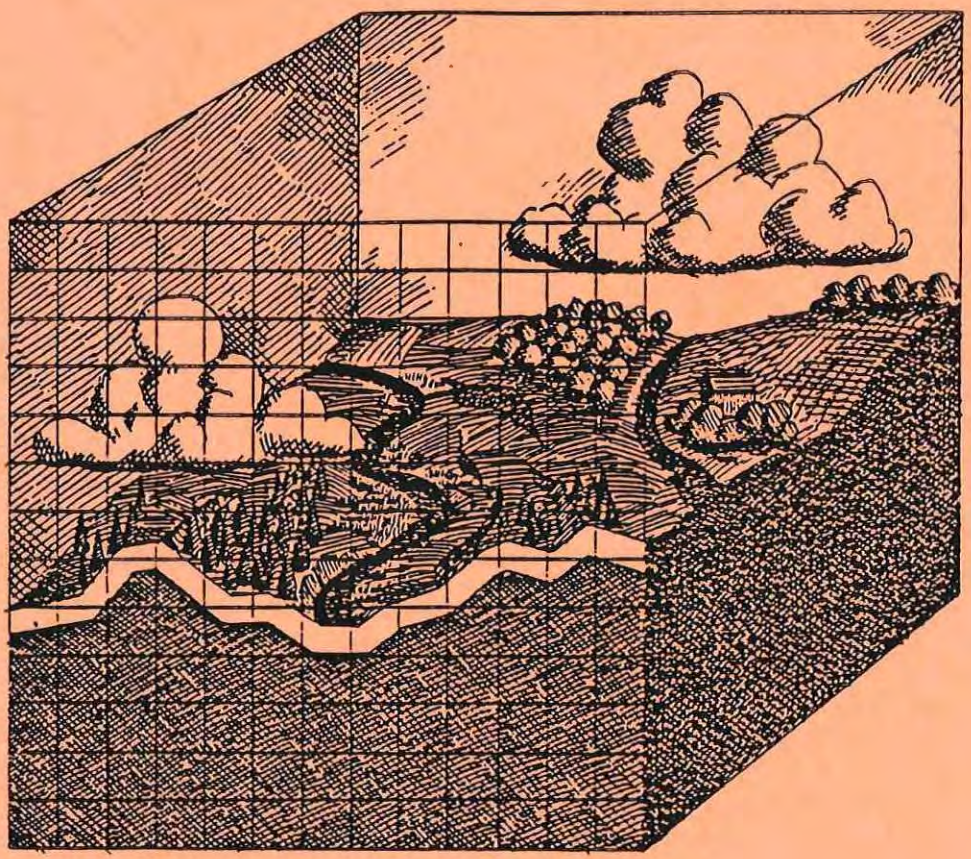
ANNUAL REPORT

ON THE STATUS OF CONNECTICUT'S ENVIRONMENT



THE
CONNECTICUT
COUNCIL ON
ENVIRONMENTAL
QUALITY

1985

The Council on Environmental Quality

The duties and responsibilities of the Council on Environmental Quality are described in sections 22a-11 through 22a-13 of the Connecticut General Statutes. The Council is a nine-member, bi-partisan entity that functions independently of the Department of Environmental Protection (except for administrative functions). The chairman and four other members are appointed by the Governor; two members are appointed by the President Pro Tempore of the Senate, and two by the Speaker of the House.

The Council's three primary functions include:

1) Preparation of an annual report on the status of Connecticut's environment, for submittal to the Governor,
2) Review of state agencies' construction projects, and,
3) Investigation of citizen's complaints and allegations of violations of environmental laws.

In addition, under the Connecticut Environmental Policy Act and its attendant regulations, the Council on Environmental Quality reviews Environmental Impact Evaluations that state agencies develop for major projects; the Council must be consulted when disputes arise regarding any Environmental Impact Evaluation.

COUNCIL MEMBERS -- 1985

Gregory Sharp, Chairman
North Branford

Peter Calder
New Canaan

Astrid Hanzalek
Suffield

Grace Lichtenstein
Norwalk

Peter Stern
Glastonbury

Barbara Uchino
Woodbridge

Mary Walton
Jewett City

Dana Waring
Glastonbury

Karl Wagener
Executive Director

STATE OF CONNECTICUT

COUNCIL ON ENVIRONMENTAL QUALITY

December 12, 1985

The Honorable William A. O'Neill
Governor of Connecticut
State Capitol
Hartford, CT 06106

Dear Governor O'Neill:

I am pleased to present the Annual Report of the Council on Environmental Quality for the year 1985.

As you know, as part of our mandate under Section 22a-12 of the General Statutes, the Council issues a report to you each year on the status of Connecticut's environment, on trends that might affect the state's economy and quality of life, and on the adequacy or deficiency of existing environmental protection programs.

For the first time, this year's report contains a Connecticut Environmental Quality Index, in which the Council has summarized briefly the status of major environmental issues. The Council intends to report on the same indicators each year and to add numerical data on wetlands, wildlife, and other resources as they become available over the coming years.

The Council also determined that two issues warranted detailed examination in this year's report: land preservation and ground water protection. This decision was based on the Council's judgment that, as the state's economy continues its strong performance and many towns experience rapid development, natural lands and ground water are two resources that require special attention. As you know, both resources are finite, and Connecticut has but one chance to preserve them.

The Council's research on these matters produced the following findings and recommendations:

<u>Land Preservation</u>

- At a time when development is claiming many thousands of acres annually, Connecticut's land acquisition program has come to a virtual halt. The U.S. Land and Water Conservation Fund, which in the 1970s supplied

PHONE 566-3510
STATE OFFICE BUILDING • HARTFORD, CONNECTICUT 06115

Connecticut with nearly $4 million per year for land acquisition, is all but defunct. Federal funds that were available specifically for urban parks have been eliminated entirely.

- A permanent fund is necessary to help urban areas maintain their parks, to secure public outdoor recreation opportunities for an expanding population, and to preserve what remains of Connecticut's unique natural heritage. These goals can best be achieved through a public-private partnership, whereby the private sector would contribute a portion of the cost of state land acquisitions. Accordingly, the Council recommends creation of an Urban Parks, Outdoor Recreation Lands, and Natural Heritage Trust Fund.

Ground Water Protection

- From 1978 through April of this year, the Department of Environmental Protection (DEP) has determined that nearly 1,000 public and private water supply wells have been contaminated from a variety of sources. DEP's powers to address ground water contamination have been strengthened and funding has been provided to provide potable drinking water to citizens whose water has been contaminated. At this juncture, it appears that the state is nearing the limits of its ability to protect ground water quality directly, and most municipalities will need assistance from the state to do the job locally.

- To further protect Connecticut's ground water from contamination, the state must form a partnership with municipalities. The Council recommends formation of an office or team within the Department of Environmental Protection specifically to encourage and assist municipalities to carry out their ground water protection duties as mandated by P.A. 85-279.

The Council has examined the economic importance of natural lands and ground water, pursuant to its statutory mandate to consider the relationship of natural resources to the state's economic needs, and has concluded that adequate amounts of both resources are absolutely essential for Connecticut to carry a strong economy into the future.

I hope you will consider these recommendations from the Council on Environmental Quality as you prepare your legislative and administrative initiatives during the coming year. If you desire more information on any issue raised in this report, the Council stands ready to assist you. Our Executive Director, Karl Wagener, who did an excellent job in developing the information base for the Council's recommendations and who authored most of this report, is especially prepared to provide additional information.

Respectfully yours,

Gregory A. Sharp

Gregory A. Sharp
Chairman

GAS/jb

CONTENTS

PART I

A CONNECTICUT ENVIRONMENTAL ALMANAC

A CONNECTICUT ENVIRONMENTAL ALMANAC

THE URBANIZATION OF CONNECTICUT

Rank of Connecticut among 50 U.S. states, based on percentage of land classified as "built-up": 3

Average number of people per square mile, Peoples' Republic of China: 278

India: 589

Connecticut: 647

Number of states with more highways per square mile than Connecticut: 2

Projected percentage growth in housing demand in western Connecticut by year 2000: 45

Rank of Connecticut among 50 states, based on percentage of land area that is national park, forest, or refuge: 50

NATURAL RESOURCES AND CONNECTICUT'S ECONOMY

Dollar value of one acre of farmland, U.S. average: 737

Connecticut average: 2862

Percentage change in cost of farmland, 1984 to 1985, U.S. average: -13

Connecticut average: +14

Number of states where land values increased more than fourteen percent: 0

Dollars paid to preserve one acre of bird habitat in Long Island Sound, 1984 average: 18,500

Dollars paid for a bushel of Chesapeake Bay oysters on New York wholesale market: 40

For a bushel of Connecticut oysters: 63

Dollar value of Connecticut oyster harvest in 1984: 8,500,000

In 1972: 650,000

Number of states outside New England where per capita water consumption is higher than in CT: 39

Number of New England states: 0

Percentage of water drawn in Connecticut that is used for purposes other than drinking: 99.997

Dollars spent annually by average Connecticut hunter in quest of deer: 87

Number of years until Kuwait's proven oil reserves are exhausted at current production rate: 250

Until United States' proven reserves are exhausted: 8

Percentage of United Illuminating Company's electricity that was generated by oil in 1984: 94

In 1985: 53

Portion of Connecticut's state budget that goes toward environmental protection: $\frac{9}{1000}$

Rank of tourism among Connecticut industries, based on employment: 5

State tax dollars generated annually by tourism in Connecticut: 150,000,000

Number of 100-year floods in Connecticut in last 50 years: 7

POLLUTION

Number of air pollutants regulated by the CT Department of Environmental Protection: 6

Number expected to be regulated by 1986: 856

Percentage reduction in insecticides sprayed by sweet corn and apple growers using Integrated Pest Management: 25

Pounds of pesticides saved by 40 farmers in the UConn Integrated Pest Management program: 6000

Percentage increase in commercial lawn and shrub care employees licensed to spray pesticides in CT since 1981: 100

Percentage of Connecticut's hazardous waste managed so as to not require permanent disposal or burial in 1983: 64

Percentage projected for 2005: 95

Portion of Connecticut's tidal wetlands destroyed by filling or dredging between 1916 and 1969: $\frac{1}{3}$

Since adoption of Connecticut Tidal Wetland Act in 1969: $\frac{1}{1000}$

Number of people living within 30 miles of Long Island Sound: 18,000,000

NUTMEGGERS AND THE OUTDOORS

Number of gallinule hunters in Connecticut: 758

Number of gallinules: 150

Percentage of Eastern U.S. residents who would risk curbing economic growth to protect the environment: 61

Number of people in Connecticut who hunt or trap: 90,000

Number who participate in wildlife-related recreation activities other than hunting, trapping, or fishing: 1,200,000

Average number of visits to state parks per Connecticut resident in 1984: 2.25

In 1954: 1.4

Number of wild turkeys in Connecticut in 1984: 3500

Number of Connecticut sportsmen going afield last autumn to hunt turkeys: 347

Number of turkeys killed: 1

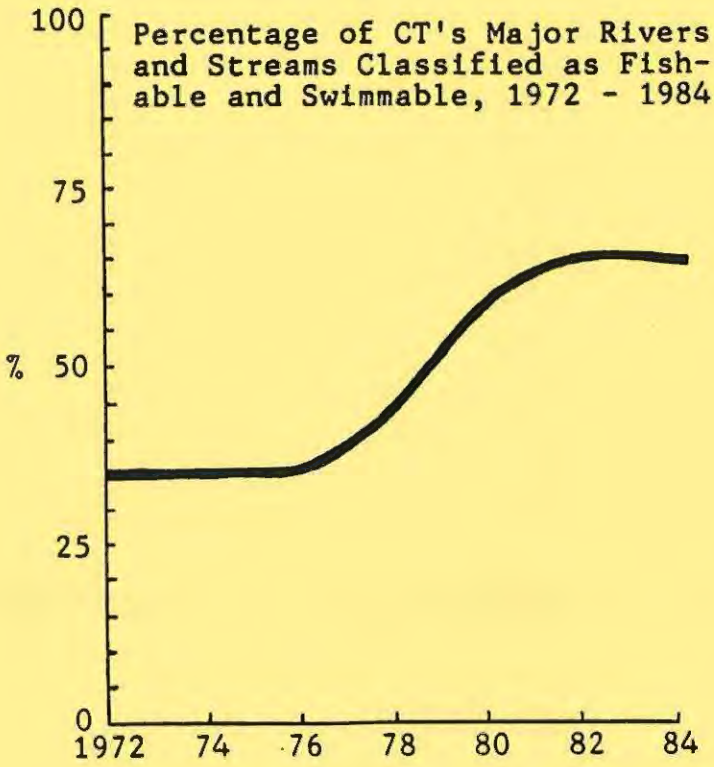
References for all statistics available from the Council on Environmental Quality upon request.

PART II

CONNECTICUT ENVIRONMENTAL QUALITY INDEX

RIVERS AND STREAMS

LONG-TERM TRENDS



3-YEAR PERIOD	FEDERAL CONSTRUCTION GRANTS FOR WASTEWATER TREATMENT PLANTS IN CT
1974 - 1976	$275 MILLION
1977 - 1979	108
1980 - 1982	89
1983 - 1985	90

KEY ISSUES

- Long-term progress in making the state's major streams and rivers "fishable and swimmable" has followed the availability of federal funding for sewage treatment plants. Since 1980, federal funding has declined sharply and progress has slowed markedly (see long-term trend graph). Combined sanitary/storm sewers, which overflow and discharge raw sewage during rainfalls, remain a major obstacle to clean rivers. A major state financial commitment will be required to make further progress; $200 million or more is needed just for the Connecticut River between Hartford and Middletown.

- Industrial discharges continue to damage some rivers and streams. Recent studies have found some industries discharging toxic materials in excess of permitted amounts. Further study is needed to assess the ecological effects of these materials.

- Increases in the Department of Environmental Protection's workload have greatly exceeded staff additions. The need to address ground water has left the surface water program under-staffed and far behind in inspections and other essential tasks. A genuine crisis looms, unless the water program gets additional personnel.

- Maps released by the U.S. EPA in 1985 indicate that parts of Connecticut may be more sensitive to acid rain than officials thought previously.

GROUND WATER

KEY ISSUES

- Once polluted, an aquifer will usually remain polluted for many years. Treatment to restore ground water quality is not practical in most cases. Much progress was made in 1985 toward providing potable water supplies for people whose wells have been contaminated. When existing drinking water needs are met, municipalities must direct more effort to preventing additional contamination.

- By helping to provide potable water to well-contamination victims, by responding to chemical spills, and by directly regulating major sources of ground water contamination (except agriculture), the state is nearing the limits of its ability to control ground water quality directly.

Number of wells contaminated, 1978 to April, 1985, by major types of contaminants:

- Pesticides: 330
- Solvents: 255
- Landfill leachate: 139
- Gas & Oil: 103
- Road salt: 55
- Nitrates and Other: 46

- Much of the job of protecting ground water is left to municipalities; despite a 1985 statutory mandate to do so, most municipalities fail to fully consider ground water protection. A state-local partnership is needed. (See Part IV of this CEQ Annual Report).

LONG ISLAND SOUND

KEY ISSUES

- An unusually large number of raw sewage discharges caused water quality to suffer in 1985. Several beaches and shellfish beds were closed by local health officials. Reasons for the discharges included mechanical breakdowns and power outages, the latter caused by Hurricane Gloria.

- Sewage discharges from boats are regulated nominally by the U.S. Coast Guard, which is understaffed to do the job. The Connecticut shoreline does not have enough stations where boats can have their sewage holding tanks pumped out; consequently, the federal government has never delegated marine sanitation enforcement powers, and authority to create "no-discharge zones," to the DEP. The growing number of boats in Long Island Sound makes this an issue in need of action.

Connecticut shoreline towns where sewage treatment plants or broken sewer lines discharged raw sewage into Long Island Sound in 1985:

- Stamford
- Darien
- Norwalk
- Bridgeport
- Milford
- West Haven
- New Haven
- New London
- Groton

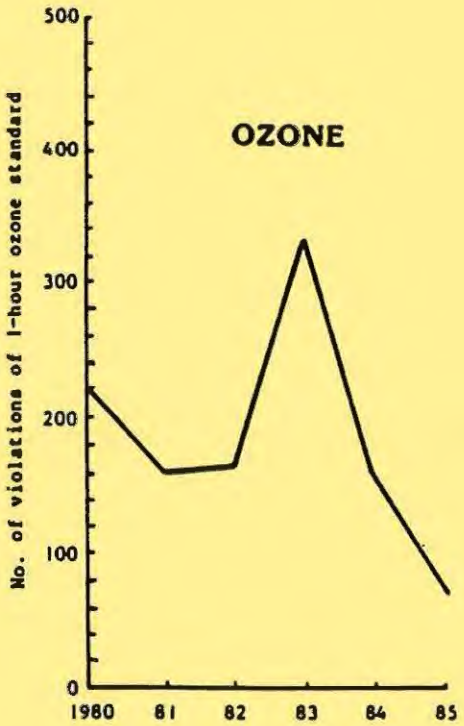
- The long-term trend in Long Island Sound is probably positive, but there is not a Sound-wide water quality monitoring program. Tissue sampling of fish and shellfish began in 1985; data from such sampling will provide evidence of long-term trends in future years.

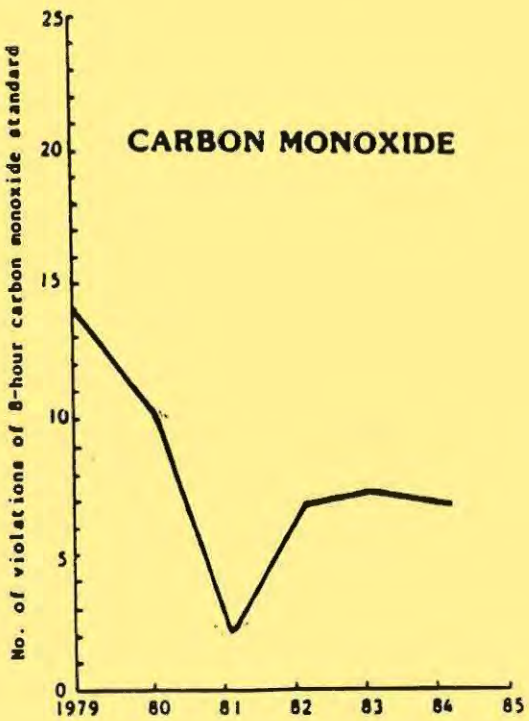
AIR QUALITY

LONG-TERM TRENDS

Ozone is the product of hydrocarbon emissions and nitrogen oxides reacting in the presence of sunlight. Favorable weather conditions and hydrocarbon-control programs resulted in fewer violations of the ozone standard in 1985 than in 1984.

Carbon Monoxide (CO) is the other air pollutant that remains a serious statewide health problem. Automobiles are the major source of CO. The frequency of violations of the CO standard has remained fairly stable in recent years.





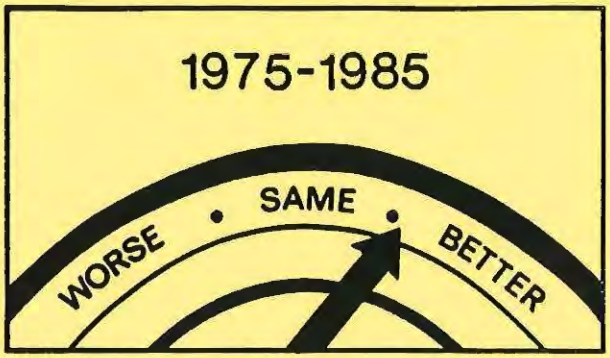
KEY ISSUES

- Ozone is best reduced by controlling hydrocarbon emissions. Despite the automobile emissions inspection program and several industrial hydrocarbon control programs, Connecticut's ozone levels frequently violate standards established to protect human health. Additional controls will probably be necessary, including Stage II Vapor Recovery (control of hydrocarbon emissions at gas stations). For more information, consult the CEQ's April, 1985 Special Report on ozone control in Connecticut.

- Nearly all of the state's air pollution control efforts and resources have been aimed at controlling six priority pollutants. Early in 1986, the DEP is expected to promulgate standards and regulations for 850 hazardous air pollutants. Hazardous pollutants create local, rather than statewide, health problems. Hundreds of Connecticut residents have apparently suffered adverse health effects from chemical pollutants. A strong hazardous air pollutant program is a necessity for Connecticut, and will require a major expansion of the air program.

WILDLIFE

Ten wildlife experts were asked to identify trends in the status of Connecticut's wildlife populations. Responses are summarized on this page. The experts included three university professors, three state officials, and four representatives of conservation organizations.



HIGHLIGHTS

- Creation of the CT Coastal National Wildlife Refuge, this state's first significant federal refuge, protected nesting habitat for several species of large wading birds which nest nowhere else in the state.
- Habitats for several rare species were preserved with the state's acquisition of West Rock Ridge, and by the Nature Conservancy's vigorous statewide activity in 1985.
- In January, new state regulations were adopted giving legal protection for the first time to timber rattlesnakes, spotted salamanders, and 12 other species of reptiles and amphibians.
- Several species of wildlife have responded well to state and private management efforts. Bald eagles, bluebirds, ospreys, roseate terns, and turkeys have all increased greatly in number, the result of deliberate assistance from humans.
- Connecticut turkey hunters' success rate is the highest in New England in the spring (the season when most turkey hunting is done; fall turkey hunters are notably unsuccessful). Prior to 1975, the wild turkey had been absent from the state for nearly 200 years.
- Each year, on the average, at least one "new" species of bird nests in Connecticut, often after an absence of many decades.

KEY ISSUES

- Despite the population growth enjoyed by some species, many other species are declining speedily in Connecticut. The current trend is for human-tolerant species, which adjust to changing habitat types, to benefit at the expense of human-intolerant species which require special, narrow habitat types. Ongoing development is quickening this trend, and there is no comprehensive state program in place to counteract the negative trend toward species loss.
- Endangered species have no legal status in Connecticut (excepting the very few CT species on the federal endangered list). Missing are legal definitions of "rare," "threatened," and "endangered" for Connecticut.
- All experts surveyed agree: wildlife habitat is being lost. This loss, if unchecked and unguided, will result in negative wildlife population trends in the near future.
- The DEP devotes most of its wildlife management budget to the management of game species and the enhancement of hunting. Reasons for this are historical, but presently the number of "nongame" species is far greater than the number of game species, and non-hunting wildlife enthusiasts outnumber hunters ten to one. The greatest need is for a fund that will enable the DEP to manage and protect all forms of wildlife, and to serve the broader public.

WOODLANDS, WETLANDS, WILDLANDS

- Connecticut has much more forested land than it did a century ago, but acreage alone is not an adequate indicator of forest health. Long-term forest productivity is of critical importance to the wood products industry. Data on forest productivity, which is known to be slowed by high levels of ozone and certain other air pollutants, are not available for Connecticut.

- Water utilities own and manage approximately 130,000 acres of forested land, an area equal to the land area in state forests. Despite statutes adopted in 1977 aimed at controlling the sale and development of important watershed lands, it is anticipated that water utilities will be re-classifying and selling thousands of acres of forested land in the near future. Will they be purchased for preservation or development?

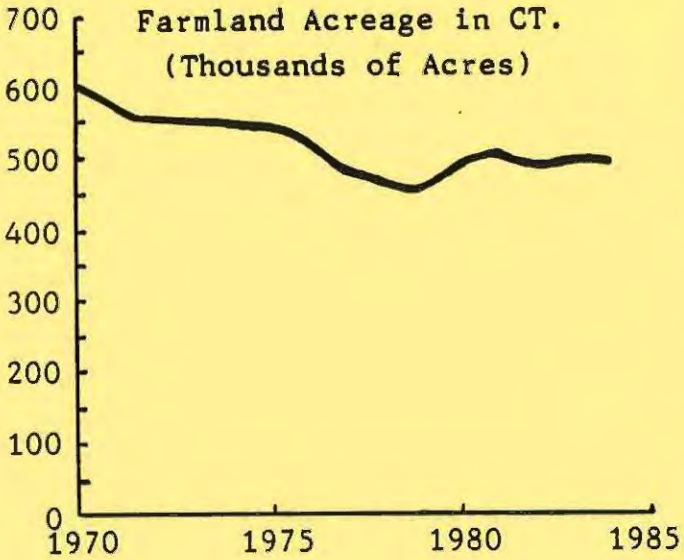
- Since adoption of the Inland Wetlands and Watercourses Act in 1972, many thousands of acres of inland wetlands have been filled, drained, polluted, or otherwise damaged or destroyed. There are no data available to determine the actual number of acres involved. In contrast to the state's tidal wetlands statute, which gives effective protection to coastal marshes, the inland wetland statute as implemented in some towns may be little more than a formal procedure for permitting wetland destruction. A system for measuring the rate of wetland loss is needed immediately.

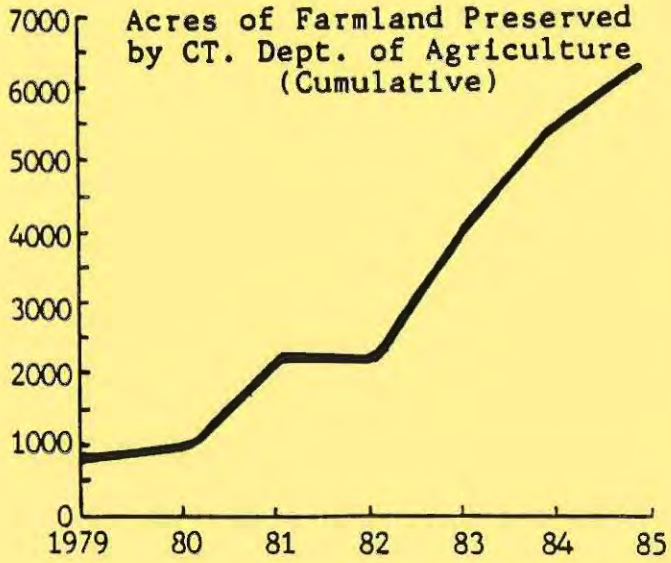
- More than 400 acres of Hammonasset State Park were designated as a Natural Area Preserve by Governor William O'Neill in August of 1985. Such designation affords a parcel of land the highest level of protection available under state statutes. Additional sites of outstanding natural value are being studied by the Natural Area Preserve Advisory Committee for future designation. The revival of that advisory committee, after dormancy for a decade, is a positive development. The state Natural Area Preserves Act, however, established a goal of 10,000 acres for the state's preserve system; after 16 years, 20% of that goal has been achieved. (See Part III of this CEQ Annual Report).

- In contrast to Natural Area Preserves, state parks are state-owned lands managed for recreation and other compatible uses. Much of the public believes, incorrectly, that designation as a state park necessarily precludes timber cutting, hunting, and other practices that one would not encounter in a preserve. It was partly this misunderstanding that led to the recent controversy over a plan to harvest timber in Devils Hopyard State Park. The DEP (perhaps with guidance from the General Assembly) must develop a clear, well-publicized policy governing timber cutting and hunting in state parks; such policy should encompass the public' desires regarding resource management in state parks. A new state land classification system that is more descriptiv than the current system (which is limite mostly to the terms "forest", "park", an "wildlife management area") was proposed in 1974 and may be appropriate now.

FARMLAND

LONG-TERM TRENDS





KEY ISSUES

- Hundreds of acres were preserved in each of the last three years through the state's agricultural land preservation program. The creation in 1985 of new permanent staff positions for that program should result in a faster rate of preservation in future years, if the General Assembly continues to make funds available at a rate that keeps pace with the rising cost of farmland.

- Numerous state, local, and private projects resulted in the permanent conversion of prime agricultural land to non-agricultural use in 1985. No precise acreage data are available, but the acreage lost surely exceeds the amount of land preserved. Farmland conversion that results from state-sponsored projects is the easiest to control; non-agricultural development of prime acreage can be minimized through better project planning.

- The Department of Agriculture's attempts to boost consumption and production of Connecticut-grown fruits and vegetables received considerable publicity in 1985. The Broccoli Pilot Project coordinated several in-state growers so that they could collectively satisfy the needs of supermarket chains. More such efforts are needed to maintain agriculture as profitable business.

- Innovative private planning and development led to the permanent protection of two farms while accomodating new housing in Sherman. The Naromi Land Trust and Housatonic Valley Association are pioneering such "Creative Development" in Connecticut for the purpose of preserving farmland and other valuable land resources.

PART III

URBAN PARKS,

OUTDOOR RECREATION LANDS,

AND NATURAL HERITAGE

URBAN PARKS, OUTDOOR RECREATION, AND NATURAL HERITAGE PRESERVATION

SUMMARY

Reviewing the recent history of land preservation and outdoor recreation in Connecticut, six central facts emerge:

1. Demand for outdoor recreation opportunities is increasing steadily -- the result of a growing population, a booming $2.25 billion tourism industry, and a growing preference for outdoor-oriented leisure activities -- while, at the same time, the supply of public outdoor recreation lands remains almost static, and the supply of potential public recreation land is shrinking.

2. Demand for certain types of public outdoor recreation greatly exceeds supply, creating serious management problems for the DEP, as well as frustration and dissatisfaction for the public.

3. In 1976, a comprehensive inventory of Connecticut's native plants and animals and their habitats identified many species in imminent danger of being permanently lost. Locations of these unique elements of Connecicut's natural heritage are now systematically identified and mapped, but are lost nonetheless because of a lack of a comprehensive, well-funded effort to preserve them.

4. With one-third of Connecticut's population dwelling in nine urban areas, outdoor recreation opportunities and natural lands are under acute pressure where they are most limited: urban areas. Cutbacks in federal urban parks funding, and the need for municipal governments to concentrate on other human needs such as housing, have seriously hurt cities' efforts to maintain their urban parks.

5. Federal funding for open space acquisition and park development has been cut by 80% since 1980, demolishing Connecticut's 1978-based five-year plan for providing outdoor recreation opportunities and preserving the state's natural heritage.

6. Acquisition of land by the State of Connecticut for conservation and recreation purposes has come to a standstill. Excepting what is purchased through irregular, special bonding authorizations, such as West Rock Ridge State Park, and what is acquired using minimal federal funds earmarked for specific purposes, the state is not acquiring any significant parcels of land.

It is possible that Connecticut is losing natural lands to development at an unprecedented rate, perhaps more than 17,000 acres per year, a rate that is due, ironically, to the public's desire to enjoy suburban and rural Connecticut's "quality of life". At a time when Connecticut's economy is reaping large economic benefits from tourism and non-urban office development, both of which are

linked to the natural amenities and recreation potential of the land, that land is being lost. Maintaining a beautiful, diverse landscape laden with recreation potential is not a trivial luxury; it is one of the footings of a healthy economy. Land preservation can only remove a tiny fraction of developable land from the real estate market, but if chosen carefully these lands will help preserve Connecticut's land-based economy.

Because the pressures and trends affecting urban parks, outdoor recreation, and natural lands are similar, they can all be addressed in one comprehensive legislative initiative. This report explores each one separately, and offers specific recommendations for each, as well as for legislation which might adequately address all three.

Summary of Needs

1. Connecticut needs a program to preserve critical elements of that which makes it attractive: its natural diversity. The DEP is, through the tenuously-funded Natural Diversity Data Base, systematically identifying this state's most valuable remaining elements of its natural heritage, but the state is not systematically working to permanently protect and preserve that heritage. The key to preservation is steady, annual funding. A systematic, logical preservation program will complement ongoing development, and ensure the continued desirability of the state as a place to visit and live.

2. Connecticut needs a fund to help cities maintain their urban parks. Until this year, federal funds were available for this purpose. Urban parks are used intensively, attracting millions of visitors annually. The cost of maintenance, if allowed to fall solely on the cities themselves, would constitute an unfair burden, as the parks are used heavily by residents of surrounding suburbs.

3. Connecticut needs to catch up to, and then keep pace with, the public's demand for outdoor recreation opportunities. The single greatest shortfall is in availability of water-based recreation. This shortfall has been identified repeatedly by comprehensive studies, and is expected to worsen two-fold or more in the next 15 years. The use of irregular bonding authorizations by the General Assembly hampers systematic efforts to meet public demand.

4. As land is acquired, there is a need, and an opportunity, to provide the public with otherwise unavailable forms of wildlife-related recreation and education. With few exceptions, the DEP's wildlife programs focus on hunting opportunities because virtually all funding comes from hunters. With supplemental revenue, the DEP could protect, manage and enhance other forms of wildlife such as eagles, bluebirds, shorebirds, and unusual animals, and provide opportunities for the public to observe, appreciate and learn about the same. Wildlife opportunities of this type would complete the outdoor picture for Connecticut residents.

Summary of Key Recommendations

1. Creation of a $10 million/year "Urban Parks, Outdoor Recreation Lands, and Natural Heritage Trust Fund":

   A. $2 million for urban parks.
   B. $2 million for outdoor recreation lands.
   C. $6 million for natural heritage preservation.

2. A steady, predictable source of revenue:

   A. One-fifth of the existing ½% real estate conveyance tax, or
   B. One-tenth of net lottery revenue, or
   C. Some combination of the above.

3. The Natural Heritage preservation funds should be spent only when matched with private funds (at a 90 - 10 (public -- to -- private) or 80 - 20 ratio), thereby establishing a private-public partnership.

4. A small percentage of the natural heritage funds should be utilized for maintaining the Natural Diversity Data Base, the state's system for identifying and evaluating natural lands.

5. A portion of the natural heritage funds should be placed in a permanent management fund at the time of acquisition.

6. Additional funds, totalling about $1 million annually, should be made available to the DEP to manage, protect, and conserve wildlife species which are not managed presently. Potential sources of revenue include:

   A. Excise taxes on wildlife-related products (except hunting and fishing gear), or
   B. Sale of voluntary wildlife stamps, or
   C. A portion of the resources in #2, or
   D. Some combination of the above

The Economics of Preserving Land: Conflicting Trends

While the primary purpose of preserving urban parks, outdoor recreation lands, and natural heritage lands is to meet the needs of Connecticut residents, the economic advantages of providing enjoyment for out-of-state residents cannot be overlooked. Specifically, the growth in tourism and the desire of corporations to relocate to Connecticut are directly related to the natural quality of the landscape and outdoor recreation opportunities. Ironically, the very attractiveness of the state, which enriches the state by generating significant tourism-related tax revenue, commerce, and jobs, also attracts development which threatens to obliterate many of these natural features. Development will likely interfere with tourism at some point in the future, unless steps are taken to preserve key desirable natural features of Connecticut.

The Tourism Boom. The tourism industry is the fifth largest employer in the state, providing jobs for at least 45,000 residents. Annual growth is about five percent. Tourism generates approximately $2.25 billion of business, which yields $150 million in state tax revenues. Eight years ago, the industry was one-third this size. Tourism officials, both at the state and regional level, frequently attribute Connecticut's tourism growth to "the natural beauty of the state." It should be noted that a large percentage of Connecticut tourists are actually Connecticut residents, indicating that the citizenry is deriving both wealth and enjoyment from the landscape.

Population and Economic Growth. Population projections for Connecticut vary according to the source, but all predict substantial growth. More relevant than simple population figures, however, are the relationships of population to land area. The natural features which Connecticut now possesses are evidence that the state can accommodate one of the greatest population densities in the entire country, but changes in the way people live will have a severe impact on the land.

A study completed in 1985 by the New York-based Regional Plan Association projects a population increase of ten percent for western Connecticut by 2000. During the same time period, demand for housing is expected to increase by 45 percent! Meeting this demand will require construction of 150,000 new housing units (although only 75,000 are expected to be built, resulting in a housing shortage). Much of the disparity between population growth and housing demand can be explained by the strong trend toward smaller households.

While painting a rosy picture for the state's economy, the forecasted growth threatens to develop substantial acreage which is now in a natural condition and, consequently, threatens to affect the level of tourism in Western Connecticut.

Reconciling Opposing Trends. Growth in population, jobs and housing will likely result in billions of dollars of additional real estate business, and many millions in tax revenue. If some small portion of this money is earmarked for preserving carefully-selected lands, then any incompatibility between development and tourism can be minimized. Thoughtful preservation of land will actually complement both development and tourism, and revenue from the former can provide funds for preserving the latter.

Summary of Important Trends Relevant to Land Preservation and Outdoor Recreation Issues

Important trends are analyzed in detail elsewhere in this report. A list of the key trends includes the following:

1. Development affects approximately 17,000 acres per year.

2. Growth in housing demand is greatly exceeding population growth. Demand for housing in western Connecticut is expected to increase by 45% in the next 15 years; meeting this demand will require 150,000 new housing units.

3. Growth in demand for swimming and other water-based recreation is exceeding the rate of population growth. Demand for outdoor swimming opportunities exceeds supply by 50,000 to 100,000 people. This shortfall is expected to double in fifteen years.

4. CT's tourism industry has tripled in eight years, and is growing at 5% annually.

5. Biologists have observed population declines in numerous species of Connecticut's native plant and animal life. Many are threatened or endangered.

6. Land costs are rising at 14% per year. (If this rate were to continue, costs would double in five years).

7. CT's Federal allocations from the Land and Water Conservation Fund averaged $3.75 million annually from 1971 through 1980; since 1981, they have averaged less than $900,000 annually.

8. Federal funds available specifically to Connecticut's urban park managers have dwindled from nearly two million dollars annually during the 1970's to zero today. Use of urban parks by non-urban residents continues, placing a management burden on the cities.

9. Federal designation of the Connecticut Coastal National Wildlife Refuge and acquisition of Applachian Trail acreage in 1984 do not signal a trend toward more federal involvement; 1984's acquisitions were extraordinary, likely to never be duplicated.

10. The last three years have brought a number of new pressures on existing "preserved" open space, which raises the possibility that the state may actually lose, rather then gain, ground against population spread. Examples include public pressure to open Bluff Point Coastal Preserve as a town beach (unsuccessful), pressure to buy bits of state forest for private or municipal use, and the anticipated loss of thousands of acres of water company lands (due to consolidation of water supplies and abandonment of some reservoirs requiring expensive treatment systems).

URBAN PARKS

URBAN PARKS

Status and Trends

Between 1978 and 1985, nine Connecticut cities received a total of $7.6 million in federal funds for urban parks through the National Park Service's Urban Park and Recreation Recovery Program (UPARR). The federal government contributed 85% toward all grants to cities, the state 15%.

The program is now zero-funded by the federal government, and little hope exists for future allocations.

Although only nine Connecticut cities were eligible for UPARR grants, those nine cities are home to one-third of Connecticut's citizenry.

According to the National Park Service, tremendous strides have been made in revitalizing Connecticut's urban parks. Typical programs funded through UPARR included rehabilitation of Pleasure Beach and other parks in Bridgeport, innovative recreation programs in Hartford, renovations to Lighthouse Point Park in New Haven (a park used by citizens from around the entire state), and rehabilitation of five swimming pools in New Britain. Planning grants were used to make park operations more efficient; Bridgeport increased productivity by 60% and decreased costs by 25% as a result of their new maintenance management plan, developed under a UPARR planning grant.

The UPARR grants were administered directly by the National Park Service office in Philadelphia. It would appear that bureaucratic and paperwork requirements were demanding. Some cities had problems with specific requirements of the grant program. An urban parks program administered by the DEP would allow more direct contact with the cities, and would have advantages over a federally-run program.

The appropriateness of spending state money to assist cities with park maintenance is beyond question; many urban parks and recreation programs are used heavily by residents of surrounding towns or, in the case of Lighthouse Point and others, by residents of the entire state. Cities should not be expected to bear the entire burden of maintaining their parks.

Size of Fund

A fund which granted $2 million per year to cities for parks management, beginning in 1986, would approximate the level of lost UPARR funding. ($7.6 million federal dollars were allocated to Connecticut over the 6 years of the program, but the minimal amounts allocated in 1983 and 1984 lower the 6-year annual average. Two million dollars could be considered an average figure).

Options

There are two approaches which the state could take in administering an urban parks fund:

1. Allocate a specific amount annually to each city, based on a formula involving population, park acreage, and other factors, allowing the cities to use the funds for their own capital or operating priorities (or some combination of the two), or
2. Require that proposals be submitted for specific projects, and the state would review and rate all proposals annually, funding the most meritorious.

Some parks department directors believe that annual allocations, without competition for grants, merely rewards cities that refuse to spend their own money on routine park maintenance. In Pennsylvania, for example, dollars are allocated to every town, and some towns simply use the state money to replace their own. According to Victor Jarm, Director of Parks and Recreation for the City of Hartford, a competitive grant program would help ensure fruitful use of state funds. He adds, however, that cities should get points in the proposal-rating system for maintaining "heritage parks," or parks that draw non-residents from around the region or state.

Recommendations

Allocate approximately $2 million annually for urban park rehabilitation and maintenance. Eligibility should be patterned after the extinct Federal Urban Park and Recreation Recovery (UPARR) Program. Disburse funds through a competitive grant program; award points for, in addition to other factors, parks which draw citizens from around the region or state. Fund both capital projects and operating costs, the latter only where the city can demonstrate a permanent commitment to park maintenance.

OUTDOOR RECREATION LANDS

OUTDOOR RECREATION LANDS

Status and Trends

Connecticut has an existing shortage of publicly-owned lands suitable for certain types of recreation. The State Comprehensive Outdoor Recreation Plan (SCORP) and the State Conservation and Development Policies Plan both identify water-based recreation as Connecticut's most serious need. State parks on the coast frequently fill to capacity and must turn away visitors on summer days; inland swimming facilities are often overcrowded as well, and some, such as Lake McDonough which serves the Barkhamsted area and draws people from as far as Hartford, is closed during times of drought (such as 1985). The 1978 SCORP estimates that demand for swimming facilities may presently exceed supply by 50,000 to 100,000 people at any one time, and is likely to be double that by the year 2000.

Boating opportunities are similarly deficient. As water quality has improved, with more streams and rivers being deemed "fishable and swimmable," public boat launching sites have not increased in sufficient number. The DEP has identified numerous water bodies with insufficient public access.

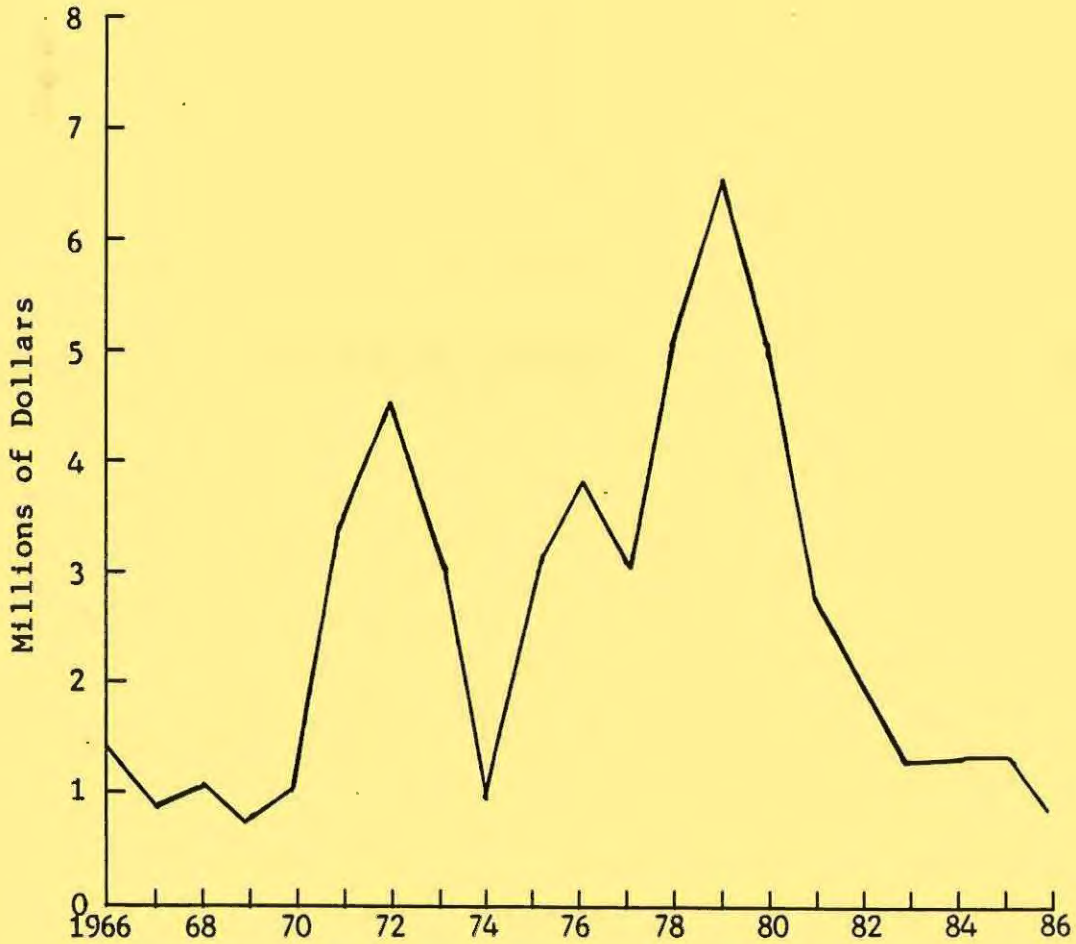
Public access for fishing is also deficient; the crowdedness of certain areas speaks for itself.

In short, public water-based recreation opportunities have not kept pace with demand. While demand is increasing, the amount of land remains relatively static, and privately owned land, which now provides some opportunities for the public, is continually being developed and removed from recreational use.

The state has other needs as well. There is a need to protect the official hiking trails network from incompatible development, and the DEP has identified lands within and adjacent to existing state parks and state forests which, if acquired, would enable the DEP to consolidate and better manage the parks.

In 1979, the DEP released a five-year schedule for allocating funds for acquisition and development of lands, based on needs identified in the SCORP. Estimated expenditures totaled $74 million for the five-year period (1978-1983). Half of the total was to have been federal dollars from the U.S. Land and Water Conservation Fund. The DEP was anticipating annual Federal apportionments of at least $7,400,000. Since 1980, however, the Land and Water Conservation Fund has declined precipitously (See Fig. 1) and now allocates one million or less annually to Connecticut.

Figure 1: Allocations from the U.S. Land and Water Conservation Fund to the State of Connecticut, 1966-1986



The small sums that Connecticut still receives, and the matching state amounts, are used primarily to fund municipal (mostly suburban) park development and rehabilitation projects. The active-recreation facilities developed with such funds -- including basketball courts, baseball fields, and lighted soccer fields -- are much needed, but they have been developed at the expense of other forms of recreation in great public demand. In 1979, the SCORP estimated that a minimum of $20 million should be spent on state land acquisition and development projects.

Need

If we assume that the Congress of the United States can maintain the present level of the Land and Water Conservation Fund, over the objections of the administration (which has attempted to zero-budget the program each of the last three years), then Connecticut will continue to be able to provide funding for some municipal outdoor recreation facilities. (It will probably be necessary for the state to continue to authorize some bonding annually, if it wishes to maintain the current policy of paying half of what is actually, under federal guidelines, the municipalities' required match). Urban parks present a special need, which is best addressed separately.

The need, then, is for state acquisition of much-needed outdoor recreation lands. Two million dollars per year, though modest, can be expended in a logical, systematic way, using existing DEP staff. That amount will probably enable the state to catch up to and keep pace with demands, though authorization for special projects may be appropriate and necessary on occasion.

Criteria for Selecting Outdoor Recreation Lands

Any legislation authorizing or appropriating funds for the acquisition of outdoor recreation lands should include language aimed at requiring DEP to spend the money according to established goals. The appropriations could be tied to needs identified in the State Comprehensive Outdoor Recreation Plan. Acceptable acquisition should include, but not be limited to, lands suitable for swimming, boating, fishing, hunting and hiking, as well as special lands such as scenic ridgetops, river corridors, and inholdings.

Recommendation

Allocate two million dollars annually for state acquisition of (or other property interest in) lands needed for outdoor recreation. Give highest priority to lands needed to alleviate existing shortages. Tie allocations to established goals, such as those identified in the official State Comprehensive Outdoor Recreation Plan.

NATURAL HERITAGE

NATURAL HERITAGE TRUST FUND

Introduction to Natural Heritage

"Natural Heritage" has no legal definition, but can be defined broadly as the land and its natural features, including native plant and animal life. The Governor, General Assembly, Department of Environmental Protection, and other official bodies, as well as numerous private interests, have recognized repeatedly that many elements of Connecticut's diverse natural heritage are disappearing. Many species of plants and animals as well as entire habitats or ecosystems are being eliminated. Recognition of this ongoing loss has spawned several attempts to preserve unique parts of Connecticut's natural heritage, but these efforts have been neither comprehensive in scope nor well-funded. Much of the most fruitful work has been funded and conducted by private, non-profit organizations, which have presented the citizenry with gifts of preserved land as well as staff positions and equipment for the D.E.P.

There are economic, scientific, and educational purposes for preserving the state's natural heritage. Perhaps the most direct economic benefit that accrues to the public at large is the influx of tourists' dollars: $2.25 billion a year, generating $150 million for the General Fund. Tourism depends heavily on the natural qualities of the state. A less direct economic benefit is the many new products and substances developed from plants every year, occasionally using rare species that had never before been studied. For example, a wild species of corn, once thought extinct, was found recently growing in a single 5-acre plot in remote Mexico. It is perennial and highly resistant to disease. If this rare species is bred successfully with corn varieties grown for food, annual dollar savings to U.S. farmers could total in the billions. Closer to home, a Connecticut biochemist studied the adhesive material produced by a native mussel, and synthesized a new waterproof glue. The new adhesive is expected to have a $10 million-per-year commercial market, plus many medical uses.

Because of the popularity of birdwatching as a hobby, the state's birds have been studied more than any other class of animal or plant. Connecticut is home, however, to some truly astounding creatures, some of which are just now being located. These less "popular" species (including, as just one example of their unusualness, a species of salamander that is comprised entirely of females) are of great value to scientists at our universities.

The educational value of natural lands is obvious. Without the lands, citizens have no opportunity to observe and learn about the natural world. The only point which may not be immediately apparent is that not all types of land provide the same educational lessons; the education varies according to the habitat. Upland forests, the most common habitat type in the state, actually hold less diversity and fewer species than many unusual, specialized ecosystems of much smaller size.

What exactly does it mean to preserve "natural heritage"? Simply, it means that the best remaining examples of Connecticut's diverse natural landscape are identified and acquired (or preserved through easement) for posterity. As just one example, scientists know that Connecticut has several black spruce bogs, a unique type of wetland formed by retreating glaciers. Black spruce bogs are home to a living system that involves many rare plants, including several meat-eating species, and a number of uncommon animal species. Given sufficient resources, the DEP, using tools it already has, can evaluate these bogs, identify the state's best remaining example of this rare habitat type, and act to preserve it. Management will then be planned so as to avoid destruction of the very qualities which led to its preservation. Future generations will thus have the opportunity to observe these ecosystems which may otherwise be eliminated for eternity.

A Brief History of Efforts to Preserve Connecticut's Natural Heritage

1903--The General Assembly creates the Connecticut Geological and Natural History Survey, which was instucted to conduct, in addition to other tasks, an "examination of the animal and plant life of the state, with special reference to its economic and educational value." The Survey, now within the DEP, has conducted many such examinations within the limits of available appropriations, but it is not responsible for preservation of the resources that it studies.

1967--The Connecticut Natural Area Preserves Act finds that, "Connecticut is a state of relatively small area, undergoing rapid industrialization and rapid diminution of areas remaining in their natural condition. It is therefore declared to be the public policy that carefully selected areas of land and water of outstanding scientific and educational interest be preserved."

Efforts to establish natural area preserves have, to date, focused exclusively on land already owned by the state which may contain unique or endangered natural features. Much work must go into identifying and evaluating potential natural areas before designation can occur, but no resources have been appropriated to the DEP for those specific purposes. Consequently, natural area preserves are designated only when staff from various DEP Units, working with private conservation organizations, find time to work on them. Governor O'Neill's designation, in 1985, of part of Hammonassett State Park as a Natural Area was the first such designation since 1972 (when three research plots and Canaan Mountain were designated by Governor Meskill).

1974--The statewide Natural Areas Inventory is completed under the auspices of the Connecticut Forest and Park Association. Four hundred areas are identified as being of outstanding scenic, geological, or ecological value. No attempt is made to systematically preserve areas in the inventory.

1976--The Connecticut Geological and Natural History Survey publishes Rare and Endangered Species of Connecticut and Their Habitats, which classifies plant and animal species as rare, threatened, or endangered, and identifies several "critical habitats". No mechanism exists to preserve these species or their "critical habitats."

1979--The second State Comprehensive Outdoor Recreation Plan (SCORP) identifies the preservation of Connecticut's "rich natural heritage" as a high priority need, with emphasis on preserving natural areas and critical habitats. Lack of funds prevents implementation of recommendation.

(The SCORP anticipated using future Land and Water Conservation Fund allocations to preserve natural areas, but these allocations failed to materialize).

1982--The Governor's Task Force For The Preservation of The Heritage of Connecticut issues 43 recommendations aimed at preserving the state's historical, cultural, and natural heritage. No comprehensive effort is launched to implement the recommendations; The Task Force is dissolved upon publication of its final report.

1983--The Connecticut Chapter of The Nature Conservancy establishes the Critical Areas Program, intended to target habitats of rare and endangered species for preservation. Governor William A. O'Neill is the Program's Honorary Chairman. The Program has preserved some 440 acres, using no state funds. Typical areas protected are coastal islands, sand plains, and fens (a type of unusual land formation). The program's limiting factor is funds.

1984--The Connecticut Chapter of The Nature Conservancy and the National Audubon Society give the state a computer and staff to initiate and operate the Natural Diversity Data Base, a systematic cataloguing and mapping of the state's rare plant and animal species and natural habitats. In 1985, the budget adopted by the General Assembly included $30,000 to assume a share of the payroll requirements.

Today--The Biology Program of the Geological and Natural History Survey, housed within the Natural Resources Center of the DEP, involves six staff positions, only two of which (the State Biologist and, beginning FY 85-86, the Natural Diversity Data Base Manager) are regularly-funded positions. These six staff members constitute a fragmented "Natural Heritage" program (though it is not so named), but each has non-related duties as well, and the program does not actually preserve much because there is no public money going into actual preservation. The staff is assigned as follows (roughly):

A. Biological inventory work - 3 positions - A botanist (the "State Biologist") and an ecologist conduct biological inventories of natural lands. The ecologist is non-permanent and is paid from private grants. A zoologist is also paid from grant money, and is also non-permanent.

B. Natural Diversity Data Base - 2 positions - A data manager and a data processor maintain the Natural Diversity Data Base, which is used by private firms, utilities, municipalities, and state agencies to determine the presence of rare species or ecosystems in proposed project sites, and by private conservation groups in evaluating land for acquisition and preservation. It is not used by the DEP for targeting land acquisitions (see "The Status of Natural Heritage Preservation"). Paid for by private conservation groups and, beginning in FY 85-86, partly by the state.

C. Natural Heritage coordinator - one person - An environmental analyst 1) performs educational work relating to natural areas, such as production of booklets describing unusual natural features, 2) coordinates the Natural Area Preserves Advisory Committee, and 3) works on the Natural Area Registry Program which helps private landowners protect endangered species occurring on their properties. Because funding for this position is from federal grants, this person also has additional, unrelated responsibilities.

The Status of Natural Heritage Preservation Today

No state money is being spent to preserve unique natural features of Connecticut's landscape (except where rare and endangered species or habitat types happen to occur together with desirable recreation lands, such as in West Rock Ridge State Park). All of the efforts of what can loosely be called the state's Natural Heritage program, described in the previous section, are aimed at 1) preventing inadvertent destruction of endangered natural resources, 2) educating the public, and 3) advising private groups in preserving the state's vanishing resources. All of these efforts are extremely important, but it is the informed judgement of all involved that the missing component is a program to identify and protect the state's rich but vanishing natural heritage. The identification is being done, albeit with private funds, but protection remains to be accomplished.

The DEP has not had funds to purchase lands which have been determined, through a scientific, objective process, to contain the state's most valuable or threatened natural resources. All land acquisition has, for many years, been conducted with money obtained for other specific purposes (See section on "The Federal Role"). The only area that has been identified through the Natural Diversity Data Base as containing unique natural features and that has been acquired with state funds is the aformentioned West Rock Ridge State Park. That park was acquired primarily because of its tremendous recreation potential for urban residents, not because it harbored the state's greatest concentration of rare plants and butterflies.

In 1985, Governor William A. O'Neill did designate part of Hammonassett State Park as a Natural Area Preserve, the first parcel so designated in thirteen years. It is anticipated that additional areas will be designated. Unless additional lands are acquired, however, all such designations will involve land that is already owned, and thus preserved, by the state.

To reiterate the core issue: The DEP is (withing the limit of modest, available appropriations and with financial assistance from the private sector) systematically identifying this state's most valuable, remaining elements of its natural heritage, but the state is not systematically working to permanently protect and preserve that heritage.

Trends Affecting the Preservation of Connecticut's Natural Heritage

There is one overriding trend which imperils the remaining "masterpieces" of Connecticut's natural landscape: the irreversible, permanent development of the land. Suburban housing is the most sprawling form of such development. (See section on Economics, p. 4). We are always at some point along a continuum that began with the first wave of colonization, and will end when the entire state is developed to its full potential (excluding preserved areas). The rate of development fluctuates greatly through time, but the result is always more developed land, with less land in its natural state. Natural land is a finite and decreasing resource; new acres are never created.

The Connecticut Council on Soil and Water Conservation estimates that development is affecting approximately 17,000 acres per year. Far fewer acres are preserved for conservation purposes, probably less than 1000 acres. Population growth, economic growth, and housing demand are projected to be strongly positive through the end of the century; consequently, development of remaining natural lands can be expected to continue at a fast rate.

A significant trend that affects preservation efforts is the increasing cost of land. Assuming that all types of land, though differing in price, increase in value at the same rate as farmland (the only type of land for which reliable figures are available), then the cost of an average acre increased nearly 80% between 1974 and 1984. From 1984 to 1985, it increased another 14%. In 1985, a million-plus dollars buys only a small undeveloped island in Long Island Sound. (Actually, a developer might pay much more for such an island; conservation organizations buying such an island pay a "bargain" price and the seller accrues tax advantages). Clearly, expenditures of several million dollars per year are necessary, if preservation is to keep pace with development.

Despite the ongoing losses to development, it can never be repeated often enough that development is not incompatible with preservation of natural lands. A well-defined, strategic preservation effort will target only an infinitesimal portion of Connecticut's developable land for acquisition. The land so targeted, however, will include the jewels of the state's heritage, jewels which would be inadvertently lost if an effort is not made to save them.

The Federal Role

If one excludes Connecticut's good fortune of being home to the nation's newest National Wildlife Refuge -- the 4-parcel Connecticut Coastal National Wildlife Refuge, authorized by Congress in 1984, and still in the acquisition process -- the federal role in protecting our natural heritage is nearly non-existent.

Prior to the creation of the Connecticut Coastal National Wildlife Refuge, the federal government had spent virtually no money (less than $10,000) in acquiring federal conservation lands of any sort in Connecticut. The federal expenditures in 1984 and 1985, both for the new wildlife refuge and for 2,000 acres along the Appalachian Trail in northwestern Connecticut, must be considered extraordinary. Connecticut had never benefitted from similar expenditures in the previous 208 years of the Union, and is unlikely to see anything like it again for a long time.

The National Park Service's purchase of the Appalachian Trail corridor was recreation-oriented, but provides a good example of the compatibility and overlap of recreation and heritage preservation. The lands preserved include some of the most scenic hills along the Housatonic River, and provides habitat for rare species.

The state is benefitting from several other federal conservation programs, none of which are aimed specifically at preserving natural lands:

Money from the federal Pittman-Robertson Fund can be used (though rarely is) to acquire lands suitable for hunting. This money, however, should actually be considered to originate with Connecticut sportsmen; the money is collected by the federal government as an excise tax on sporting goods, and returned to the states in proportion to the size of each state and its hunting population.

The money from the Federal Land & Water Conservation Fund, which has shrunk yearly since 1980, is used primarily to develop municipal recreation areas. Some of these funds are also used for planning, but may not now be used for "natural heritage" programs, which was a permittable expenditure several years ago.

Occasionally, the federal government funds special study projects, such as Wild and Scenic River studies, but leaves the task of preservation to the state. (There appears to be no strong sentiment in the state in favor of an active federal role in scenic river preservation).

Public-Private Partnership For Preserving Lands

Everyone benefits from natural diversity, but one could argue that a small portion of the public derives more direct benefits than than the remainder of the population, even if those benefits are as nebulous as a greater understanding of natural systems and the extra satisfaction in knowing they are being preserved. This portion of the public is apparently willing to spend more than average to further preservation. The state could, through a public-private partnership, take advantage of that willingness-to-pay in order to stretch state dollars. Any fund established specifically to preserve lands in their natural state probably should involve a partnership with private organizations which are willing to contribute dollars. There should never be any confusion, however, that the state is funding "private reserves"; all purchases will be by the public for the public benefit.

(The preservation of natural lands is different from preservation of urban parks and other outdoor recreation lands with regard to the appropriateness of private funding. The general public, many members of which are disadvantaged and do not belong to private, non-profit conservation organizations, benefits directly from outdoor recreation opportunities. There is no one small segment of the citizenry that benefits from urban parks and outdoor recreation more than the population as a whole).

Who will Participate?

In some cases, private individuals or members of the general public may wish to contribute. In most instances, however, an established private, non-profit conservation organization will make the donation and/or conduct the necessary fundraising.

Without a doubt, the primary organization participating will be the Connecticut Chapter of The Nature Conservancy (TNC). This group, which has preserved 16,000 acres of natural lands in Connecticut and 2.4 million acres nationwide, can be safely regarded as "established" and permanent. A review of the membership of TNC's Board of Trustees indicates that the group has become fully enmeshed with the state's corporate community, the bi-partisan political community and the conservation community. Its general membership is among the largest of any conservation organization in the state. Furthermore, through its Land Trust Service Bureau, it has direct ties to most of the state's 80 land trusts; thus, TNC can coordinate local participation as well.

Other statewide groups which are likely to contribute to the pubic-private partnership include the Connecticut Audubon Society (established 1893, 14,000 members, 1400 acres preserved), the National Audubon Society or local chapters thereof, and watershed asociations. Both the Connecticut River Watershed Council and the Housatonic Valley Association have land-preservation departments.

Natural Heritage Needs

There are two primary needs:

1. The DEP's program for identifying, in a scientific and objective way, the state's best examples of our natural heritage -- a program which involves field investigations and the Natural Diversity Data Base -- must be maintained and placed on a secure financial footing. It now depends very heavily on the largesse of private groups (and some tenuous federal funds).

2. There is a need for a standing fund which would enable the DEP to acquire and/or protect those natural areas identified as being of outstanding natural value. This fund must be in place in order that:

    a) the DEP can acquire privately-held parcels of highest priority before they are permanently lost, and
    b) the DEP can acquire other important valuable parcels (as determined through the same, objective process) when they suddenly appear on the market.

In addition, there are opportunities to accomplish the following:

3. Creation of a public-private partnership for preserving natural heritage lands.

4. Setting aside a percentage of each acquisition to fund all future management costs, through the creation of a Permanent Management Fund that would eliminate the need to draw from the State's General Fund for management of acquired lands.

NON-GAME WILDLIFE: A LAND-RELATED ISSUE

"Nongame" Wildlife: A Land-Related Issue

Because wildlife conservation programs have traditionally focused on the enhancement of those wildlife species which are hunted or trapped, known collectively as "game" species, programs aimed at the conservation of all other species are referred to as "nongame" wildlife programs. In Connecticut, nongame species outnumber game species ten to one (unless one counts invertebrates as well, in which case the ratio becomes many thousand to one).

Despite the preponderance of nongame wildlife, the DEP has not had significant resources to devote to nongame. Traditionally, demand for wildlife management has come from sportsmen, who support the state's activities through license fees and related revenue. In recent years, however, a much larger portion of the public adopted wildlife-related hobbies other than hunting and trapping. This large public wishes (expressed through polls and memberships in conservation organizations) to see the state work to conserve nongame wildlife in addition to game.

It is widely believed that people who enjoy wildlife in so-called "non-consumptive" ways (meaning the animals are not taken, but merely observed, photographed, studied, etc). would be willing to pay toward its conservation. This belief is based on the success of voluntary check-off boxes on 31 states' income tax forms whereby citizens can contribute all or portions of their refunds. There may be better ways to harness the willingness-to-pay of wildlife enthusiasts (and, obviously, there has to be, in Connecticut). Innovative methods are necessary since the best example of all -- the way sportsmen have for decades voted to tax themselves through license fees -- is unavailable to nongame enthusiasts because a licensing scheme for nongame is unworkable.

Some opportunities do exist for copying the sportsmens' success, particularly in the area of excise taxes. Would birdwatchers, campers, and hikers be willing to pay a modest additional tax on their equipment to help conserve the wildlife which they enjoy?

The question of funding for nongame wildlife species is being explored by the blue-ribbon Connecticut Wildlife Conservation Committee, a panel of experts created jointly by the DEP and the Connecticut Audubon Society. The Committee's report is expected by 1986.

One funding source that would seem to be non-controversial would be the sale of state wildlife stamps, patterned after federal Migratory Bird Hunting Stamps (known commonly as "Duck Stamps"). Unlike those required for hunting, purchase would be voluntary.

Unfortunely, experiences of other states indicate that net revenue would be small. Nonetheless, the fact that many prominent wildlife artists make their home in Connecticut and have expressed a willingness to help if such a program were initiated, suggests that Connecticut might do better than average.

An additional source of funding would also be needed, but the stamp program would be excellent for publicity.

Many species of nongame wildlife are faring poorly in Connecticut. The public's opportunity to enjoy the wildlife is limited in many instances, too. Connecticut is the winter home of dozens of bald eagles, yet most residents do not know how or where to see them. In other states, well-publized "Eagle Days," during which residents can go to specified places and observe the eagles under the supervision of a state biologist, have been extremely popular, drawing many thousands to see the eagles.

Many species of birds, mammals, and other animals are losing ground in Connecticut due to lack of attention to their habitat needs. Currently, only one DEP biologist is available to cover the whole state for nongame concerns. A comprehensive program would involve inventory work, habitat management, restoration programs, and education.

Nongame wildlife programs are usually partly wildlife-oriented, partly human-recreation-oriented. Sometimes, the conservation of wildlife necessitates the acquisition of land. In other cases, the recreation opportunities that wildlife affords are the icing on the cake of land preservation.

Recommendations

1. Select a funding mechanism (or mechanisms) that meet(s) the following criteria:

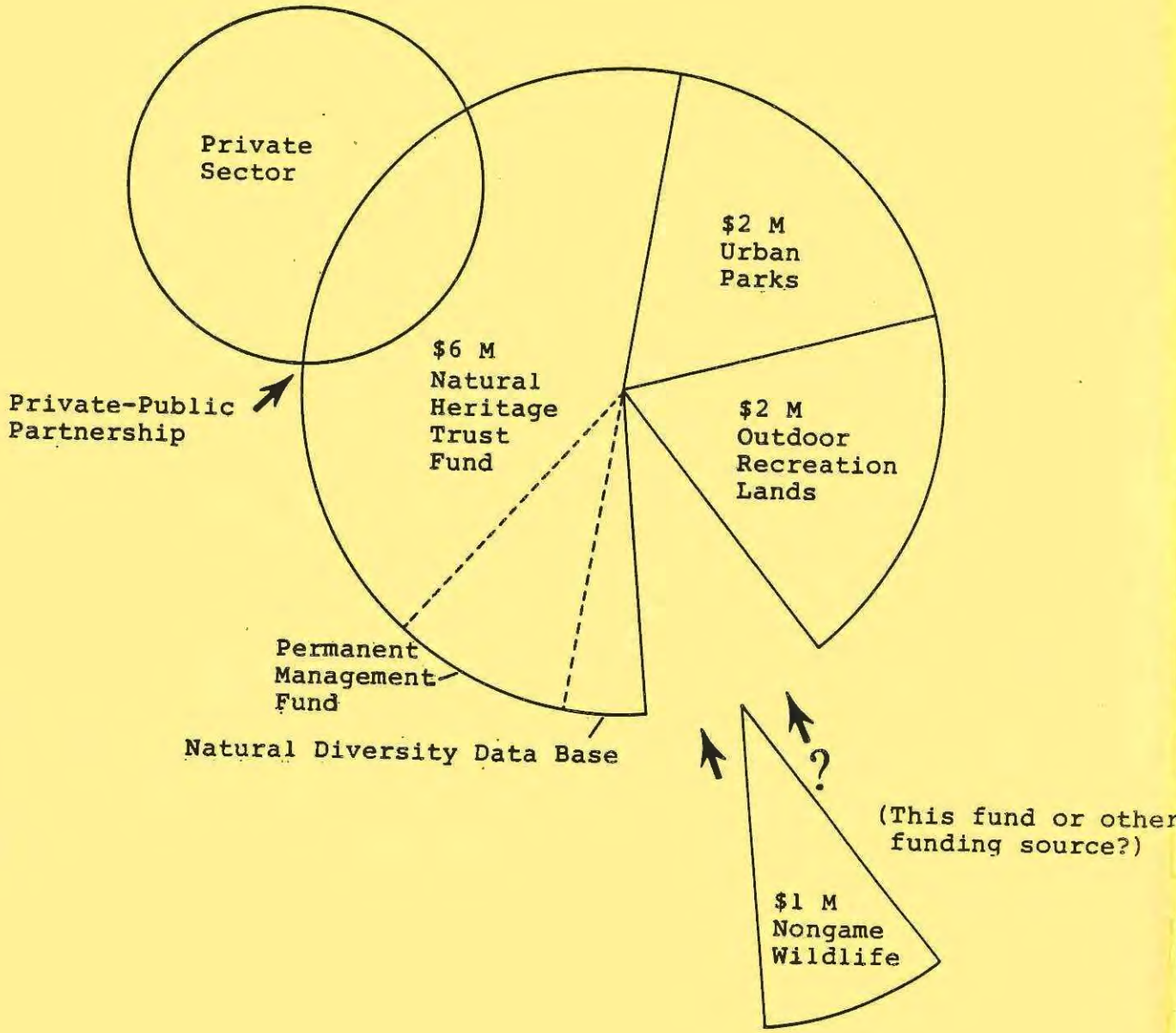
   - provides a steady annual flow of at least $1 million for operating costs;
   - relates somehow to the purpose of the fund, by taxing development or capturing wildlife enthusiasts' willingness-to-pay, or is voluntary.

2. Initiate, in addition, an annual "Wildlife Stamp" program, with proceeds earmarked for a new wildlife fund.

3. Require that the funds be expended in a manner consistent with the recommendations of the Connecticut Wildlife Conservation Committee.

PROPOSAL: AN URBAN PARKS, OUTDOOR RECREATION LANDS, AND NATURAL HERITAGE TRUST FUND

THE URBAN PARKS, OUTDOOR RECREATION LANDS, AND NATURAL HERITAGE TRUST FUND



PROPOSAL: AN URBAN PARKS, OUTDOOR RECREATION LANDS, AND NATURAL HERITAGE TRUST FUND

Connecticut's land-related needs can best be addressed through a combination Urban Parks, Outdoor Recreation Lands, and Natural Heritage Trust Fund. The three components of the Fund would be known as 1) the Urban Parks Fund, 2) the Outdoor Recreation Lands Fund, and 3) the Natural Heritage Trust Fund. (The term "trust" is used with the Natural Heritage component because portions of that component, as proposed, would be placed in a permanent management fund, and another portion used to finance the Natural Diversity Data Base; the Fund's other components would be used directly for acquisition or, in case of urban parks, for grants).

The objective of the proposed fund would be to provide a steady stream of revenue to meet urban park, outdoor recreation, and natural heritage needs described in the previous sections.

Regardless of the revenue source or mechanical details of such a fund, there are five critical ingredients which must be part of any legislation creating the Fund:

1. A steady, predictable, adequate source of revenue,

2. A requirement for private contributions to the Natural Heritage component of the fund.

3. A small portion of the Natural Heritage component earmarked for maintaining the Natural Diversity Data Base, which is the objective tool used for targeting lands for preservation.

4. A percentage of each Natural Heritage acquisition dedicated to a permanent Management Fund, the interest from which would be used to manage and maintain the acquired lands in perpetuity.

5. Ability for the DEP to respond to sudden or unexpected, limited-time opportunities to purchase high-priority properties.

These critical ingredients are discussed in greater detail below with the Council on Environmental Quality's recommendations:

1. Revenue Source

In preserving a statewide "system" of natural areas, the DEP must have access to a stable, predictable source of funds. Land availability is erratic, and often the most desirable parcels are sold before the General Assembly can act. The ideal fund would be a dedicated one, with an earmarked source (or sources) of revenue. Potential revenue sources include:

A. Real Estate Conveyance Tax

A portion of the existing real estate conveyance tax is probably the revenue source that, in the citizen's mind, can best be seen to relate to land preservation. In a sense, development would be taxed to fund (in part) concurrent land preservation. The connection is clear.

The state's existing conveyance tax generated about $49 million in FY 84-85, and is expected to generate a similar amount in FY 85-86.

A land preservation effort that is tied to a percentage of the real estate conveyance tax would be able to keep pace with both land costs and development; as the cost of real estate increases or as real estate development quickens, the amount of money available for preservation could increase simultaneously.

B. Lottery Revenues

This revenue source does not have a logical tie to natural lands preservation, but it does have the characteristic of being "voluntary." Lottery revenues are used by at least two states to fund land acquisition. If marketed properly, the knowledge that lottery revenue is being used for natural heritage preservation may prompt a large number of otherwise non-gambling members of the public to buy lottery tickets. Officials in the Department of Special Revenues are neutral on the use of lottery revenues; they have evidence, however, that any outside attempt to actually modify the lottery itself will be counterproductive. (An example is the ill-fated Massachusetts lottery intended to finance the arts, where legislative interference in the design of the program doomed it).

Options include earmarking a fixed percentage of overall lottery revenue, or a fixed percentage of one or more individual games. Revenue projections follow:

	GROSS ANNUAL REVENUE (est.)		
GAME	84-85	85-86	86-87
a. Lotto	$53 M	$62 M	
b. Daily Numbers	48 M	48 M	
c. Instant Lottery	31 M	31 M	
d. Play 4	14 M	14 M	
ALL GAMES - Gross*	149 M	161 M	181 M
- Net	132 M	144 M	164 M

(*not exactly the total of a,b,c, & d)

C. Mineral Severance Tax

Many states place taxes on minerals when they are extracted from the ground by mining companies. Connecticut could, conceivably, institute a severance tax, most of which would be paid by stone and sand and gravel companies. The advantage of this potential revenue source is the logical connecticon between depletion of the state's non-renewable mineral resources and the preservation of land; we would be trading one land-based resource for another. The disadvantage would be that a small number of companies would be paying the cost of land preservation statewide. There are 99 firms in CT, of which 22 have more than 20 employees. (It is unknown if costs could be passed on to the customers who, in the case of sand and gravel, are largely the state and municipalities buying from the lowest bidder).

Mineral producers would have to be taxed severely to generate significant funds, as they produce only $50 million to 60 million dollars worth of minerals annually. Even five million dollars of tax revenue would require a 10% tax on the extracted minerals. This contrasts sharply with a mineral-rich state like West Virginia, where mining companies extract nearly five billion dollars worth of minerals annually.

2. Requirement for private contributions

There are two ways in which a private-public partnership could work:

A) Annual Fund. Private donations could be solicited annually, at the time of appropriation of public funds, to create a pool of funds "all at once" which the DEP could draw on throughout the year. The amount of public money expended would be dependent on the amount of private money raised, up to the annual revenues. The advantage of this approach is that it gives the DEP maximum flexibility; the primary disadvantages are the costs of soliciting private donations and the lack of general enthusiasm for contributing toward the preservation of unidentified lands (see B, below).

B) Requiring private donations at the time of each purchase. Example: The DEP, through the Natural Diversity Data Base, identifies an island in Long Island Sound that is home to several rare species. If available for acquisition (or easement, whichever is appropriate), the DEP targets the island for preservation. The DEP Natural Heritage staff notifies the Nature Conservancy, The Connecticut Audubon Society, and/or a local land trust of the DEP's desire to acquire the land. The private groups determine who will match the state money. That group (or groups) raise the money to match (at some proportion) the state funds, and the DEP preserves the land. Because the DEP's objectives will be compatible with those of the conservation groups, there is a built-in system of checks and balances; if no conservation organization is willing to match the public funds, the land must not be truly valuable as natural heritage. (The dependability of conservation groups in CT is discussed later).

Private conservation groups, both local and statewide, have indicated that it is very much easier to raise private donations for specific projects than for general preservation funds. The Nature Conservancy's solicitation of $1.3 million for Chimon Island is a good example; the image of nesting herons was very persuasive to potential donors. Rare plants can have the same appeal when properly portrayed.

Requiring a match for specific projects, rather than for an annual fund, holds another advantage for the state. In many instances, when the DEP has notified a conservation organization of its intent to preserve a particular parcel, the conservation organization itself can purchase the land for re-sale later to the state. The advantage of this approach is that the private group can often purchase the land (or easement) at a price far below market value (because of tax advantages for the seller), and the savings are passed on to the state when the state purchases the land (or easement) from the private organization.

Recommendation:

Require the private sector to contribute to each acquisition, rather than to the overall annual allocation.

Size of the Private Share

Recognizing that 1) natural heritage preservation benefits all citizens, and 2) the point of a private-public partnership is to take advantage of a greater willingness-to-pay among a minority of the public, and 3) private organizations must work extremely hard to raise large sums, it makes sense to have the public share significantly larger than the private share. Logical options for the public share are 90%, 80%, or 75%; any less would seriously impede preservation efforts, as funds may go unmatched. For the first few years of the program, at least, the highest reasonable public share would be appropriate so that the DEP can begin at once to meet the backlog of preservation needs. The proposed program could include a phase-in schedule for higher private shares.

Whatever the public's share, care must be taken to ensure that the public does not erroneously perceive the program as a matching grant program. Expenditures would not be matching grants to private groups. The program would be administered entirely by the state. Funds would be spent by the state to fulfill the state's purposes and objectives, for the state's benefit; the private share is a contribution to the state's goals, not the other way around.

Recommendation:

Require a private share of no more than 25% of the cost of each acquisition, at least for the first five years of the program. An even larger public share is preferable.

3. Earmarking Funds for Operation of the Natural Diversity Data Base

It is important to tie any natural heritage preservation effort to a scientific, objective mechanism for identifying and evaluating high-quality natural lands; the existing mechanism is the Natural Diversity Data Base (NDDB). The NDDB is a computerized inventory of rare and unique natural features including plant and animal species; unusual habitat types such as bogs, sand plains, and trap-rock ridges; and "natural areas" (identified though the 1971-73 Natural Areas Inventory which may possess unusually good scenic, scientific, or educational value (or some combination of the above). Any parcel targeted for acquisition will likely posess more than one such feature; i.e., one priority may be a bog listed in the Natural Areas Inventory that harbors a variety of rare plants and animals. The NDDB's computer information and maps can identify the lands that hold the greatest concentration of such natural features, thus ensuring the best use of the funds.

Tying a major land preservation effort to the NDDB requires that the NDDB be capable of producing good information. The quality of the output depends, of course, on the quality of the input. Quality input, in turn, requires both field staff to gather data and office staff to record it. In addition, the DEP should have the capability to have work done through contracts with universities or consultants. If, for example, the state wants to know the locations of all rare orchids growing in the state, they could develop a short-term contract with an orchid expert. For field staff, office staff, operating costs, and contracts, the Natural Diversity Data Base will require $200,000 to $250,000 per year. It should be noted that this would also include the costs of other services provided by the NDDB, including providing information to other DEP units, other agencies, municipalities, developers, utilities, conservation organizations, and individuals. Some of the staff time would also be used to develop land preservation recommendations, and to continue the functions performed by the current Natural Heritage Program coordinator, such as coordinating the Natural Area Preserves Advisory Committee.

An optional, additional use of the proposed Natural Heritage Trust Fund would be to earmark a portion (say 1%) to produce publications that explain to the public what is being preserved.

Recommendation:

Earmark up to 4% of the annual Natural Heritage Trust Fund allocation for operation of the Natural Diversity Data Base. Earmark 1% for relative educational publications or other materials.

4. Dedicating a Portion of Each Purchase to a Permanent Management Fund

A danger in acquiring land is the management burden such acquisition brings. To avoid the need for escalating general fund appropriations for land management, one proposal is to set aside a pre-determined portion of the market price of the land in a Natural Land Management Fund. All monies set aside would be placed in one, comprehensive Natural Land Management Fund. Interest earned from the fund would be used to manage each parcel of land according to need, rather than earmarking specific amounts annually for each area. By having just one large Natural Land Management Fund, unusually large management costs (such as repairing storm or fire damage) during any one year would be available (assuming that other preserves could get by with less-than-average maintenance in that particular year).

The Nature Conservancy estimates, based on its experiences in managing a nationwide system of preserves, that a management fund of 25% of the parcel's market price is a realistic estimate of long-term needs. Only interest is spent.

The market price, rather than the acquisition cost, is best used as the index for determining the size of the management fund, to reflect the fact that the acquisition cost may be considerably less than the market price, if obtained through a bargain sale or the myriad techinques used by conservation organizations.

Recommendation:

Put a sum equal to 25% of each acquisitions fair market price into a permanent Natural Land Management Fund. Such a fund would be used to manage all properties preseserved through the Natural Heritage Trust Fund.

5. Authority for the DEP to respond to sudden or unexpected, limited-time opportunities.

It would be ridiculous to assume that the State Biologist has examined every acre of Connecticut's countryside to determine whether it contains rare or unique natural features. Therefore, parcels which are offered for sale to the state need to be evaluated and, if found to be extraordinarily valuable, preserved. In such, situations, the DEP does not have the luxury of waiting for bond authorizations.

One-time only opportunities, even for preservation of high-priority natural areas, often arise on short notice, and the DEP must have discretion to act, assuming, of course, that the DEP is bound by carefully defined criteria. The development of such criteria must be part of any preservation plan enacted.

Relationship to the Land and Water Conservation Fund

The U.S. Land and Water Conservation Fund allocates funds to each state annually. Revenue is primarily from offshore oil leases, with additional sums from sales of surplus lands. When conceived and implemented in the early 1960's the intent was to provide funds primarily for land acquisition. While some states use the money for acquisition, Connecticut uses its allocation primarily for recreation development projects. Connecticut passes nearly half of its allocation to municipalities. In 1984, all municipal grants were for recreation development projects, from band shelters to baseball fields.

Land and Water Conservation Fund allocations are a fraction of what they were in the 1970's. Nonetheless, they provide a good complement for the proposed land acquisition fund. There is really no need to for the funds to be formally entwined in any way. The unpredictable level of federal funding is a good reason not to tie any state program to it. Connecticut should assume that the Land & Water Conservation Fund will provide some small level of funding annually. Some of this money can be used for development projects associated with outdoor recreation lands acquired through the state fund. The state match for the Land & Water Conservation Fund should be funded through traditional means.

Recommendation:

Keep the proposed Urban Parks, Outdoor Recreation Lands, and Natural Heritage Trust Fund separate from the U.S. Land and Water Conservation Fund.

Relationship to Municipalities

Municipal officials may be aware of local open space parcels that qualify for inclusion in the state's Natural Heritage program, but that do not appear in the DEP's Natural Diversity Data Base for the reason that they have not been surveyed or investigated by professional field staff. The Natural Heritage preservation program should be structured in a way that encourages any municipality that wishes to see a particular parcel preserved to ask the DEP to evaluate the the land's natural heritage value. If found to be of outstanding value, it might then be suitable for state acquisition. In such cases, it might be appropriate for the municipality to contribute the "private" share match.

Any time a parcel is acquired, the affected municipality should be consulted regarding management. State-local management partnerships may be desirable. The state's goals, however, should not be subverted.

Recommendation: Involve municipalities in the Natural Heritage preservation program.

What Other States Are Doing:

The amount of money spent by states on state parks and recreation areas varies tremendously. Connecticut is somewhat below the national average, when adjusted for population; per capita, CT is the 13th lowest spender on parks. Such a ranking does not, however, take into account other types of state-owned conservation lands.

No summary of other states' efforts toward preserving natural heritage lands or urban parks is available. A few states, however, are famous for their well-funded outdoor lands programs.

Missouri voters, through a 1974 statewide referendum, opted to earmark a one-eighth of one percent sales tax increment to a program called "Design for Conservation." With a population approximately 50% larger than Connecticut's, Missouri has over 30 million dollars to spend annually on parks, forests, and non-game wildlife (in addition to the traditionally-funded programs that existed before the new fund).

Colorado voters, through a 1982 referendum, initiated a state-sponsored lottery, of which 50% of the net revenue goes toward state parks (10%) and municipal parks or conservation projects (40%). Total net revenue, after 2½ years of operation, totaled $114 million.

Florida is embarking on a major new natural land acquisition program. Florida officials are looking forward to spending 4 billion dollars at a rate of 100 million annually. A tax on real estate transactions is the largest of several revenue sources going into the fund.

Thirty-one states with income taxes have special check-off boxes on their tax forms, by which taxpayers are able to voluntarily contribute to a state wildlife fund. (In most states, only those getting a refund are able to contribute using the tax form). New York brings in the most revenue annually, about $1.7 million.

Many states use a portion of the revenue to buy land. On occasion, there has been vocal opposition to the fund when, as in New Jersey, money from the fund was used to buy land, and the land was opened to hunters.

For Connecticut, the point is moot, but it should be noted anyhow that the tax check-off mechanism is encountering many problems in many states, and, according to some economists, is neither a fair nor efficient way to raise money for wildlife and land.

The island of Nantucket in Massachusetts recently secured state legislation which enabled them to begin assessing a 2% real estate conveyance tax, with all of the revenue going toward acquisition of remaining natural lands. The tax will generate about $2 million each year.

Indiana and Iowa provide the best examples of Natural Heritage Trust Funds. Both states recently established public-private partnerships for the preservation of natural lands. Indiana uses general funds. Iowa uses lottery funds. The funds are 2 and 1 million dollar annual funds, respectively. It is important to note that land in those states costs half as much as land in Connecticut. The director of the Nature Conservancy in Indiana believes also that, despite his state's relative large size, Indiana may actually have fewer sites of natural significance than Connecticut. Indiana's program, adopted in 1984, has already approved eleven sites for preservation. Frequently, a private organization buys the land targeted by the state, and the state reimburses the group (minus the private share), resulting in greater speed and significant savings for the state.

PART IV

GROUND WATER PROTECTION:

CREATING A STATE-MUNICIPAL PARTNERSHIP

GROUND WATER PROTECTION: CREATING A STATE-MUNICIPAL PARTNERSHIP

Summary

The Connecticut Department of Environmental (DEP) Protection regulates most major ground water pollution sources directly, helps to provide potable water to residents whose wells have been contaminated, and provides information to some municipalities for their local ground water protection efforts. The DEP is also formulating a plan for protecting Regionally Significant Aquifers; when adopted, the state will have approached the limits of its ability to protect ground water directly.

The state is unable (under present statutes) to control local land use and certain ground water-polluting practices which are best managed by municipalities. Very few municipalities have adopted master plans, zoning regulations, or ordinances with the protection of ground water as a major consideration, despite a 1985 statutory mandate to do so. Municipalities will require additional assistance from the state.

Pollution from agriculture remains a unique and difficult problem, one that is best solved through a greater emphasis on awareness and education along with some additional regulation.

Introduction

In 1985, the General Assembly adopted a powerful new act that has the potential to revolutionize the way municipalities plan and zone. P.A. 85-279, An Act Concerning the Protection of Public Water Supplies, is one of the few recent state laws that tells municipal planning and zoning authorities what they must consider. Municipalities are empowered to consider and regulate many things, from building height to billboard size, but are mandated by state law to consider only a few.

P.A. 85-279 says municipalities must consider the protection of ground water in their planning and zoning.

Specifically, towns must now consider the protection of existing and potential surface and ground drinking water supplies. The key words are "potential" and "ground". In most towns, the location of existing water supply reservoirs are well established, and none but the most ignorant of town commissions would permit the development of pollution sources in the watersheds. None but the most astute, however, has a good idea of where potential ground water sources are located. In some cases, such areas probably encompass the town's entire land area.

It is reasonable to assume that most municipalities are not particularly eager nor well-prepared to begin planning for ground water protection. Since 1980, they have been empowered to plan and zone to protect ground water, but only a handful have utilized this opportunity. Many towns were even supplied by their Regional Planning Agencies with maps and manuals to assist with aquifer protection ordinances; still, no action resulted.

The public in many towns does not yet recognize drinking water protection as a land-use issue. But maintaining ground water quality depends more on proper land use than on any other form of regulation. To the extent that land use control is in the hands of municipalities in Connecticut, the responsibility and ability to protect ground water rests in 169 town halls.

Aquifers and Land Use

Occasionally one hears an agitated citizen or local official assail a developer or government agency for proposing some sort of development project "over an aquifer." To locate a landfill, mall, or gas station anywhere but over an aquifer, however, would be impossible, for at some depth beneath every point of land in this state lies an aquifer. An aquifer is any geological formation that holds water in usable amounts. Aquifers vary in type, size, flow rates, water quality, and overall usefulness, and local officials must determine which of their aquifers are worth protecting.

Aquifers composed of layers of sand and gravel are known as stratified drift aquifers. A coarse-grained aquifer of this type can yield thousands of gallons per minute, and may hold great potential for community water supply. Stratified drift aquifers are most commonly found in the river valleys. Where a high-yield aquifer spans portions of several towns or has the potential to supply water for several towns, it becomes a regionally significant aquifer.

A few dug wells are found in "till," which is unsorted material left by the glaciers. Till is not an important aquifer type.

The majority of wells in Connecticut derive their water from bedrock aquifers. Nearly all private household wells, and most small public wells, pull water from the fractures running through bedrock. The yield of an individual well in bedrock is usually many times smaller than one in a stratified drift aquifer.

Rain, ground water, rivers, streams, and lakes are all names for the same water; the proper term to use at any one time depends on where the water is at that time. Rain hits the ground. A certain amount runs off directly into streams and lakes, but much percolates through the ground into the aquifer beneath. (If this

were not so, most of Connecticut's wells would soon run dry). The ground water in the aquifer flows slowly toward the same stream or lake as the runoff, but at a very much slower rate. Flow in some aquifers is best measured in terms of feet per day. Eventually, virtually all ground water discharges into lakes, streams or, along the shoreline, into Long Island Sound. (If this were not so, all of our streams and rivers would be dry during periods of no rain).

Just as the purity of a lake or stream reflects the quality of the water flowing into it, so does the purity of an aquifer depend on the quality of incoming water. If the rain falls on a landfill, it will carry contaminants from the garbage into the aquifer. If it falls on a junkyard or auto repair shop, it may carry solvents or petroleum into the aquifer. If the rain falls on a pile of road salt it will carry sodium into the aquifer. Falling on agricultural fields, it may carry nitrogen fertilizers or pesticides downward to the water table. Drinking water supply wells down-gradient of the contamination source may become polluted.

Some contaminants need no water to reach the aquifer. Gasoline from a rusted storage tank can flow directly into the ground water.

Thus is the connection between land use and drinking water quality. The purity of an aquifer depends on what might be on or near the surface of the land above.

Excellent information regarding the nature of ground water, and its relation to land use, can be found in "Protecting Connecticut's Groundwater - A Guide for Local Officials" available from the Department of Environmental Protection's Natural Resources Center.

The State's Role in Protecting Ground Water

State Role, Part A: Regulation of Polluting Activities

Certain activities that have the potential to pollute ground water are regulated directly by the state. These include:

1. Solid Waste landfills
2. Hazardous waste generation, storage, treatment, and disposal facilities.
3. Sewage disposal.
4. Commercial fuel oil storage.
5. Industrial discharges.
6. Septic systems (those under 5,000 gallons/day are usually administered by local health officials).

In addition, the Department of Environmental Protection is developing regulations pertaining to the storage and application of road salt, and the disposal (or recovery) of waste oil. While state regulations governing the six activities enumerated above are generally regarded as being reasonably effective (though all six types of activities can still be expected to contaminate ground water in Connecticut on occasion), one should not assume that the road salt and waste oil regulations under development now will necessarily be adequate when promulgated. Regulations developed by the Department of Environmental Protection for underground fuel and chemical storage tanks were rejected twice by the General Assembly's Regulation Review Committee before being adopted in 1985. Unfortunately, the clauses that exempt many tanks and allow multiple repairs leave Connecticut with the weakest such regulations in New England. Because of the provision allowing multiple repairs of leaking tanks, many leaks can be expected to occur, and communities can expect to continue to experience ground water contamination from leaking storage tanks.

Guiding the DEP's evaluation of applications for landfills (which must receive wastewater discharge permits) and other types of wastewater discharge permits is the state's ground water quality classification system. Ninety-two percent of the state's land area overlies ground water that is Class GAA or GA, meaning that the water is being used for drinking water supply, or is believed to be suitable for such use without treatment. Normally, most types of discharges would not be allowed in such areas. The remaining land area is Class GB, which would indicate degraded ground water quality, or Class GC, which is the limited area (less than 1% of the state's total) potentially suitable for waste disposal.

Connecticut's ground water classification system is acknowledged to be among the most progressive in the nation, serving as a model for other states and the federal government. It has been put to very few tests, however, because of the infrequency of applications for new waste water discharge permits to ground water. The system is a logical one, but opportunities do exist for political pressures to disrupt the logic of the system; parties may apply to have areas re-classified to allow discharges where the ground water might be classified presently as GA. Nonetheless, few programs, if any, are ever ironclad, and Connecticut's ground water classification scheme is better than most.

State Role, Part B: Protection of Regionally Significant Aquifers

In 1985, The General Assembly, (at the urging of Governor O'Neill) instructed the DEP to develop a strategy for assessing and protecting the state's forty Regionally Significant Aquifers. By definition, these are aquifers that are supplying or have the potential to supply several towns with clean drinking water. Regional control is desirable to prevent a municipality from carelessly allowing pollution of the aquiferwhen, in fact, the aquifer may be an existing or potential drinking water supply for a neighboring town. The town with the aquifer may be deriving its water from other sources and ignorant of the aquifer's importance. The DEP has until 1987 to report its findings and recommendations.

Several options are being studied by the DEP. Any effective program will necessarily involve controls on land use. Potential schemes include local programs patterned after inland wetlands reviews, or after the state's tidal wetland review program. Direct state regulation of selected activities over Regionally Significant Aquifers is another option. Difficulties may arise where existing land uses threaten an aquifer presently.

State Role, Part C: Spill Clean-Up and Potable Water Provision

The DEP is equipped to respond to accidental spills of chemicals. In many instances, the DEP requires the responsible party to clean the area to the extent that ground water contamination is prevented. If, for example, a transformer on a utility pole explodes and rains PCBs onto the ground, the utility is required to remove the contaminated soil (and dispose of it properly).

If a drinking water supply is found to be contaminated, the DEP attempts to identify the responsible party, who then receives orders to provide an alternative source of drinking water to the affected parties. Through 1985 amendments to the Potable Drinking Water Act and related appropriations, state money is available for towns to provide new drinking water supplies for communities with contaminated wells.

The DEP's clean-up and potable water provision capabilities are intended to reduce damage from spills and assure everyone safe drinking water. They are ground water protection measures in that potential polluters of ground water have a strong incentive to avoid contaminating the ground water; the costs of providing alternate water supplies, if ordered by the DEP to do so, can be extremely high.

State Role, Part D: Information

The Department of Environmental Protection has most of the information that a municipality would need to protect its ground water. The DEP has available

1. Ground Water availability and flow maps for the entire state,
2. Maps depicting all community wells,
3. Checklists for identifying activities that may pollute ground water, and
4. A guide for local officials, published in 1984, entitled "Protecting Connecticut's Groundwater".

In addition, one DEP staff member regularly visits municipal commissions that desire assistance in designing ground water protection ordinances or regulations. This staff person has visited approximately 20 towns, of which a few towns have adopted regulations. The DEP also sponsors yearly workshops for local officials.

DEP officials purposely do not provide a model ordinance, believing that each municipality should design its own unique program based on the goals and problems of the town. The DEP attempts to help towns in identifying local ground water resources of importance, and in determining what, exactly, they wish to protect.

If a municipality wishes to sponsor a collection of hazardous wastes from households (pesticides, paint thinners, cleaning fluids, etc.), the DEP will advise town officials and provide grants within the limits of available state appropriations. Hazardous household wastes are discarded frequently down the drain by homeowners, a practice which leads to the contamination of a number (estimated by DEP officials to be dozens) of wells annually.

The Federal Role

A federal role in ground water protection is emerging, but Connecticut communities should not expect major changes or effective protection as a result. In the short run, federal activity will consist primarily of studies. Some activity can be expected in the area of leaking underground storage tanks. The anticipated level of federal involvement does not warrant postponement of ground water protection action by states or municipalities.

Everything Else Is Left to Municipalities

The majority of ground water pollution sources are not fully regulated by the state. These sources include:

1. Agricultural activities, particularly the application of pesticides, and the application and storage of fertilizers. (Pesticide application is regulated, but not with specific regard to a pesticide's impact on ground water).

2. Residential fuel oil storage.

3. Household hazardous wastes.

4. Small chemical users.

5. Small solvent users, such as auto repairers, furniture strippers, and dry cleaners; wastes produced by these firms are subject to state regulation, but actual usuage, which includes chronic spillage of small amounts, may not be.

6. General urban and suburban land use.

Pesticides and solvents have contaminated far more wells than have landfills or commercial oil tanks. Each of the sources listed above has contaminated dozens of wells. Planning and zoning commissions have the ability to prevent much contamination. Though their authority to regulate pesticide use is severely limited, towns' ability to prevent new wells in pesticide-tainted areas is strong. And no one, other than the local zoning commission, has the authority to prevent a high-risk landuse, not regulated by the state, from setting up business in the recharge area of a town's drinking water supply aquifer.

Planning and zoning are not the only tools available to municipalities for protecting ground water. In fact, towns that are completely or nearly built-up may need to take a wholly different approach, one involving inspection of potential pollution sources. Ordinances governing the installation and maintenance of residential fuel oil storage tanks may also be appropriate. The limited aquifer protection experience in Connecticut to date has consisted of an overemphasis on rapid adoption of new zoning regulations. In a few extreme cases, towns have adopted what appear to be tight new zoning regulations, but the ground water problems in those towns would have best been addressed through regulation of existing pollution sources. Such regulation is achieved by adoption of appropriate ordinances, tailored to cover the specific problems and potential problems of the municipality.

Summary of Current Problems

1. Municipalities, particularly those with no planning staff (or an overburdened staff) have neither the expertise nor the personnel to develop a good ground water protection plan. The procedure recommended to municipalities by the DEP for developing ground water protection plans is necessarily complicated and takes many months. The intended result is to develop town-specific plans, but towns need assistance.

2. Many municipalities are unaware that they are required to consider aquifer protection in their planning and zoning.

3. Despite the 1985 statutory mandate, some towns perceive no incentives to alter current zoning practices, nor perceive any threats from the state for failure to do so.

4. One DEP employee is assigned to work with municipalities on ground water protection. Working alone at the current rate of progress he will need more than a decade to reach all of the municipalities in the state. Because of other responsibilities, this employee spends less than 50 percent of his time assisting municipalities.

5. Speed is essential. Many municipalities have GA areas zoned for industrial or commercial use. Once contaminated, the aquifers might not be purified for decades, if ever. Who knows how many municipalities have master plans and zoning regulations inconsistent with the protection of ground water? No one.

6. In addition to land use, local officials need to be concerned about regulating pollution sources such as home fuel oil tanks, which are not regulated by the state. Again, towns need technical assistance.

7. Agriculture has polluted more wells than any other single type of activity, but is regulated less than most commercial activities.

Options and Recommendations

A. Spurring Local Action

The web of state ground water protection regulations has been spun tighter in recent years, but the greatest potential for closing the holes further lies with municipalities. Though required to consider ground water protection in their planning and zoning, municipalities are not demonstrating conscientious efforts to do so. Two options exist by which the state could help municipalities achieve the goal of reasonable aquifer protection:

1. A statutory requirement that municipalities prepare a ground water protection plan for integration into a town's master plan, zoning regulations, and ordinances. Such plans should (logically) be subject to approval by the DEP. If any town fails to submit an acceptable plan by a stated deadline, the DEP would prepare a plan for the town. Many towns would be forced to hire consultants; if this option is chosen, the General Assembly could consider offering grants to towns to pay for plan development.

2. Formation of a DEP Local Aquifer Protection Assistance Office. Functioning as a consulting firm offering free advice to towns, this office could work with local officials in developing plans. This option represents an accelerated, better-funded extension of the work done presently by one DEP staffer (who presently must spend the majority of his time on other responsibilities). This recommendation, if adopted, would complement the first recommendation, and would reduce the need for towns to hire private consultants. A minimum of three professional staff is necessary.

B. Regionally Significant Aquifers

The Council on Environmental Quality has already recommended to the Office of Policy and Management that Regionally Significant Aquifers be designated as "Preservation Areas" on the State Comprehensive Conservation and Development Policies Plan Map. (Action taken June, 1985 in letter to OPM).

The CEQ now recommends that legislation be adopted which would require any town conducting a "significant activity" in any designated preservation area to notify the state (and the appropriate Regional Planning Agency) so that OPM, DEP, and CEQ can advise the town on the appropriateness of the proposed activity. "Significant activity" might include, but not be limited to, wetland permits, subdivision approvals, zone changes, industrial parks, and other commercial development approvals. This recommendation for requiring notification of state agencies when significant local activities are proposed in a preservation area is similar to, but goes beyond, a statute adopted in 1985 that makes the Commissioner of Health Services a party to any municipal hearing that concerns zoning activities that could affect a public water supply. The difference is that the new recommendation would lead to state consultation where future, as well as present, drinking water supplies (or other existing significant resources identified as preservation areas) are involved.

In addition, the DEP should design a regulatory scheme for Regionally Significant Aquifers that effectively prohibits potentially polluting activities in recharge areas. The General Assembly should make adoption of such a plan a high priority. (Probable year for such legislation: 1987).

There is a need, too, for a new administrative approach for dealing with problem regions. Many regulatory approaches to regional aquifer protection may be limited by their inability to alter existing facilities and practices which may already be releasing chemicals that can pollute ground water. For large regional aquifers (including, but certainly not limited to, those classified formally as Regionally Significant Aquifers) where such polluting or potentially polluting land uses are already in existence, the DEP needs to coordinate hydrological data, contamination data, and related information in an effort to plan future development and aquifer use in the region. Currently, when the DEP issues an order to a polluter of ground water, the agency normally requires a hydrological study. For some regional aquifers, the DEP may already hold in its files a number of studies relating to various points in the aquifer, the result of numerous orders issued in that region. The DEP needs to establish an office or a team to coordinate the hydrogeologic data in its files that has been developed by private consultants pursuant to DEP-issued orders, in an effort to develop a region-wide picture of contamination. This team should also ensure that all hydrogeologic studies developed by consultants in the future be consistent and meet the needs of the DEP.

Agriculture - A Special Problem

Agriculture has contaminated more wells in Connecticut than any other single type of activity. (This is a fact, not an indictment; the Council on Environmental Quality recognizes that much of the contamination probably resulted from the legal application of legal pesticides recommended by government agencies and personnel).

Three common types of agricultural activity appear to be the most damaging to ground water:

1. Storage of manure,
2. Application of fertilizers, and
3. Application of some pesticides,

The improper storage of manure appears to be the most easily correctable problem of the three. Large manure piles left in the open contribute various nitrogen compounds to both surface and ground water. In surface water, the nitrogen may accelerate eutrophication (a condition marked by over-production of plant growth in the water) or, in the case of ammonia, create conditions toxic to aquatic life. In ground water, the result may be nitrate levels in excess of safe drinking water standards established by the federal government. The DEP issues corrective orders to approximately twenty farms a year. Large animal-feeding operations must obtain a permit from the DEP, while smaller farms must develop a management plan that, if followed, will reduce the risk of future contamination incidents.

The missing component of the regulatory framework regarding manure is a set of guidelines, standards, or regulations that delineate exactly what is acceptable manure management. The DEP is reportedly working on a set of Best Management Practices for agricultural activities, in cooperation with the University of Connecticut. The state should wait to see how effective these are before regulating manure storage more directly.

The application of fertilizers presents a different regulatory problem. Although few farmers would deliberately choose to be wasteful, most plant-production guidelines call for the application of fertilizer in excess of what the crops can use. It would be difficult for the DEP to alter or oversee fertilizer application. Statutorily, the DEP has the authority to regulate any activity which poses a hazard to the waters of the state. However, regulating fertilizer application may not be immediately practical. Perhaps a more productive approach would be for extension agents and other government personnel who advise farmers to modify their recommendations so as to minimize impacts to ground water.

The problem of pesticides in ground water is probably the thorniest of all. As in the case of improper manure storage, the DEP can order someone to stop if his activity poses an obvious threat to the waters of the state. Furthermore, the Commissioner of Health Services can issue orders to stop conditions or activities that he judges to imperil a public water supply. Such remedies are responses to acute problems, and do not address the long-term degradation of ground water supplies that presently might not be supplying public wells. Long-term, systematic control of pesticides is necessary.

One immediately available solution is to reduce the amount of pesticides applied to crops. Integrated Pest Management (IPM) is a successful pest control system that involves pesticide application only when a pest appears on a crop, rather than application on a rigid, periodic schedule. The Commonwealth of Massachusetts has been actively researching and promoting IPM, tackling one crop at a time. The University of Connecticut has also been active in assisting farmers with IPM. Approximately 40 sweet corn and fruit growers participate in the 4-year old UConn IPM program. Reductions as large as fifty percent have been achieved with some pesticides, at great savings to the farmers. Organic farming, which involves the use of many pest-control measures at the exclusion of pesticides, presents the most environmentally desirable form of agriculture. The conversion from chemical-dependent farming to organic farming takes several years for an individual farmer to accomplish, however, and few Connecticut farmers are able to withstand the several years of lowered profits necessary to develop a profitable organic farm. Organic farming, though increasing, does not appear to be a short-term solution to pesticide pollution in Connecticut. Connecticut could benefit from a state-sponsored promotion of IPM, perhaps with an eye toward encouraging organic farming in highly sensitive ground water areas.

To reduce the risk of ground water contamination from pesticides that are introduced to crops and soils, Connecticut must evaluate all components of its three-part pesticide control program.

Part 1 is pesticide registration and labeling. After evaluating manufacturers' data and other scientific information, the U.S. Environmental Protection Agency (EPA) may decide to register a

pesticide. Before it can be used in Connecticut, it must be similarly registered by the Connecticut DEP. Connecticut does not have the resources to conduct evaluations equal in scale to those of the U.S. EPA. Connecticut can, however, choose not to register a pesticide.

When a pesticide is registered, the manufacturer is required to put instructions on the label in conformance with federal dictates. The instructions might include crops on which the pesticide may be used, application rates, time-of-year restrictions, and rules for disposing of empty containers. To use a pesticide in any way that does not conform to the label is a violation of federal law. Connecticut has little or no control over what appears on the label. (A state's control is limited to refusal to register a new pesticide unless acceptable state-specific information appears on the label). Unfortunately, the federal registration and labeling procedure is based on the dangers that a pesticide may pose to humans, wildlife, crops, and surface waters, but does not always consider the potential impacts to ground water.

Part 2 is the training and certification of applicators. Connecticut receives $15,000 annually from the U.S. EPA for educating pesticide applicators. DEP officials believe that state-sponsored training of exterminators has resulted in a reduction in the frequency of well contamination caused by chlordane, a termite-control insecticide. Designing tests that are stringent enough to weed out incompetent applicators, and placing an emphasis on ground water contamination in appropriate training sessions, could have a role in preventing ground water contamination.

Part 3 is inspection and enforcement. Three pesticide field inspectors cover the entire state, in an effort to make certain that applicators are doing nothing illegal. Considering that these inspectors also inspect for compliance among, and respond to complaints about, exterminators, lawn and tree care companies, pesticide manufacturers, and pesticide retailers from hardware stores to swimming pool supply companies, one must conclude that compliance depends on the good faith and competence of farmers and other pesticide applicators. No number of inspectors could oversee more than a small fraction of pesticide applications in this state on any one day; the need is for the DEP to have enough visibility, and a record of punishing violators, to create a strong incentive for compliance. The Office of the Chief State's Attorney (Statewide Prosecution Unit for the Environment), in a promising development, has worked closely with the DEP in the past year and secured fines of up to $25,000 from violators of pesticide regulations.

Of the three -- registration and labeling, training and certification, and enforcement -- the strongest available regulatory tool is registration and labeling. Unfortunately, it is a tool that is primarily in the hands of the federal government. The U.S. EPA is reported to be considering the re-labeling of certain pesticides to account for their threat to ground water, a move that must be encouraged.

The DEP has a fourth regulatory tool available, outside the normal pesticide control process. The DEP can promulgate new regulations aimed at controlling any pollution source, including pesticides. If the state were able to identify areas -- Regionally Significant Aquifers, for example -- that are endangered by certain pesticides, the DEP could conceivably restrict application of those pesticides in the sensitive areas. There are precedents for regulations that go beyond federal rules; a recent example is the controversial time-of-year restriction on encapsulated pesticides that was promulgated (and quickly repealed) by the state to protect honeybees. The hearings, meetings, studies, and discussions that led to those ill-fated honeybee protection regulations took more than one year, yet seem minute compared to the work that would be required to develop regulations restricting pesticide use over sensitive aquifers.

There is a Governor's Task Force on Pesticides reviewing the problems described above. There is a need for action following the comprehensive recommendations that hopefully will result from the task force's deliberations.

Following the discovery of the pesticides EDB and Vorlex in hundreds of Connecticut wells in 1983 and 1984, the DEP and the Connecticut Agricultural Experiment Station sampled a limited number of wells in a search for other pesticides. Fortunately, none were found. From that survey we may be able to conclude that the major areas of pesticide contamination probably have been identified, and that the largest remaining task (once all of the current victims are hooked up to permanent potable water supplies) is the prevention of future contamination.

To summarize the agriculture and ground water issue: The ability of the DEP to further regulate those agricultural activities which contaminate ground water is limited mostly by practical considerations, rather than legal roadblocks. The need is for an integrated approach that stresses ground water-oriented education and training of farmers, agricultural advisers, and pesticide applicators, in addition to tight regulation and enforcement. The state can also encourage Integrated Pest Management, which counts among its benefits the elimination of unnecessary pesticide application.

Opportunities for municipal regulations of farming activities are very limited, being restricted to regulating the storage of fuel, wastes, and pesticides. As stated previously, however, a municipal zoning commission can head off potential well-contamination problems by studying the ground water under proposed residential developments on agricultural land to determine whether the water meets drinking water standards.

PART V

1985 ACTIVITIES OF THE C.E.Q.

1985 ACTIVITIES OF THE COUNCIL ON ENVIRONMENTAL QUALITY

The appointment of six new council members, a new chairman, and a new executive director brought change and a surge of activity to the CEQ in 1985. This annual report fulfills one of the council's three major statutory responsibilities; the other two duties include reviewing state agencies' environmental impact documents and investigation of citizen complaints.

Approximately twenty-five Environmental Impact Evaluations (EIEs) and Findings of No Significant Impacts (FNSIs) were reviewed by the CEQ. Comments were forwarded to the Office of Policy and Management (OPM) regarding six; deficiencies were discussed with OPM and the appropriate agencies. The council found that the quality of EIEs and FNSIs varied greatly from project to project; planned for 1986 is a critical review of recent documents with suggestions for improvements in the implementation of the Connecticut Environmental Policy Act, under which EIEs and FNSIs are prepared.

Numerous citizen complaints and allegations of environmental law violations were received in 1985. Simple allegations of wrongdoing were referred to the appropriate unit within the Department of Environmental Protection. The CEQ has been shown to be most useful where an environmental problem exists but no clear environmental statute is involved. The CEQ addressed several tough cases in 1985, most of which are still being resolved. Typical cases include:

- Complaints of wetlands violations against a town, regarding town-sponsored activities in a wetland, where the selectmen form a majority on the town's inland wetlands agency. The complaint had been taken previously to the DEP, which had notified the town that an apparent violation had taken place but did not require corrective action. The CEQ was able to help persuade the town to go through the proper permit application procedures, with the selectmen pledging to abstain on wetlands permit applications involving town-sponsored activities. (Note: The state wetlands statute is not explicit on the question of whether it is proper for chief elected officials to vote on wetlands permits involving town-sponsored projects).

- Complaints of citizens living near an airport regarding increases in air pollution caused by new airline service. The council's investigation found air quality at airports to be wholly within the federal government's jurisdiction, though there may be opportunities in the future for the state DEP to document air quality problems at airports. The DEP expects to obtain the equipment necessary to do so as part of its hazardous air pollutant

control program, but does not intend to use the equipment to measure pollution at airports.

- A complaint regarding erosion of land caused by drainage from a state highway.

- Complaints that an Environmental Impact Evaluation completed by the DEP for a hydroelectric project did not assess the impacts accurately. Some of the citizens' comments were incorporated into the CEQ's comments to OPM; Commissioner Stanley Pac stepped in and cancelled the project.

The council spent considerable time working with citizen organizations in obtaining appropriate changes to the proposed hazardous air pollutant regulations. Also, pursuant to citizen complaints and inquiries, the CEQ investigated the DEP's policy governing timber harvesting in state parks; this investigation is still ongoing.

Because of the potential importance of the State Conservation and Development Policies Plan to environmental quality, the Council on Environmental Quality recommended to OPM several significant changes to that plan, which is being revised currently.

The Council on Environmental Quality looks forward to working with Governor William O'Neill, the General Assembly, the Department of Environmental Protection and other agencies, as well as with citizens, toward implementation of recommendations in this report.

ACKNOWLEDGMENTS

Most of the work for the Connecticut Environmental Quality Index was done by Margarita Moore, a student intern from the University of Connecticut. The typing was done (without benefit of a word processor) by Wanda R. Ashe, CEQ staff member. Some of the illustrations (the good ones) were produced by Rosemary Gutbrod of the DEP's Information and Education Unit; The CEQ offers sincere thanks to her and to all the DEP employees who provided information or other assistance for this report.