial minerals resource inventory efforts, market analysis and new product research, and continued consideration of environmental protection and mitigation techniques.

Recreation Resources

Resource Protection. Natural resources provide the base of opportunity for outdoor recreation, and the quality of our air, waters, forests, fish and wildlife populations and other resources must be protected to ensure high-quality outdoor opportunities in the future.

Funding. In recent years, there has been decreased federal support for outdoor recreation and movement to replace broad-based funding with narrower sources such as user fees. A stable, long-term source of funding is needed.

New and Existing Facilities. Continued acquisition of recreational lands is needed to meet outdoor recreation needs in developing areas and other key areas and to provide opportunities close to people's homes. Existing recreation facilities must also be protected and retained for recreational use.

Changing Demand. Innovation and diversity in programs and facilities is needed to respond to increasing and changing user demands and provide all segments of our society access to the outdoors.

Marketing. To make the best use of our recreation resources, we need better information on what outdoor opportunities people desire and we need to better inform people of available opportunities.

Liability Cost. High costs of liability insurance have caused closure of some recreation operations and threaten closure of others. The issue needs national attention.

Coordination. Better coordination among outdoor recreation providers is needed to foster a common state perspective on our outdoor recreation system.

Environmental Education. Continued commitment to environmental education is key to building a conservation ethic among Minnesotans.

Water Resources

Water Allocation. The need and demand for efficient water resource allocation requires accelerated efforts to quantify water availability, distribution and use and to identify social, economic and environmental trade-offs associated with major changes in water availability.

Local and State Governmental Functions. Local and state government roles in public water resources development projects will become more prominent. As the federal government role decreases, project types that may be affected, state-local institutional arrangements, and possible alternative sources of funding need to be identified.

Flood Reduction. Flooding continues to be one of the most significant and costly water resource issues in many parts of the state. The demand to provide protection or removal of older floodplain structures and to develop additional measures to reduce damages to rural lands will continue.

For Further Information

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NATURAL RESOURCE MANAGEMENT
ACCOMPLISHMENTS

GENERAL

- Local conservation, regulations
- Longer range planning and cooperation
- Public awareness and participation
- Development - all resources
- State Planning Agency
- Environmental Quality Board
- County Soil Surveys
- Interdisciplinary Cooperation
- Historical Preservation Programs
- Environmental Congress
- MN DNR (Minnesota Department of Natural Resources)
- Natural resource data base
- RIM and conservation reserve
- State soil survey
- Improved resource assessment
- Integrated resources management
- Environmental Policy Act
- Legislation requiring environmental review and interdisciplinary perspective -- NEPA/MEPA/EQB, etc.
- Improved evaluation of cost-benefits in decision making
- Increased citizen awareness and participation - shifting attitudes towards awareness of health and environment.
- Recognition of relationship between national farm legislation and state environmental goals -- 1985 Farm Bill/RIM
- Expanded resource inventories -- Forestry Phase I and II, peatlands, water, etc.
- Creation of scientific and natural areas
- Development of Land Management Information Center
- Acid Deposition Control Act (1980)
- More interaction between public agencies and private groups involved in and concerned with resource management
- Improved DNR image
- Farmland preservation
- Expanded public access
- Increased tourism promotion
- Iron Range Resources and Rehabilitation Board
- Volunteer Magazine
- Formation of MEEB/REEC
- K-6 Environmental Education Law
- Conservation chapters of Federal Farm Bill
- Volunteer program
- Boating while intoxicated program
- Strong acquisition and development program
- Waters protection -- protected waters, tax credits
- Dedicated funding -- stamp programs, etc.
- Conservation/Agriculture
- Environmental Rights Act

FISH, WILDLIFE AND NATIVE PLANT RESOURCES

- Fish and wildlife management programs
- Turn in Poachers (TIP)
- Habitat protection
- Habitat acquisition
- Nongame program/income tax checkoff
- Wildlife planning
- Wildlife population restoration
- Roadside management program
- Healthy deer population
- Advanced hunter education
- Turkey population
- More informed sportsmen
- Ducks Unlimited
- Pheasant and duck stamp
- Delayed roadside mowing
- Endangered species legislation
- Hunter education and other educational programs
- Deer management programs (doe permits), turkey program, Lake Superior sport fish
- Fish intensification program
- Wild Rice

FOREST RESOURCES

- Forest inventory
- State Shade Tree Program
- Forest Management Act of 1982 (MFRP)
- Aspen resource management and value added

RECREATION RESOURCES

- Development of state and county parks
- Creation of BWCAW (Boundary Waters Canoe Area Wilderness)
- State trails system development
- Water access development
- Parks (state) created
- Natural Heritage Program
- Outdoor recreation and development programs
- Protection of BWCAW
- Outdoor Recreation Act of 1975 - scientific and natural areas, state parks, state trails, wild and scenic rivers, water access, wildlife management areas, state forests
- Development of Lake Superior and St. Louis River fishery recreation
- Expanded recreation system -- river, trails, parks, camp-grounds,
- Develop recreation facilities
- Handicap access to outdoor recreation
- Trails, canoe and boating routes
- BWCAW/Voyageurs National Park efforts
- LCMR (Legislative Commission for Minnesota Resources) recreation program
- Privatization of concessions in state parks
- Snowmobile trail program
- Expanded outdoor recreation opportunities

MINERAL RESOURCES

- Mineland Reclamation Act
- Peat Management Program
- Increased mineral exploration/mineral potential evaluation
- Copper-nickel and peat studies

WATER RESOURCES

- Restrictions on farm chemical use
- Protected waters and wetlands program
- Improves wastewater treatment
- Water quality standards
- PCA Permit Process
- Surface Water Management Act
- Public Waters Act
- State land use programs -- shoreland and shoreland zoning act, flood plain, wild and scenic rivers -- state and federal
- Development of Watershed Management/local water planning
- Wetland protection -- Executive Orders 11990 -- Protection of Wetlands, and 11988 -- Floodplain Management
- 404 Wetland Protection Agreement
- State and Federal Water Bank
- Expansion of groundwater data collection
- Reserve discharge elimination
- Flood control - wetland restoration

NATURAL RESOURCE MANAGEMENT SESSION ONE
ISSUES/PROBLEMS

Please Note: Numbers in parentheses denote participant "votes". Other parenthetical material added for clarification. Otherwise, text is copied verbatim from participants' lists.

PARTICIPANTS' ISSUES FOR FURTHER DISCUSSION

- Inadequate funding for natural resource management; permanent funding for RIM (13)
- Need to update inventories; accessibility (11)
- Preservation of public land base (9)
- Soil erosion/contamination (9)
- Solid waste disosal and generation (7)
- Waters -- protection/quality/quantity (6)
- Species/habitat preservation and restoration (5)
- Need for better communication between agencies, public, and among agencies (4)
- Conservation of archeological resources (3)
- Better natural resources information/education effort (3)

OTHER ISSUES OF CONCERN

- Need to educate older Minnesotans -- education extend outside elementary school age (2)
- Need to preserve more natural lands -- native prairies, wetlands (2)
- Political consensus (policy) on energy uses of natural resources (2)
- Drainage (2)
- Wetland protection (2)
- Research and development (2)
- Improve natural resource data base and accessibility (2)
- Land reclamation -- mining/erosion prone farm land/wetlands (2)
- Integrated forest management/product development (2)
- Completion of state and local park system (2)
- Improve urban outdoor recreation resources/opportunities (2)
- Need to apply management principles of scientific and natural areas to all DNR lands (1)
- Agencies competing for dollars (1)
- Use of appropriate technology -- such as alternative water purification methods (1)
- Waste management alternatives (1)
- Perceived public needs (1)
- Active participation in natural resource management by local units of government (1)
- Water management coordination (1)
- Prescribed fire needs (1)
- Overlap of regulatory authority (1)
- Protection of urban forest (1)
- Acid precipitation (1)
- Continuation of prairie and wetland tax credit programs -- significant land/feature set a side (1)
- Farm chemicals (1)

NATURAL RESOURCE MANAGEMENT SESSION ONE
ISSUES/PROBLEMS

- Need public support for DNR's role as land manager
- Need to make better use of all agencies in accomplishing goals and achieving broad public exposure
- Blocking up land ownership -- need for consolidated ownership
- Pressures on public and private land management from increasing demands for use
- Need more management for recreational uses/better access to recreation opportunities -- marketing, access for low-income and handicapped
- Need (to) address groundwater needs
- Shoreline preservation/protection -- lakes and streams
- Potential to diversify mineral resources
- Increased reliance on states for funding
- Marketing analysis
- Resource allocation
- Further integration of natural resource management
- Need for effective public involvement
- Need for innovative approaches to river management
- Participation of university system
- Improve strategy planning
- Surface water quality
- Loss of land to urban development
- Urban/wildland fire problem
- Rural economy decline
- Peatland/biomass production
- Long-term impacts of mine closures
- Lakeshore/river development
- Redefine role of state, county and local government
- Treaty rights of Indians
- Increased use of all-terrain vehicles
- Dumping on state lands

NATURAL RESOURCE MANAGEMENT SESSION ONE
RECOMMENDATIONS FOR ACTIONS

ISSUE: PRESERVATION OF PUBLIC LAND BASE

- Determine the highest and best use of the land.
- Consolidate if appropriate (the land base).
- Develop that (land in public ownership) with potential.
- Other alternatives:
  - Leasing
  - Set aside
  - Conservation reserve
  - Adjustments in payments to counties.

ISSUE: SOIL EROSION/CONTAMINATION

- Support goals of non-point source pollution issues teams.
- Fund programs of public education re: soil and water conservation.
- Full implementation of 1985 farm bill -- sodbuster, swampbuster, cross compliance, conservation measures.
- Support passage of Clean Water Act.
- Revision of State Drainage Code.
- Passage of State Erosion Control Laws -- agriculture, urban, forestry.
- Shelterbelt restoration.
- Require mandatory watershed planning.
- Expand private incentives for conservation.

ISSUE: SOLID WASTE DISPOSAL AND GENERATION

- Research.
- Legal incentives for recycling and reuse.
- Financial incentives for recycling and reuse.
- Education.
- Statewide intergovernmental coordination.
- Tires: Market development.
- Litter: Bottle bill passage.
  Education funding.
- Waste reduction: Education funding.
  Packaging regulations.
  Recycling/marketing.

NATURAL RESOURCE MANAGEMENT SESSION ONE
RECOMMENDATIONS FOR ACTIONS

ISSUE: INADEQUATE FUNDING FOR NATURAL RESOURCE MANAGEMENT/PERMANENT FUNDING FOR RIM

- More Funding
  - Sources:
    - Expand and dedicate portion of sales tax
    - Federal excise tax on sporting goods
    - Non-returnable containers
    - Cigarette tax -- smokeless tobacco
    - User fees -- needs study
    - Liquor tax
    - Deed tax -- development of real estate
- More Efficient Management/Coordination/Planning
- Prioritize/Focus Program Evaluation
- Ways to Accomplish Above Goals
  - Political action
  - Accountability -- money spent properly
  - Public education/involvement
  - Involve all levels of government
  - Develop priorities
  - Use natural boundary

ISSUE: NEED TO UPDATE INVENTORIES; ACCESSIBILITY

- Form a working committee to deal with standardization and other issues between agencies.
- Clearinghouse: Computerized data base of information on environmental resources; revitalize "Index".
- Set up budgets for data collection and management.
- Funding to make data available and useful/put tools in hands of users.
- Follow up collection to continue usefulness.
- When developing programs for data collection, include both data collection plus service requirements to sustain system.
- Train people on how to use systems and their versatility.

NATURAL RESOURCE MANAGEMENT SESSION TWO
ISSUES/PROBLEMS

PARTICIPANTS' ISSUES FOR FURTHER DISCUSSION

- Funding (14)
- Agency/Group Coordination (13)
- Preservation, restoration, and maintenance of ecological/biological diversity (7)
- Non-point water pollution (7)
- Waste management pollution/non-pollution (6)
- Landowner/sportsman/recreation liability conflicts (6)
- Human/natural resources interaction -- urban sprawl, unemployment, rural economy, development, exploitation (4)
- Pheasants (4)
- Acid rain (4)
- Drainage laws are obsolete -- need for policy, revision of laws (4)

OTHER ISSUES OF CONCERN

- DNR image -- public understanding and support; employee and public apathy (4)
- Teacher training in environmental education (4)
- General public education (3)
- Forest management (2)
- Soil conservation (2)
- Protection of large plots of native prairie/grass lands (2)
- Funding mechanisms -- user fees vs. general funding (2)
- Suitablity vs. capability in land use decisions (2)
- Centralize DNR education functions (2)
- Maintenance of parks and recreation facilities (1)
- Resource user education (1)
- Habitat loss and degradation (1)
- Funds for ditch tax -- public land local revenue loss (1)
- Increasing recreational land and multiple usage (1)
- Harmony between protection, development and maximum usage (1)
- Retention of public lands (1)
- Supply and demand of natural resources (1)
- Adequate staffing to cover programs (1)
- Land use control (public and private) (1)
- Stronger public involvement (1)
- Better use of data/resource base data management (1)
- Targeted land acquistion -- acquisition of inholdings
- Resource management/market development
- Poaching
- Reorganization
- Individualized lake management
- Sand and gravel extraction
- Contaminated fish

NATURAL RESOURCE MANAGEMENT SESSION TWO
ISSUES/PROBLEMS

- Impact of federal farm policy on agriculture use
- Better management of public owned lands
- Mourning doves
- Pesticide use
- Information availability for local water planning
- Shoreland management
- Internal communications within agencies
- Wetland destruction
- Farming practices
- Management of reserve lands -- RIM/CRP/Set aside
- Water access
- Accessibility to hunting lands
- Mosquito control
- Large predators -- wolf, bear
- Low priority of resource management at federal level
- Mineral exploration issues
- Protection of special lands -- peat, BWCAW, sensitive lands
- Incorporate endangered species management as part of ongoing operations
- Improper usage of public lands
- Off-road vehicle problems
- Reserve mining and like issues
- Water resource protection -- appropriation, quality
- Resource allocation
- Improve communication and cooperation between wildlife and ASCS
- Inconsistent posture -- agency and inter-agency on environmental cleanup matters
- Stop escalation of unfunded programs
- Water level programs
- Adequate management planning for all resources
- Impact on hunting and fishing by advanced technology

NATURAL RESOURCE MANAGEMENT SESSION TWO
RECOMMENDATIONS FOR ACTIONS

ISSUES: FUNDING

- Optimum usage of available funds.
- Tax base revenues.
  - Allocation of a prescribed percentage of sales tax for resource management and staffing in addition to general fund.
  - Deducted federal excise tax on expanded sporting equipment -- nongame equipment, cross-country skis, bird seed, snowmobiles, binoculars.
  - Increased private sector/foundation donations and sponsorship.
  - Explore new revenue operation methods -- state lottery, unrefunded bottle deposits -- dedicate to certain aspects.
  - Release federal dedicated funds -- LAWCON.
  - Use of existing state funds to leverage private monies -- matching grants.
  - Explore new user fees -- marina fees, passive user fees -- to have users pay share.
  - Delegating some programs on to lower levels of government.
  - Expansion of federal funding to mandated programs, e.g., acid rain, waste water.

ISSUE: AGENCY/GROUP COORDINATION

- Create interagency personnel transfer and sharing opportunities.
- Implement existing and new interagency agreements, e.g., use of highway right-of-way.
- Resolve merger issues.
- Annual natural resource coordination conference -- before legislative session.
- Central data repository.
- Training -- intergovernmental.
- State priority on coordination -- direction for agencies.

ISSUE: PRESERVATION, RESTORATION AND MAINTENANCE OF ECOLOGICAL/BIOLOGICAL DIVERSITY

- Identify components -- plants, animals, habitats, climate
- Inventory components -- endangered species/habitats.
- Monitor components.
- Educate -- outreach to public.
- Management/Coordination
  - Prioritize -- set goals.
  - Acquisition.
  - Preservation -- state/private.
  - Land use control.
  - Deep freeze embryo and tissue bank where appropriate.

NATURAL RESOURCE MANAGEMENT SESSION TWO
RECOMMENDATIONS FOR ACTIONS

ISSUE: NON-POINT WATER POLLUTION

- Concentrate on agricultural.
- Enforce existing ditch laws -- buffer strips.
- Add pools at specified distances when reditching or new ditching.
- Improved monitoring of non-point pollution on ground and surface waters.
- Put in place a network of agencies to implement a non-point abatement program.
- Identify best and most economical management practices and disseminate to agricultural, urban and forest communities; private and public emphasis on direct benefits; implemenation of farm bill.

ENVIRONMENTAL RISK
BY RICHARD BRAUN

When you look at the various topical areas for the Congress, they all appear to be focused on specific issues with the exception of Environmental Education and Environmental Risk. These two subjects reach across all environmental issue areas.

When first asked to address the subject of environmental risk, I frankly wasn't very interested. It seemed to me to be more of a legal problem and it also seemed that because of the far-reaching applicability of the topic, it should be assigned to an attorney rather than the Commissioners of Transportation and Energy and Economic Development.

However, the more I thought about environmental risk, the more sense it made to have someone approach the subject from an environmental decision-making background. That perspective is where I'm coming from in discussing this issue with you today.

I've spent eight years with the Environmental Quality Board, and more than 30 years in transportation. During my years with the EQB, I've been concerned about environmental impacts caused by many different kinds of projects and by highway projects in particular.

My experience as a Board member has been enlightening, as well as thought provoking. Until the new environmental review program rules came into effect in 1982, the EQB was frequently in the position of making judgment calls about many potential risks to the environment. A few large projects are still being reviewed today under old environmental review rules. Very frankly, I've felt uneasy about many of the decisions that the Board has made, and I've felt that way because it seemed to me we just didn't have enough information about those projects in terms of environmental risk.

Examples of some of the projects include: the recent transportation of nuclear spent fuel rods from Monticello to storage facilities in Morris, Illinois; expansion of the spent fuel pool at the Prairie Island Nuclear Power Plant in Red Wing in 1980; the Freeway and Burnsville Landfill EISs in 1980; and studies on the effects of hog feedlots on ground water.

As decision-makers, even under the old rules, the EQB did not actually approve projects, even though the public thought that Board actions had that effect. Instead, the EQB determined whether risk of impact to the environment was significant enough to merit preparation of an EIS. The EQB also determined whether EISs adequately addressed impacts associated with proposed projects.

Frankly, many EQB members were very concerned about making decisions which had potential for serious far-reaching environmental consequences. I shared the concerns of other Board members. Generally, I felt there just wasn't enough sound information to assess environmental risk and the validity of proposed mitigation. Many times, unfortunately, our decisions followed and were based on legal debate rather than a logical assessment of impacts.

However, in spite of the problems, we are fortunate in Minnesota to have an environmental review process which provides a mechanism for environmental risk assessment. The review process, combined with permitting processes, is a good basis for meeting the problem of assessing environmental risk. The problem is it doesn't go far enough.

Why did the Board include this subject in the Environmental Congress? For exactly the reasons I've just discussed. There is a concern about the effectiveness of the present system in the areas of risk assessment and risk management. A void exists in regard to an extended framework which addresses environmental risk. Why am I personally involved? Mostly because I just don't feel comfortable with some decisions that I, as a Board member, have helped to make.

The Fact Sheet on environmental risk which you have received provides more information on the subject. Right now, though, I'm going to attempt to share some information I've acquired about environmental risk in order to get our thinking going about this broad--often misunderstood--subject.

Environmental risk can be separated into two process areas. The first is risk assessment--a way of determining problems associated with a substance, project or action. The second is risk management--what to do about the problems and how to control them.

Typically, formal risk assessment in the human health area, is an estimation of association between exposure to a substance and incidence of disease based on scientific data. Environmental risk assessment can then be thought of as a means to measure the physical impact that will result from a project or an action. I feel environmental risk assessment is more difficult than human health risk assessment for a variety of reasons: risk to human health is more focused and generally more information is available about potential risk; environmental risk assessment needs a stronger scientific base to work from; environmental risk is harder to quantify; risk to human health seems to be assessed more consistently; and finally, environmental risk is further complicated by the introduction of values which are not quantifiable.

Ways to enforce protection of the environment are in place. What we don't have in place are risk management strategies that extend beyond environmental studies. Risk management strategies which factor in assessed risks, benefits, and costs of control methods would allow decision-makers to act constructively in spite of uncertainties.

We need to carefully weigh and balance overall service or benefit to many or the environment as a whole against the benefit or risk to a few or an isolated area. We need to consider immediate risk versus long term risk or accumulative risk over time. We also need to consider the combined risk of several smaller projects or actions. We need to think about the distribution of risk--how many people, how wide an area; the reversibility or persistence of environmental risk; costs involved in reduction of risk, for example, elimination of alternatives, loss of benefits, impact to society through unemployment; and finally the level of uncertainty that exists--greater risk reduction generally means greater control, greater cost and less efficiency.

Ideally, risk management integrates judgment with the results of risk assessment; focuses judgments that lead to more explicit decisions; demonstrates what will be done to reduce risk; estimates risk associated with all alternatives and selects the one with the most risk reduction for a given level of resource; is consistent but provides flexibility to respond to different kinds of problems.

Even when we can objectively assess risk, there is often times no way to objectively manage it. We can't ignore subjective perceptions. We must be responsive to people and help them separate founded fears about risk from unfounded ones.

Fear is strongest about things that are not known. Many times the Board has seen evidence of these fears in regard to projects like the proposed nuclear waste repository site or the effects of direct current (dc) powerlines, for example. This one bothered me, too.

People are also more likely to trust a known rather than an unknown risk, even if the unknown is safer. Power plants are a good example of this. People are more willing to accept health risks from a coal fired plant even though a nuclear plant is thought by most experts to be much safer. To respond to peoples' fears, all information about risk must be presented in an easily understandable manner, and decisions must be based on sound principles. Through careful handling of information about environmental risk, we can help people understand and become more knowledgeable about risk. To effectively manage risk, maybe we should be looking for new ways to involve the public in environmental risk management decisions.

In looking ahead to the year 2000, the State must consider how methods of controlling environmental risk can be incorporated with technological advances in order to assure that we're not put in a situation of having to choose between economic growth and technical advancement and the environment. This will require cooperation across all levels of government and in many situations across state lines as well. Everyone needs to be part of the decision regarding how far the State should go in assuming responsibility for environmental risk and risk management. To control every risk would cost an astronomical amount. We must instead find ways of balancing available resources with environmental risk reduction. Environmental risk is everyone's responsibility since everyone benefits from technological advances.

To focus this topic for the remainder of the Congress, I would like you to consider new environmental issues likely to occur. For example, designation of hazardous waste routes, development of hazardous waste facilities, burn facilities as an alternative to landfills. Solutions to these issues may be more costly, they may be less popular politically and more difficult to implement, and there may not be general agreement about them. There may be potential for immediate, as well as future risk.

Then having considered the issues, discuss strategies for effective and ethical environmental risk management. And finally, consider ways to involve citizens more effectively so that they can help to make wise decisions involving environmental trade-offs and social progress.

The Environmental Quality Board has taken the task of environmental stewardship for the State of Minnesota very seriously. Environmental risk assessment and management are tools that members of the Board, as decision-makers, can use in maintaining the physical, chemical and biological integrity of our environment, not only for today but for many years to come. It's a challenge for all of us to do the same.

Environmental Risk

To attempt to define environmental risk is to enter a gray and controversial arena. Even the definition of risk may vary greatly in evaluation of risks to the environment. The process of risk evaluation is strongly influenced by the values placed upon the affected environment and upon anticipated adverse effects. Potential consequences of an action or an occurrence are frequently defined in terms of loss, injury, or destruction. This, however, is only one element in a process known as environmental risk assessment and management.

Scope

Environmental risk assessment is an analysis of the potential adverse effects of human actions or decisions and natural occurrences upon the environment. Elements of environmental risk assessment include:

Risk or hazard identification. Will exposure to an action or an agent cause an adverse environmental effect?

Dose/action-response assessment. What is the relationship between the amount or magnitude of exposure and the environmental effect which results?

Exposure assessment. Measurement or prediction of the exposure resulting from an action. In some cases, exposure may be slow with accumulative impacts. In other situations, immediate or catastrophic impacts will occur. Greater impacts may occur in sensitive areas.

Risk characterization. Combine the previous elements to provide an estimated occurrence of a particular adverse effect in a specific situation. This also provides the bridge between risk assessment and risk management.

Risk management utilizes risk characterization, the costs and benefits of non-risk elements (social, political, economic and technical considerations), and control options (standards, permits, mitigation and regulations) to evaluate alternative actions. Because risks and benefits are not evenly distributed, evaluation may be difficult for decision makers. Often the benefit or risk to a few must be weighed against the benefit or risk to the many.

Use of risk assessment in making public decisions is frequently confined to determining a tolerable level of risk and modifying actions to ensure that risk beyond a specified level will not occur. Consideration of tolerable risk enters into each decision through a wide variety of methods ranging from the use of standards promulgated through hearings to a "seat of the pants feeling." In Minnesota, the Department of Health has derived a lifetime tolerable risk level policy for humans: during the 70 years assumed for a person's lifetime, one extra adverse effect will occur for each 100,000 persons. This standard is also used by the Pollution Control Agency.

Although public concern about environmental hazards can have powerful influence over assignment of risk to an environmental area or population, it is often ignored in risk assessment and management. Experts may not acknowledge public concern because it is frequently based on unsubstantiated perceptions of threat. The public, however, is very concerned with how an action may affect them personally and with the uncertainty in risk assessment.

Public Perception Vs. Expert Opinion

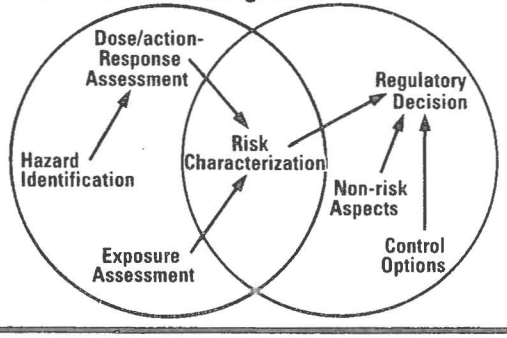
Public	Vs.	Expert
1	Nuclear Power	20
9	Pesticides	8
14	Spray Cans	26
18	Electric Power (non-nuclear)	9
22	X-ray	7
24	Railroads	19

Participants were asked to rank the risk of dying in any year from 30 various activities and technologies.

One way of presenting information about risks to the public is the use of comparable risks.

Without means to effectively communicate environmental risk to the public, the public cannot knowledgeably participate in decisions that will affect them and their environment. Because people prefer to err on the side of safety, they will generally believe the worst case presented to them. Also, people are more willing to accept risks associated with activities over which they have control and knowledge even though the risk associated with those activities is high.

Risk Assessment and Risk Management



Comparable Risks

Activities estimated to increase your chances of dying in any year by one in a million.

Smoking 1.4 cigarettes	Cancer, heart disease
Drinking 0.5 liter of wine	Cirrhosis of the liver
Spending 1 hour in a coal mine	Black lung disease
Spending 3 hours in a coal mine	Accident
Living 2 days in New York or Boston	Air pollution
Traveling 6 minutes by canoe	Accident
Traveling 10 miles by bicycle	Accident
Traveling 150 miles by car	Accident
Flying 1,000 miles by jet	Accident
Living 2 months in Denver on vacation from New York	Cancer caused by cosmic radiation
Living 2 months in average stone or brick building	Cancer caused by natural radioactivity
One chest X-ray taken in a good hospital	Cancer caused by radiation
Living 2 months with a cigarette smoker	Cancer, heart disease
Eating 40 tablespoons of peanut butter	Liver cancer caused by aflatoxin B
Living 5 years at site boundary of a nuclear reactor	Cancer caused by radiation
Living 150 years within 20 miles of nuclear reactor	Cancer caused by radiation
Eating 100 charcoal-broiled steaks	Cancer from benzopyrene
Living within 5 miles of a nuclear reactor for 50 years	Cancer caused by accidental radiation release

Prepared by the Minnesota Department of Transportation and the State Planning Agency for the Minnesota Environmental Quality Board

History

In 1969, the National Environmental Policy Act (NEPA) created a mechanism for assessing the impact that proposed man-made actions would have upon the environment. In 1973, Minnesota established a State Environmental Review Process. Through these two processes, significant environmental impacts are identified and decision makers and the public are given an opportunity to evaluate the environmental consequences of an action or the combined impact of several actions.

In addition to providing alternatives for development of a proposed project, positive and negative environmental consequences and mitigation options for minimizing the negative effects are evaluated. Typically, mitigation is introduced as a means to assign responsibility or liability for resolving the negative consequences of a proposed action.

Another means of managing environmental risks is the State's permitting authority. The Pollution Control Agency has the authority to establish air, water, and solid waste standards and rules; thus regulating risk through its permitting process. The Department of Natural Resources also regulates risk to waters, wildlife, and vegetation in the State through a permitting process.

Issues

The challenge for Minnesota is to conduct risk assessment in a way that all priority environmental issues are wisely regulated and protected through informed ethical decisions by governmental officials and the public. Environmental risks cannot be isolated from human risk. Actions that pose negative consequences to our environment will ultimately result in a threat to humankind as well. The risk assessments will be complex, and must be done and presented in a way that is understandable to the general public.

Although incorporation of risk assessment into human health issues has been going on for some time, little has been done in other environmental areas. Environmental problems that confront the State are increasingly complex and less amenable to simple, proven approaches. Designation of hazardous material routes through Minnesota, siting of a hazardous waste facility, and balancing use of landfills and recovery facilities are some of the issues that have come into focus in recent years.

Environmental Decisions Through Standards

Acid Deposition Control Plan

Since 1980, the Legislature has recognized that acid rain is a serious environmental threat and has directed the Pollution Control Agency to identify sensitive areas and to adopt an acid deposition standard and a control plan to protect these areas. An extensive effort by agencies, environmental groups, industry, and the public culminated in 35 days of public hearings in the winter and spring of 1986. Approximately 965 exhibits, 800 letters, and testimony from 75 "expert" witnesses were entered in the record. The principles of risk assessment and management were fundamental to this effort. The standard for wet sulfate deposition and the control plan were approved by the MPCA on July 21, 1986.

Environmental Decisions Through Environmental Impact Statement Process

Crude Oil Pipeline: Wood River, Illinois to St. Paul Park, Minnesota

Responses to the Draft Environmental Impact Statement (February, 1977) pointed out the potential for ground water contamination where the proposed pipeline route passed through an area of sinkholes and shallow depth bedrock aquifers. While no formal risk assessment was made, agreement was reached between state agencies and the pipeline company to minimize the environmental risk of the pipeline. Consequently, the pipeline was routed in areas having a minimum of 50 feet of glacial till to protect bedrock aquifers.

Consistent environmental risk assessment methodologies and policies for environmental risk management are needed. To effectively meet the variety and complexity of problems relating to environmental risk assessment and management, the Legislature, agencies and the public must address the following issues:

- How can the State deal with cumulative or long term environmental effects versus immediate or catastrophic environmental effects?
- How can value judgments be expressed and used in environmental decisions?
- How can environmental risks and accountability be assigned in a democratic arena?
- How can risks be weighed against benefits, and how can risk or benefit to many be weighed against risk or benefit to few?
- Should there be economic consideration in managing risk and what impact does minimizing risk have upon the State's economy and business climate?
- How can environmental risk be communicated to the public?

Minnesota...Year 2000

During the 1970s, concern for the environment and our health changed our thinking about ourselves and the world we live in. The merging of these two concerns resulted in the establishment of the Environmental Protection Agency and the celebration of Earth Day, as well as the creation of major environmental legislation. We began to accept accountability for our environment and realized that health risks might be reduced by reducing risks to the environment.

Minnesota has received wide recognition for its efforts to protect the environment. Through strong innovative laws and broad-based public involvement, the State has established a national reputation for effective, responsive environmental protection. This trend must continue if Minnesota's air, land, and water are to be cleaner in the year 2000 than they are today.

As new, more complex threats to our environment emerge, assessment of their risk to the environment and wise management of those risks will be needed. The solutions to complex problems may be scientifically and politically controversial; they may be elusive and expensive. Because almost all human pursuits — in the home, in industry and commerce, in transportation and recreation — have potential environmental consequences, management must be far-reaching.

The citizens of Minnesota have learned that a healthy economy and a clean environment are more than just compatible — they are interdependent. As public awareness increases, risks to the environment and to human health may decrease and quality of life in our State may improve. Individual effort and self-discipline, combined with tougher regulation, will help to ensure that many of our present environmental risks may one day disappear.

For Further Information

Tolerable Risk, Section of Health Risk Assessment, Minnesota Department of Health. September, 1985.
Risk Business, by Micheal Shodell and **Staying Alive in The 20th Century,** by William F. Allman, *Science 85,* October, 1985.
Risk Assessment and Management: Framework for Decision Making, Environmental Protection Agency, December, 1984.
Risk Assessment and Risk Management of Toxic Substances, Department of Health and Human Services, May, 1985.

ENVIRONMENTAL RISK ACCOMPLISHMENTS

INCREASED AWARENESS

- Environmental awareness
- Focus of public and private from cure to prevention
- Awareness of finite resources
- Recognition of need for arms control
- Public awareness, education, and activism
- Challenges to risk assessment

ESTABLISHMENT OF EFFECTIVE INSTITUTIONS, PROGRAMS, POLICIES

- Establishment of government institutions -- U.S. Environmental Protection Agency, MN Pollution Control Agency
- Funding for environmental programs
- Environmental legislation and EIS and permit processes -- NEPA and MEPA
- Waste water treatment of point sources
- Federal and state endangered species act
- Federal and state Superfund legislation
- Administrative procedures act requiring public hearings
- Aggressive judicial involvement, e.g., Reserve; USA vs. Ethyl Corp.
- RIM -- Critical habitat
- Air pollution control of primary pollutants
- Beginning of toxic management
- Initiation of health risk assessment models
- Initiation of environmental risk assessment models, e.g., long-range transport of acid rain
- History of standard setting
- Hearing process and other structured involvement by affected parties

INCREASED KNOWLEDGE AND COMMUNICATION

- Linking public health "knowns" to broader environmental issues
- Better quantification and understanding of impacts
- Aspects of water quality are improving
- Improvements in analytical technology and data base development
- Greater weight of environmental considerations in decision making
- Concepts and models of risk analysis
- Numerical guidelines for acceptable health risk and use by other agencies
- Increased industry cooperation/understanding
- Initiation of scientific research or environmental health effects
- Acceptance of risk procedures by the Environmental Protection Agency

ENVIRONMENTAL RISK SESSION ONE
ISSUES/PROBLEMS

PLEASE NOTE: Numbers in parentheses represent participants "votes". Other parenthetical material is added for clarification. Otherwise, text is copied verbatim from participant's lists.

PARTICIPANT'S ISSUES OF GREATEST CONCERN

- Determine environmental responsibility -- proper government level, "Who pays?" (6)
- Lack of linkage between scientists and policy makers; poor agreement among scientists (experts) and research (6)
- Preservation of biological diversity (5)
- Lack of efficient resolution of environmental risk assessment vs. the courts (4)
- Establish framework to broadly assess environmental problems across traditional agency lines (3)
- Public understanding of risk; need to educate the public (3)
- Prioritization needed for long-term funding of risk assessment/abatement programs and research (3)
- Long distance transport of air pollutants, e.g., acid rain (2)
- Project/site - specific versus cumulative effects, such as establishment of toxic limits with consideration of additive and synergistic effects (2)
- Lack of public input into decisions on risk (2)

OTHER ISSUES OF CONCERN

- Inadequate cost assessment of environmental risk (1)
- Lack of effective monitoring and evaluation of long/short-term impacts of projects which carry risks (1)
- Technology advancements without knowledge of short and long-term effects because we don't have enough ability to assess risk (1)
- Population control (1)
- Non-point source pollution (1)
- State hazardous waste disposal system, including source reduction (1)
- Solid waste management system for environmental protection and resource conservation (1)
- Education reform (1)
- Lack of effective prevention
- How to balance one groups's risk against another group's gain
- More effective assessment of liability, i.e., private sector
- Toxic contamination in food chains
- Groundwater protection
- Scientific illiteracy of decision makers
- Transportation of hazardous materials/route selection
- Pursuit of happiness means more than material consumption

ENVIRONMENTAL RISK SESSION ONE
RECOMMENDATIONS FOR ACTIONS

ISSUE: DETERMINE ENVIRONMENTAL RESPONSIBILITY: PROPER GOVERNMENT LEVEL; "WHO PAYS?"

- Assessment of current government framework
- Identify gaps and problems
- Identify alternate courses of action
- Implement selected courses of action
- User fees
- Coordinate government responsibility and review: oversight role of EQB needs to be enhanced.
- Coordination among states' efforts
- Mandatory container deposit
- Distinguish between correction and prevention, and costs: those borne by government and those borne by private
- Identify gaps in environmental risk assessment, i.e., groundwater and other issues which aren't specifically assigned to a certain agency
- Legislative direction to fill gaps
- Develop/strengthen leadership at high state level

ISSUE: LACK OF LINKAGE BETWEEN SCIENCE AND POLICYMAKERS; POOR AGREEMENT AMONG SCIENTISTS, EXPERTS, AND RESEARCH

- Funding for research/study
- Workshops/forums for linkages between researchers and policymakers
- Legislative hearings to provide linkage with scientists, i.e., new technology committee in the Minnesota House of Representatives
- Establish and encourage increased communication between scientific and political communities
- University of Minnesota research funds through state agencies
- Establish science courts to resolve differences among experts, e.g., National Academy of Science

ISSUE: PRESERVATION OF BIOLOGICAL DIVERSITY

- Legislature and government agencies must assign a high priority to the preservation of biological diversity, i.e., incentives to private enterprise such as tax credits
- Education of public -- increase awareness of need for preservation
- Allocating of funds for international development with preservation of diversity in mind
- Research
- Inventory of present diversity
- Reform land and water planning at local level and implement habitat protection, reclamation, preservation
- Consider impact of proposals on individual species in EIS (Environmental Impact Statement)

ENVIRONMENTAL RISK SESSION TWO
ISSUES/PROBLEMS

PARTICIPANT'S ISSUES OF GREATEST CONCERN

- No formal risk assessment/risk management process in Minnesota (9)
- More research (6)
- Traditional decision making process inadequate (6)
- Credibility (4)
- Standardize methodology (4)
- Who decides acceptable risk? (1)
- Public perceptions and input must be factored in (1)
- Need to mitigate effects of decisions (1)
- Synergistic effects (1)
- Body load -- total exposure (1)
- Don't allow misuse of risk analysis, e.g., artificial restraints on factors (1)
- Prioritization of issues that involve risk assessment (1)

OTHER ISSUES OF CONCERN

- Who determines the risk
- Need to factor in all economic costs
- Failure of environmental review process to examine alternatives early and to handle cumulative effects
- Make better use of risk assessments, e.g., enforcement
- Initiate use of risk analysis earlier in decision process
- More education of public -- re: risk
- Problem - People's values differ
- Standardize acceptable risk
- Can we quantify everything
- Resultant quantification of liability
- Recognition of limits and uncertainties in risk assessment -- no definable end point -- best guess or judgement
- Improve data base
- Translation of assessments into action
- Public reluctance to accept risk
- More public understanding of stages of risk analysis

ENVIRONMENTAL RISK SESSION TWO
RECOMMENDATIONS FOR ACTIONS

ISSUE: NO FORMAL RISK ASSESSMENT/RISK MANAGEMENT PROCESS IN MINNESOTA

- Commission or task force with following charges:
  - Assure public, industry, government, interest group, and academic community involvement in incorporative/risk analysis into public choice process
  - Seek agreement on desirable risk analysis methods
  - Consider what is acceptable risk
- Form an interagency council with public and industry input to standardize risk assessment/risk management procedures
- Rule-making process should be employed in developing procedures

ISSUE: RESEARCH

- Increase support for basic research
- Increase state funding for research
- Focus on body load and synergisms
- Task force to examine research and funding for:
  - Methods of research analysis and limits thereof
  - Best ways to incorporate into public choice processes
  - Substantive research needs and different standards for economic vs. health vs. gene pool, for example

ISSUE: TRADITIONAL DECISION MAKING PROCESS INADEQUATE

- Task force to examine incorporation of risk analysis to assure that agency integrity is preserved including procedures for public involvement
- Cost of risk management decisions borne by benefactors -- public or private
- Rule-making process
- Alternatives must be considered earlier in decision-making process
- Regional planning

ENVIRONMENTAL EDUCATION
BY EDWARD BUCHWALD

There are two important exclamation points in the story of environmental education in the United States. Theodore Roosevelt made the first one. After a profound experience in the outdoors of western North Dakota, Roosevelt developed a conservation ethic which became a dominant theme of his presidential administration. He, more than anyone else, made the public realize that we need to conserve nature as well as use it. The creation of the National Parks and Monuments during his tenure as president is a constant reminder of the value that we place on the importance of nature.

The second great exclamation point occurred on the first Earth Day. Citizens of all ages became intensely aware of the value of our environment to our health, economy, and general well being. It marked a long series of legislative efforts, both nationally and in Minnesota, to protect our environment from our own folly.

Environmental education reflects these two areas. Environmental education, when I was a boy, centered very much on the conservative ethic. It was that ethic that led me to plant more than 2,000 trees as a Boy Scout during my high school years. It taught me to value wildlife, to see the damage brought by excessive soil erosion and the fouling of lake and streams, and to be committed to doing something about these problems.

But it was not until the first Earth Day that we all began to realize that nature is not separate from humankind. The environment is part of our everyday lives, the air we breath, the water we drink, are the basis for our economic well being. We learned that we need to integrate our thinking about nature into our everyday affairs. Education became an important part of that effort. And it is not just formal education but all education provided by free people in a free exchange of knowledge and ideas.

Such education is diverse and complex. It comes from professional educators, of course, but it also importantly comes from citizen-activists, business and industry, and government. Citizens in the Sierra Club, Izaak Walton League, and National Audubon Society are deeply involved in educational efforts among their own members and society at large. The nature center phenomenon in Minnesota and elsewhere is largely a grass-roots effort at environmental and outdoor education. The business sector is also greatly involved in environmental education. Work on the part of Northern States Power Company to explain peak demand and the need for intergrating energy planning into environmental planning are examples of industry's needs to educate the public. Government becomes involved in a number of ways ranging from hunter education to the Waste Education Roundtable proposals. Each commission and agency represented on the Minnesota Environmental Quality Board has an outreaching environmental education effort.

Perhaps the most dramatic effort in formal education is provided by the new Elementary Education Rule promulgated by the Minnesota State Board of Education. That rule is an extraordinarily important attempt at explaining that environmental education should be a part

of all elementary education. No longer is it sufficient to have just a one or two-day visit to a local or regional nature center, good as that may be. It is now the rule that environmental education must become part of the required offerings of all elementary schools, and that it shall have natural, social, valuing, and action components.

All of this shows the great commitment to and strength and diversity of environmental education in Minnesota. Americans in general, and Minnesotans, in particular, continue to consider clean water, clean air, and a healthy environment to be highest priority items. Indeed, most Americans and Minnesotans are willing to tax themselves and spend more in order to have a healthful environment.

Minnesotans are an outdoor people. Lieutenant Governor Marlene Johnson's recent, important work has shown that Minnesotans, especially children, are very concerned about, and value the quality of their outdoor experiences. My own anecdotal knowledge tells me that those people who are keenest about protecting environmental values are those who have had an important life experience in nature. Minnesotans have many life experiences in nature, and they sense the importance of the environment in many aspects of their lives well beyond recreational needs.

Reading newspapers and listening to television news makes one thing vividly clear. We are a part of a larger world. Our business and industry no longer can be content with knowing just the Upper Midwest. We need news and information about agriculture in Brazil, mining in Argentina, oil production in the Mideast, and computer developments in Japan. We also need to know about air pollution around the world, population trends in third world countries, and the spread of toxic substances into world ecosystems. E. F. Schumacher, the great British economist, said, "We must think globally when we act locally."

The challenge, then, is for us and our children, to see the world in its entirety and to act on that knowledge.

The Elementary Education Rule is a brilliant acknowledgement of the need to look holistically at the world. But it is only a start. It deals only with elementary education. Five years from now what will we be doing with our elementary students turned middle-schoolers?

The tradition in Minnesota is that professional teachers cannot do it alone. It is the responsibility of citizen-activist, business and industry, and government. Diversity is our strength.

In our working sessions we need to discover what more needs to be done to assure that we are all prepared for the year 2001. We should take the lead from the Elementary Education Rule. We must educate students of all ages in the natural, social, valuing, and action contexts. So, as you go into small-group working sessions may I suggest that you find answers to these questions: How can we best provide the needed bio-ecological education for all people? How can we make it clear that all of us are an intergral part of the environment? How do we make decisions that will assure our great-grandchildren of a vote? How do we determine our values about the quality of living in Minnesota? How do we think globally and act locally on environmental issues? And, finally, how can we move ourselves and others to action? Thank you.

Environmental Education

Environmental education has no clear definition, but can be generally viewed from two perspectives. One is formal education which includes traditional elementary, secondary, and post-secondary education. The second is the non-formal which encompasses all other environmental education efforts.

Environmental education in Minnesota flourished from 1967 to 1974. It received major support from the legislature, government agencies, academic institutions, and citizen groups. In 1971 the legislature established the Minnesota Environmental Education Board (MEEB). In 1972, MEEB published *Environmental Education . . . A State Plan for Minnesota.* The plan recognized both the enormity of the task of environmental education and the wealth of information and expertise already available in Minnesota.

The 1972 plan proposed creating a regional system of volunteers with a small paid staff to assist both formal and non-formal environmental education efforts. In 1973 the Regional Environmental Education Councils (REEC's) were created.

In the mid-to-late 70s, a "holding pattern" was entered as governmental and citizen interest shifted to the energy crisis. In the early 1980s, environmental education experienced a real decline triggered by large state and federal budget cuts.

In the mid-80s various task forces and organizations increasingly are noting the importance of education to specific issue areas and are identifying environmental education as a need.

Formal Environmental Education

There is no clear agreement among environmental educators on a definition of environmental education. Historically, modern environmental education has developed from many disciplines and is a complex mixture of the old (nature study, ecology, and population study), the new (systems analysis, energy education, futures education, and global education) and the borrowed (science, social studies, mathematics). Environmental education attempts to bring these perspectives together and many educators use the term "holistic" to describe the approach needed. Holism is defined by Webster as the "view that an organic or integrated whole has a reality independent of and greater than the sum of its parts."

Some characteristics common to all environmental education efforts are a:

- hard core of ecological content;
- recognition of worldwide problems of crisis proportions;
- component of conscience, or a value system; and
- commitment to private and public action.

A 1977 Minnesota Department of Education (MDE) publication, *Some Essential Learner Outcomes in Environmental Education,* contains environmental education program goals for students. It also contains a planning process for integrating or "bridging" between subject areas (e.g., science and social studies) when developing an environmental education curriculum. The goals were developed by approximately 40 environmental educators using as a base the 1972 *Environmental Education . . . A State Plan for Minnesota* and the *Oregon K-12 Course Goals in Environmental Education.* Goals are for students to be:

- able to understand ecological systems;
- provided with experiences which will assist in the development of personal appreciation, sensitivity and stewardship for the environment;
- able to understand cause-and-effect relationships between humans and the environment;
- able to understand the decision-making processes of individuals and institutions;
- able to evaluate alternative responses to environmental concerns or issues before deciding on a course of action or no action; and
- able to understand ways in which planning/nonplanning influences the future.

Environmental education curriculum development is expensive and has been funded mostly by federal grants and by private corporations. The Minnesota Legislature has responded to the need for environmental education twice — by mandating, in 1969, basic environmental education and, in 1977, energy education. In both instances, dual responsibility was legislated — the Minnesota Department of Education (MDE) was made responsible for teaching and the appropriate agency (the Minnesota Department of Natural Resources in 1969, the Minnesota Energy Agency in 1977) was made responsible for content accuracy. The curriculums were professionally developed by the Minnesota Environmental Sciences Foundation, Inc. (MESFI). MEEB had an advisory, training and distribution role. This method for curriculum development (known as the "Minnesota Model") has received national recognition for the high quality of the products produced.

Early environmental education curriculum was written for interdisciplinary teaching situations. Therefore, it was used primarily at the elementary level where most teaching is interdisciplinary in nature. Later, energy materials were written to be subject-specific at the secondary level. Over the years, various groups have identified gaps in teaching materials which include: acid rain, surface water quality, groundwater quality, waste management, nuclear waste, noise, indoor air pollution, lead pollution, the humane treatment of animals, human ecology, and the urban environment.

The Environmental Education unit of the MDE has one professional employee responsible for technical assistance to 435 public school districts with 1,514 schools, about 40,000 teachers, and approximately 700,000 students. The MDE is augmented by the Minnesota Environmental Education Board and the Regional Environmental Education Councils which are located throughout the state.

Prepared by the Minnesota Department of Education, the Minnesota Environmental Education Board, and the State Planning Agency for the Minnesota Environmental Quality Board

According to the MDE, the essential requirements for effective environmental education in the K-12 schools are:

- Classroom teachers prepared for the innovative methodology demanded by environmental education;
- Educators who understand environmental education and are committed to including it in their learning programs;
- School administrators and local boards of education who encourage and support environmental education.

Elementary Education. In 1985, the State Board of Education amended its elementary curriculum rule and required environmental education beginning in 1986. The Rule requires that environmental education be "integrated" into all of the subject areas of "common branches" in public elementary schools; be taught in four "contexts" — natural, social, valuing, action; have a "scope and sequence" that coordinates through grade 12; and include a process to review and evaluate the program.

Secondary Education. At the secondary school level, environmental education is taught as an elective or integrated into specific subject areas at the discretion of the instructor. In 1983, a task force of educators, agencies and concerned citizens drafted legislation to require environmental education. This legislation was not passed.

Post-secondary Education. Since Earth Day in 1970, the post-secondary education system has responded to the need for environmental education by including general curriculum courses; providing technical training for a growing environmental job market; creating departments or sub-specialties for environmental topics; and integrating environmental issues with traditional disciplines. Length of training ranges from one or two courses for non-specialists through a one-year Water and Wastewater Technology course to several years for doctoral programs in environmental sciences.

In the 1980s, a decline in the number of students seeking environmental education has occurred and some course offerings have been dropped. Indications that this decline is leveling off are appearing. For example, in the past year a new major in Environmental Interpretation and a required course in environmental education have been added at two post-secondary schools.

Nonformal Environmental Education

Nonformal environmental education includes all education and information dissemination which occurs outside of a formal education setting. It is primarily adult education. Its purposes range from general citizen awareness to "targeted" audiences for a specific action. The concern Minnesotans have for their environment can in large part be attributed to the many and varied providers of nonformal education.

The *Minnesota Environmental Directory* lists approximately 500 groups — most of whom provide some form of nonformal education to various audiences. Providers of nonformal education include large state agencies, established environmental organizations, industry groups and small "ad hoc" groups formed to address a specific concern or proposal.

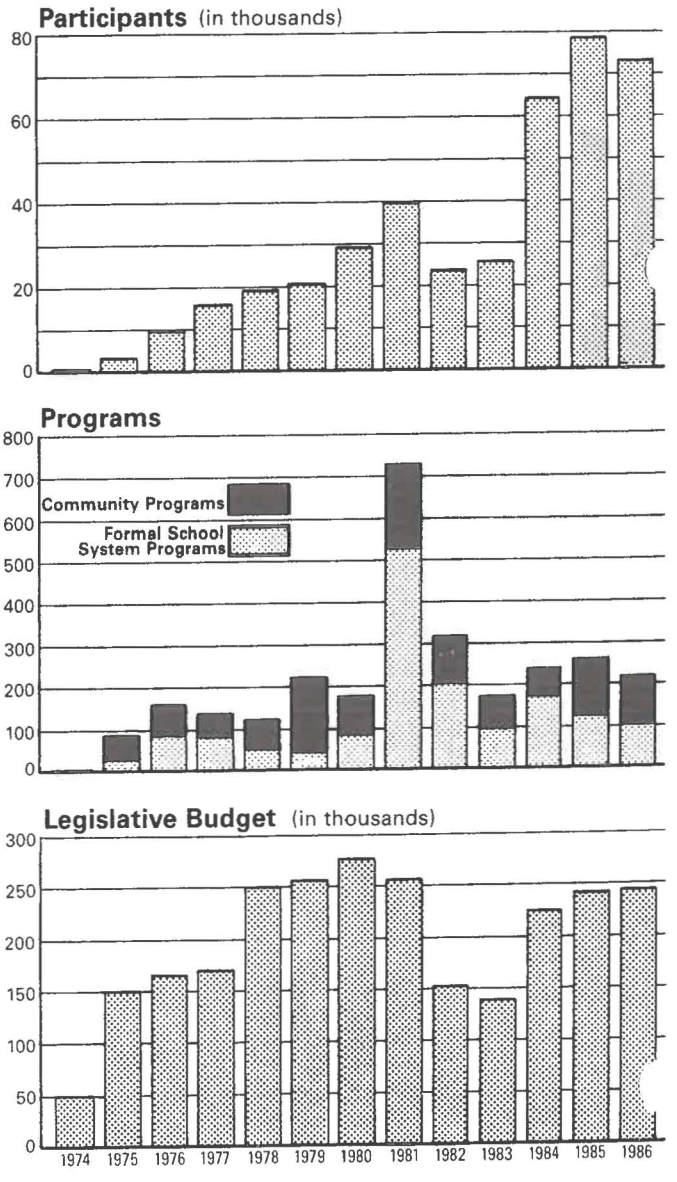
The August, 1986 report of the Waste Education Roundtable contains the following observations on nonformal environmental education:

- The nature, purpose and audience served "limits" a group's education role. This limitation is important to consider when evaluating environmental education activities and programs;
- Providers are on differing, unequal levels in terms of staff, resources, funding and capability;
- Education and information activities are not always regular or ongoing;
- Although many groups are identified in catalogues or directories and maintain access to materials or information, "outreach" is often limited; and
- Communication among the various providers is not regular. Although not essential, nonformal environmental education would likely benefit by a sharing of expertise and experiences.

Methods of communicating environmental messages vary from brochures, newsletters for members, direct mailings, door-to-door handouts, providing speakers, news media stories and coverage of events, to expensive advertising campaigns. Although the role of the news media is to inform rather than to educate, the choice of coverage, editorials, interpretation and analysis affect general citizen awareness.

The effectiveness of advertising campaigns has been documented. For example, the Minnesota Zoo has established a 91 percent correlation between its advertising budget and the number of visitors. However, use of the advertising campaign is not widespread among nonformal environmental educators in Minnesota, possibly due to the expense.

Environmental Education Activities 1974-1986



The MEEB/REEC System. This system, established by the legislature in 1973, was given the responsibility to "promote coordination among various groups and institutions developing and distributing environmental materials." Each volunteer REEC group is autonomous. Programs vary from region to region. Programs have included workshops, conferences, forums, learning materials, curricula, presentations at fairs and community events, and coordination of local environmental formal and nonformal education activities.

Waste Education Roundtable. This group was established in 1985 by the Waste Management Board and finished its work in August, 1986. The *Waste Education Roundtable Final Report* identified the need for improved education efforts for both formal and nonformal education. Following a year of intense study, the Roundtable made 24 recommendations in the areas of audience needs, providers of waste education, formal education, the role of the news media, the role of local government officials, the role of advertising, mandatory laws and fee incentives, and a structure for action. Many of the recommendations are applicable to environmental education in general. These include:

- Better coordination of current programs
- Development of a broad curriculum program on solid and hazardous wastes;
- A state "secondary education" requirement;
- On-going, formalized briefings of the news media;
- Legislated requirements for programs should ensure an educational component;
- State provision of a "clearinghouse" for information; and
- A "high-profile" advertising campaign.

Issues

Definition. What is environmental education?

Importance of Environmental Education. How important is formal environmental education to the resolution of environmental issues? Is the commitment of non-educators and educators adequate to its relative importance?

Secondary Environmental Education. Should secondary environmental education be patterned after the new elementary rule?

Teacher Preparation. How should teachers be prepared for environmental education requirements which call for "holistic," integrated, and K-12 sequential approaches to the subject matter?

Curriculum. How can we ensure development of high-quality, creative environmental education curriculum and programs? Who should be responsible for developing and funding curriculum materials for water and waste issues — groundwater, surface water, solid/hazardous/household-hazardous, nuclear, acid rain and other airborne depositions, cross-media pollution, recycling, reuse, recovery and others?

Financing. Should public funding be increased for environmental education?

Environmental Education Plan. Is the *1972 Minnesota State Plan for Environmental Education* appropriate and adequate for 1986?

Data. Do we have adequate formal education data to make wise decisions?

History of Environmental Education

1967	Minnesota Environmental Sciences Foundation, Inc. established. Offered expertise in curriculum development, outdoor classroom design, and teacher in-servicing.
1969	Minnesota law passed requiring MDE and DNR to jointly produce environmental education materials.
1970	National Environmental Education Act, provides funds for states to plan environmental education programs.
1971	Environmental Conservation Library (ECOL) established. Minnesota Environmental Education Board (MEEB) created.
1972	*Environmental Education . . . A State Plan for Minnesota* published. Post-Secondary Symposium for environmental education.
1973	Regional Environmental Education Councils created. Several nature centers begin. Agricultural organizations commit resources to environmental education.
1975	The Curriculum Planning Project aids 30 school districts.
1977	DNR redefines its role. Emphasizes "conservation" education. Legislative mandate to MDE and Energy Agency to develop energy education materials with mostly federal monies.
1978	NSP begins annual energy workshop for teachers. Energy mini-grants to 20 to 25 teachers annually. Bemidji State University and MDE jointly bring "Project Learning Tree" to Minnesota.
1979	"Water Awareness Year." Conference for teachers held. Federal grant to St. Anthony School District to produce a secondary hazardous waste curriculum.
1980	Minnesota Association of Environmental and Outdoor Education, a professional association, is created. MDE and MEEB survey schools on status of environmental education. Nongame wildlife checkoff allowed on tax returns. Public states strong desire for using funds for education. Acid Rain Bill requires public education but provides no funds. Federal grant for Acid Rain secondary curriculum to School District 197, West St. Paul.
1981	State Budget Cuts; MEEB cut 50%; MDE programs decline. Federal Budget Cuts; Education funds disappear immediately. Waste Management Board created. No funds for education.
1983	National "Ag in The Classroom" brought to Minnesota. Governor's Council on Rural Development funds "Ag-Stravaganza" a soil conservation curriculum for elementary students.
1984	Project WILD, a major national wildlife curriculum brought to Minnesota with funds from Nongame Wildlife Program. MEEB coordinates, and workshops reach 1,100 teachers in a year.
1985	State Board of Education requires environmental education at the elementary level beginning with the 1986 school session. Waste Education Roundtable established. Environmental Quality Board includes environmental education as a formal part of its work program and issues identification process.
1986	MDE, MEEB, MEQB and MAEOE co-sponsor seminar to gather curriculum and produce a descriptive catalogue for elementary teachers. The *Waste Education Roundtable Report,* the *Governor's Commission on Minnesotans Outdoors Report,* the *Water Resources Research Center Seminar Report* and the EQB Work Program call for more environmental education efforts and better coordination.

Coordination. Should coordination activities for environmental education be increased? What is the appropriate role of nonformal educators in formal environmental education?

Minnesota...Year 2000

The trend is to "institutionalize" formal environmental education. Within the next 10 to 15 years, secondary environmental education and some form of teacher certification at the elementary and secondary levels may be required.

Various groups and institutions are likely to continue to recommend and support environmental education efforts in association with a wide range of environmentally-oriented issues. These efforts will spawn legislative proposals and subsequent lobbying efforts directed at specific issues. While this single topic focus may result in improved environmental education in specific areas, efforts to develop broad-based environmental programs may suffer.

Minnesota has the opportunity to decide what the citizens of the state will understand about their environment an dhow they will learn about the environment. Today, the options all remain.

Glossary

Adult Education. That portion of an individual's learning processes which takes place during the adult years.

Curriculum. A specific course of study within a given subject or several different subject areas.

Formal Education. That portion of an individual's education provided by specific recognized institutions — elementary, junior and high schools, vocational schools, junior colleges, colleges and universities.

Nonformal Education. Processes by which an individual gains knowledge and experience outside of recognzied formal educational institutions.

Post-secondary. An individual's formal education following graduation from high school.

Acronyms

DNR	Department of Natural Resources
ECOL	Environmental Conservation Library
EQB	Environmental Quality Board
MAEOE	Minnesota Association for Environmental and Outdoor Education
MDE	Minnesota Department of Education
MEEB	Minnesota Environmental Education Board
MESFI	Minnesota Environmental Sciences Foundation, Inc.
REEC	Regional Environmental Education Council

For Further Information

Contact the source listed in parentheses if you are interested. The availability of the publications is unknown.

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Minnesota Bulletin #20 (Minnesota Department of Education)
Minnesota Environmental Directory/1986 (Environmental Quality Board)
Catalogue of Environmental Education Resources (Minnesota Department of Education and Minnesota Environmental Education Board)
What Makes Education Environmental? Noel McInnis and Don Albrecht. (Library or book store)
The Web of Life, John Storer (Library or book store)
A Sand County Almanac, Aldo Leopold (Library or book store)

ENVIRONMENTAL EDUCATION
ACCOMPLISHMENTS

INCREASED AWARENESS

- Awareness of environmental issues
- Acceptance of specific environmental problem legitimacy
- Awareness among K-6 teachers
- Recognition of Agriculture role
- Strong higher education support
- Recognition that environmental education is many things: outdoor education, indoor environment, cities
- Anti-smoking
- Urban sprawl
- EE (Environmental Education) as interdisciplinary
- County agents
- Conservation "volunteer"
- Mass media coverage
- Volunteers
- Ag Extension -- Minimum Tillage etc.
- Media expertise -- outdoor writers
- Earth Day
- Redbook

LEGISLATION/REGULATION

- Minnesota Department of Education Environmental Education Rule
- Waste management act and education following waste siting
- MEEB/REEC
- 1969 law -- mini units
- Superfund program
- Non-game check-off
- 1969 Environmental Education Act -- DNR (Department of Natural Resources) and DE (Department of Education)
- MESFI (Minnesota Environmental Sciences Foundation, Inc.) is established
- Environmental review process
- Mini grant program
- Radioactive waste act
- State plan for EE written, approved
- RIM (Re-Invest in Minnesota)

INSTITUTIONS/ORGANIZATIONS

- MEEB (Minnesota Environmental Education Board) -- unique in U.S.
- Diverse institutional resources -- MNA (Minnesota Naturalists Association), MAEOE (Minnesota Association for Environmental and Outdoor Education), AIN (Association of Interpretive Naturalists)...
- State environment groups work

ENVIRONMENTAL EDUCATION
ACCOMPLISHMENTS

INSTITUTIONS/ORGANIZATIONS, Cont'd.

- Minnesota Conservation Corp, Youth Conservation Corp -- Youth programs -- Jr. Naturalist programs
- Camps/EE centers
- Stewardship/churches
- Conservation Projects, i.e., 4H/BSA (Boy Scouts of America)
- Environmental Conservation Library
- Environmental Quality Board
- Ikes/Audubon/National Wildlife/Sierra
- SWCD (Soil and Water Conservation Districts) -- EE mandate/priority
- Commission on MN Outdoors -- Recognition of EE

CURRICULA/EDUCATIONAL TOOLS

- Acid rain tapes
- Experimental process
- Curricula: Project Wild, Learning Tree, Great Lakes, Agstravaganza
- Energy Curriculum
- Agency-developed materials -- USFS (United State Forestry Service) Smokey, etc.
- MN Zoo/Museum's, i.e., Bell; Nature Centers
- EE Magnet School (St. Paul)
- Resource Guide

PUBLIC/PRIVATE PARTNERSHIPS

- Recognition of compatibility of business and environmental concern
- NSP energy education workshop
- Waste education roundtable report
- MN Beautiful
- DNR field EE efforts
- Roadsides for Wildlife
- DNR hunter education
- OBIS

ENVIRONMENTAL EDUCATION SESSION ONE
ISSUES/PROBLEMS

Please note: Numbers in parentheses represent participant's votes. Other parenthetical material inserted for clarification. Otherwise, text is copied verbatim from participants' lists.

PARTICIPANTS' ISSUES OF GREATEST CONCERN

- Need for adequate, stable funding (17)
- Coordination between agencies/distribution organizations (13)
- Visibility needed and marketing efforts (12)
- Include mineral resources in environment board review (10)
- Public complancency (5)
- Promote secondary EE rule (3)
- Moral and ethical considerations -- other cultures (3)
- Global thinking penetration (3)
- Exploitation versus conservation/sustainability structural and cultural changes (3)
- Awareness assessment (3)

OTHER ISSUES OF CONCERN

- Educating elected officials (2)
- Need for coordinated EE newsletter (2)
- More education on wise farming practices (2)
- Require EE training for teachers, admins. and boards (2)
- Need to determine education priorities (1)
- Agency EE efforts seen as self-serving (1)
- Expand opportunities for continuing education credits for teachers (1)
- Increase local funding to implement elementary rule (1)
- Identify indicators of a good EE program (1)
- Birth to death education (1)
- Strengthen interdisciplinary approach -- coordinate teachers, hire broad teachers (1)
- Lack of aquatic education (1)
- Tanstaafl (There Ain't No Such Thing As A Free Lunch) -- personalize/ownership/survival (1)
- Ed. of teachers and administrators and boards (1)
- "Urbanization" of populace -- youth (1)
- Alternate energies (1)
- EE as higher priority in curricula -- funding (1)
- Approaching zero waste
- Avoid zero sum interpretation of consumption
- Better access to "Outdoor classrooms"
- Focus/coordination of EE efforts
- Media approach once direction is set
- Limits -- cycles -- systems -- nature knows best
- Priorities -- individual/societal
- Local solutions -- not waiting for "Them"
- Means to act on education provided

ENVIRONMENTAL EDUCATION SESSION ONE
ISSUES/PROBLEMS

- Vested interests -- resolutions
- Competition and self-interest among educators
- Instant gratification syndrome
- Political enpowerment
- Quality and vision vs. Bureaucracy
- Technology won't fix it
- Proactive, not responsive, lifestyle changes make "Appropriateness" "Economic" - Schumacher
- Inividuals must -- don't wait for "them"
- Increase awareness of voters and lawmakers that clean environment is crucial to all aspects of life
- Funding -- sustained
- Implement MN EE plan in its entirity
- Identification of positive models -- agencies, corporations
- Lack of enforcement and support of elem. rule
- Need for "secondary rule"
- Lack of marketing strategy for EE
- EE has not made stewards out of public
- Ongoing environmental degradation
- Lack of EE in higher education
- Radioactive waste disposal
- Need to provide staff support to volunteers
- REEC agency efforts too fragmented -- shotgun approach too often
- Attracting, keeping active volunteers
- Esthetic, built environment awareness
- Sell environment quality on cost basis -- not free)
- Organize teacher trainers in EE
- Lack of adequate curriculum materials
- Groundwater/surface water/acid rain
- Get the word out about EE Rule
- Better evaluation tools for EE
- Too much duplication of EE effort
- Development and implementation of EE rule
- Coordination of EE within districts
- Greater comfort regarding EE in K-6
- Integration into other curricula
- Develop resources networks -- people, currriculum, materials (specimens, etc.)
- Central data bank of information
- Minnesota teachers training criteria
- Human values and activitiy -- Economic, Esthetic, Policy
- Family based EE
- Money for teacher in-service
- Strong professional development strategies
- Risk management
- Move from new fad to core
- Get past TV values
- Identify benefits of environmental protection
- Make sure "Environment Ed" materials are accurate
- Back up systems for teachers and curriculum

ENVIRONMENTAL EDUCATION SESSSION ONE
RECOMMENDATIONS FOR ACTIONS

ISSUE: MARKETING

- Develop campaign in mainstream media -- image development of environmental education
  - Papers
  - Radio
  - TV -- BB tourney, hockey
  - Billboards
  - Cable TV
  - Weekly column
  - Radio 60 sec. spots
  - Involve major advertisers
  - XYZ Chemical Company might support strong message to bolster own image

ISSUE: ENCOURAGE DIVERSE SOURCES OF MONEY

- Incentives for programs in many state agencies
- Incentives for support from diverse private sources -- non-govt.
- Support from diverse other govt. sources -- non-state

ISSUE: STRENGTHEN EXISTING COORDINATING NETWORKS, LAWS, RESOURCES, PROGRAMS

- Give all appropriate agencies voting membership on MEEB
- Provide adequate funding to broad-based steering group
- Determine responsibilities for each of the "actors"
- Better mechanism

NOTES FROM DISCUSSION

- Each agency will include environmental education as a line item in their budget. (Appropriate agencies)
- Broad base input from other than state government

ENVIRONMENTAL EDUCATION SESSION TWO
ISSUES/PROBLEMS

Please Note: Participants in this session did not "vote" for issues of concern. Instead, five discussion groups generated lists of issues. By concensus of entire group, one list was chosen as being most representative of the group's priority issues. The top three issues were chosen from this list through discussion and consensus.

PARTICIPANTS' ISSUES OF GREATEST CONCERN

- Value centered education (#1)
  In lieu of developing recommendations for actions on this issue, (which the group considers an action) the group adopted the following "Mission Statement" which will be revised periodically:

  "Environmental Education is a life-long process. Its aim is to impel people into value-forming experiences. It is a way of looking at life, fostering awareness of other life and of inter-relationships, learning to recognize the effects (both good and bad) man has on his physical and biological surroundings, and the responsibilities he must accept for the mere fact of his presence and his activities in the environment. It should enable him to make sound ecological decisions and foresee their consequences; to make value judgements and act accordingly. Environmental education encourages development of life, values and a style of living which minimizes destruction and maximizes those relationships that enhance life. It is learning how to contribute to the quality of life and fosters the constructive use, rather than exploitation, of the environment."

- Plan for delivery of elementary rule (#2)
  - Defined, development of curricula & inventory of interdisciplinary topics/values
- Public E.E. (Environmental Education) (#3)
  - Marketing.
  - Overall strategy
  - De-centralized

OTHER ISSUES OF CONCERN ON LIST CHOSEN AS REPRESENTATIVE

- E.E. Rule for 7-12
  - Inventory of resources
- Teacher Training
  - Certification requirements
  - Continuing education
  - Otherwise promote teacher comfort with subject
  - "Technical Support"
- Stable funding
- Coordination
  - (Committee or ?)
  - Statewide level
  - Regional/small scale
  - School districts
- Incentives for develop. E.E. agenda/materials etc...
  - State, private sector, public

ENVIRONMENTAL EDUCATION SESSION TWO
ISSUES/PROBLEMS

OTHER ISSUES OF CONCERN LISTED BY PARTICIPANTS

- Different ways of delivery of information
- Secondary education rule est.
- Teacher training -- Pre-In-Service
- Professional training
- Evaluation method to test elementary rule
- Implementation date - test elementary rule
- Goals for general public env. education
- Training
  - Adult education
  - Public
  - Teacher
  - Student
- Develop network
- Consistent funding sources
- Credibility environmental education
- Audience identification
- Issue identification
- Alternative solutions
- Require credits -- environmental education
- Goal -- change lifestyle
- Interconnectedness
- Marketing -- using media
  - fine tune
  - captured audience
- Assessment by survey
- Measure impact of particular program
- Coordination of environmental education programs
- Strengthen MEEB -- consistent/increased funding, staffing, support
- Legislative commitment to environmental education -- consistent focus and support; directives to agencies)
- Develop local commitment -- superintendents, school boards, etc., -- i.e., teacher in-service
- Extend environmental education rule beyond elementary
- Develop programs to address other population/interest/career groups -- farmers, parents, etc.
- Develop incentives for the production of E.E. materials, i.e., films, curriculum, displays, etc.; also, involvement by corporations and other private sources of funds/ideas
- UMBRELLA E.E. organization for purposes of making recommendations to appropriate agency, Governor; and get info to educational units, community informal ed., GO
- Target isues through coordination/facilitation
- Marketing E.E. issues with citizens
- Resistance to education on an issue -- apathy?
- Need more participatory E.Ed. "Hands On"
- Increase effectiveness/efficiency in dealing with E.E. issues
- EE Rule K-12 and scope-sequence

ENVIRONMENTAL EDUCATION SESSION TWO
PROBLEMS/ISSUES, CONTINUED

- EE compentency for teacher certification
- Higher Ed - Coordinate pub. ed. efforts.
- Funding for EE in budgets of agencies, organizations; sustainability of funds/dedicated funding
- Image change "redflag words"
- Fully implementing existing laws relative to EE get rid of those things that don't work.
- A need for a more effective and cohesive structure to represent E.E. throughout state -- image, funding, lobbying, excellence
- Improve formal E.Ed. efforts
  - K-12 EE rule scope sequence
  - EE comp./teacher cert.
  - More EE CEU activities -- HANDS ON
  - Coord. EE activities in higher ed.
- Develop high quality E.E. marketing and image strategy to reach all MN citizens

ENVIRONMENTAL EDUCATION SESSION TWO
RECOMMENDATIONS FOR ACTION

The group developed recommendations for action in several issue areas which they summarized as follows:

- Statewide Coordinating Structure
  - Develop a network
  - Establish goals
  - Inventory
  - Evaluate
  - Strengthen MEEB
  - Adequate funding stability

- Market High Quality E.E. for all Minnesotans
  - Audience identification
  - Skillful use of media
  - Identify new ways

- Improve/Strengthen Formal & Informal E.E. Efforts
  - Hands on -- participatory activity, i.e., act. in schools
  - Training
  - Exploration
  - Value centered ed.
  - Higher Ed & certification
  - Local commitment
  - Elementary and secondary rule

- Coordination
  - Dev. network
  - Issue identification
  - Matching programs to groups to expertise
  - Measure impact of var. programs
  - Establish goals -- elementary rule, second rule, public-professional ?

- Marketing
  - Credibility
  - Identify audience
  - Awareness assessment
  - Medias use -- TV, radio, bill bd.
  - Different ways of delivery
  - Profess. PR
  - Evaluation and feedback

- Funding
  - Diverse, stable, adequate

- Training
  - Establish secondary rule
  - Credits
  - Different audiences
  - Professional
  - Public
  - Teacher
  - Student
  - Evaluation

RESULTS OF ENVIRONMENTAL CONGRESS PRIORITY ENVIRONMENTAL ISSUES BALLOT

Each congress participant was asked to review the Environmental Quality Board's current list of the State's 10 priority environmental issues. 97 of the more than 200 participants completed the environmental issue ballot. Participants were given the opportunity to reorder the existing list and to add new items. The following listings presents both the existing EQB priorities and revised priorities that reflect the results of the balloting. Also, presented is a list of other issues identified on completed ballots.

EXISTING PRIORITY	CONGRESS PRIORITY
1. State and local water planning and management	1. Surface and groundwater protection
2. Soil conservation and water quality	2. Toxic contamination
3. Surface and groundwater protection	3. Soil conservation and water quality
4. Toxic contamination	4. Education
5. Nuclear power plant decommissioning	5. State and local water planning and management
6. Acid rain	6. Acid rain
7. Land fills/siting/ alternatives	7. Land fills/siting/ alternatives
8. Indoor air pollution	8. Environmental monitoring data
9. Peat and mineral development	9. Nuclear power plant decommissioning
10. Environmental monitoring data	10. Indoor air pollution

OTHER ISSUES IDENTIFIED
(Ranked in order of votes received)

1. Peat and mineral development
2. Health and risk assessment
3. Coordination--federal/state/local-interagency
4. Funding
5. Waste reduction--solid/hazardous
6. Other issues receiving at least two votes:
   Ground water research (Karst areas)
   Reconcile attitudes and lifestyles with carrying capacity
   Enforcement
   Pollution tax
   Strengthen social impact assessment in E.I.S.
   Preservation of biological diversity

MINNESOTA ENVIRONMENTAL QUALITY BOARD

Congress Evaluation Form

Congress Participants were asked to rate items from 1 to 5 with 5 being the highest value.

1. Overall experience as a delegate 3.9

2. Overall organizational Congress format 3.9

3. Assistance and service from Congress staff 4.4

4. Design-outcome-expectations of Congress 3.7

5. Quality of panel presentations 3.7

6. Effectiveness of first day small group sessions

Natural Resources	3.4
Toxic	3.7
Health	2.7
Education	2.8
Risk	4.0
Water	4.1

7. Evaluation of first day luncheon speaker 3.8

8. Effectiveness of second day small group sessions

Natural Resources	4.1
Toxic	3.5
Health	4.1
Education	4.1
Risk	3.5
Water	4.1

9. Evaluation of second day luncheon speaker 3.1

10. Need for future Environmental Congress

A. Annually 37

18 General issues
14 Single issues

B. Biannually 42

30 General issues
7 Single issues

C. Most say 2-5 years, possibly every 3 years. Annually, for the next 10 years, then every 5 years with annually updated reports.

Issues should be general at first, then single issue Congresses.

ADDITONAL COMMENTS TO THE CONGRESS PLANNERS AND STAFF

A. CONGRATULATORY

1. Thanks-Good job

2. Excellent effort and a successful first congress

3. Good opportunity to interact with people from various agencies both public and private.

4. Good job overall-but the end product did not reflect the brain power and capacity of the participants. Should have probed deeper in some ideas and developed them.

5. The congress did not add to my knowledge of the issues discussed; however, it was an excellent opportunity to discuss the issues with agencies, businesses and private ogranizations. I felt that the mini-sessions did set priorties for the EQB.

B. COMPOSITION OF DELEGATES

1. Broader participation by the private sector representatives is needed.

2. Lack of involvement of local officials and staff, the private sector and the scientific and research community.

3. Need better balance of legislators, businessmen, citizens and others. Need to more actively recruit attendees.

C. SMALL GROUP STRUCTURE

1. Need to reassess the small group structure. Improve nominal group technique.

2. Small groups spent too much time with accomplishments and issues rather than recommendations.

3. Recommendations were not meaningful. Facilitators could have better directed discussions for concrete recommendations.

4. Small groups were too big. Not enough time for discussion.

D. FOCUS OF CONGRESS

1. Need to focus on specific solutions to specific problems. Sessions should be geared to develop goals to specific issues. Specific legislation is needed to reduce environmental problems.

2. Eliminate "Accomplishment" section in topic group-could be better dealt with on the congress level.

3. Need to be somewhat more focused but maybe not single issue oriented.

4. Send out survey prior to congress to determine which areas of interest/concern are most desired to be put on agenda for small groups.

5. The EQB congress could be used as an educational format on single issues.

E. CONGRESS SCHEDULE.

1. Congress should be scheduled for weekends to allow more people to attend.

2. Include an evening session open to the non-registered public with appropriate media coverage.

3. Should follow-up on congress recommendations to the participants . Publish proceeding and follow-up at six month intervals.

F. TOPIC/PRESENTATION

1. Employ creative approaches to topic presentations rather than talking drama with audience participation.

2. Include a formal debate on a relevant topic as part of the congress. Provide an opportunity for audience to question debators.

3. Bring in a speaker on environmental mediation to explain how this technique is being used nationally to address environmental conflict.

4. Should have a congress on program implementation.

G. OTHER CONCERNS/SUGGESTIONS

1. Congress should work for unified set of priorities. It would be very useful to address very specific issues to develop specific plans and methods of implementation solutions.

2. Congress could be helpful in evaluating current government framework. Identify gaps, then identify alternate courses of action and implement new frameworks.

3. Congress should provide discussion/question and answer panels made up of:

   a. A panel of key environmental issues legislators.

   b. A panel of major state environmental interest groups representatives.

c. A panel of state environmental agency heads.

d. A panel of industrial environmental specialists.

e. A panel of academic/university specialists with involvement in environmental disciplines/research.

These panels would be available in designated rooms during a designated period of time during congress for participants to question and interview regarding issues, solutions and ideas.

MINNESOTA ENVIRONMENTAL QUALITY BOARD
ENVIRONMENTAL CONGRESS
Pre-registration
December 1, 1986

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