Heritage Resources Centre
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Lessons from Chesapeake Bay

Population, Growth and Development: The Maryland Solution

Land Trusts: Applications in Maryland and Ontario

Conservation and Management of the Critical Area in the Chesapeake Bay Watershed

Long Point Environmental Folio
Publication Series

Working Paper 4

Long Point Environmental Folio Publication Series
Managing Editors: J. Gordon Nelson and Patrick L. Lawrence

A study team at the Heritage Resources Centre is developing an Environmental Folio for the Long Point Biosphere to assist management agencies and local citizens in understanding the human and natural components of the ecosystem. The folio will consist of a series of maps and text that would outline current major management issues and areas of concern. A series of project publications is being prepared to accompany the folio. These reports will consist of supplementary information collected during the study. This project is supported by the Royal Canadian Geographic Society and the Social Sciences and Humanities Research Council of Canada.

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Conservation and Management of the Critical Area in the Chesapeake Bay Watershed

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ABSTRACT

Long Point and other parts of the Lake region share many environment and development concerns. Among these are: the direct and indirect effects of population growth and industrial development; decline in traditional industries such as fishing; growing pressures from tourism and recreation, various types of air and water pollution; infilling, fragmentation and loss of wetlands; and bird and other wildlife losses.

The quality of environment and life is threatened in both areas and each area can learn from the experience of the other. With this in mind we have decided to publish these papers which analyze and describe approaches made to environment and development concerns in the Chesapeake Bay area. The papers were prepared by three University of Waterloo Faculty of Environmental Studies students involved in a field course to Chesapeake Bay in April, 1993. Their findings should be of value to the people of the Long Point area and other parts of Lake Erie and the Great Lakes.

ACKNOWLEDGEMENTS

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Gordon Nelson
Chair, Heritage Resources Centre

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Alison Dow

Introduction: Growth & Population

One of the great challenges of the 1990's is to develop appropriate visions for the future. With changing economies and growing environmental concerns, governments and citizens alike are being forced to consider and plan for sustainable living: that is, how to address such issues as quality of life, natural and cultural heritage preservation, economics and the sustained health of both humans and the natural environment. Pivotal to each of these issues is the complex relationship between the distribution of a steadily increasing population, the pace and composition of development, and the combined effects on the natural environment.

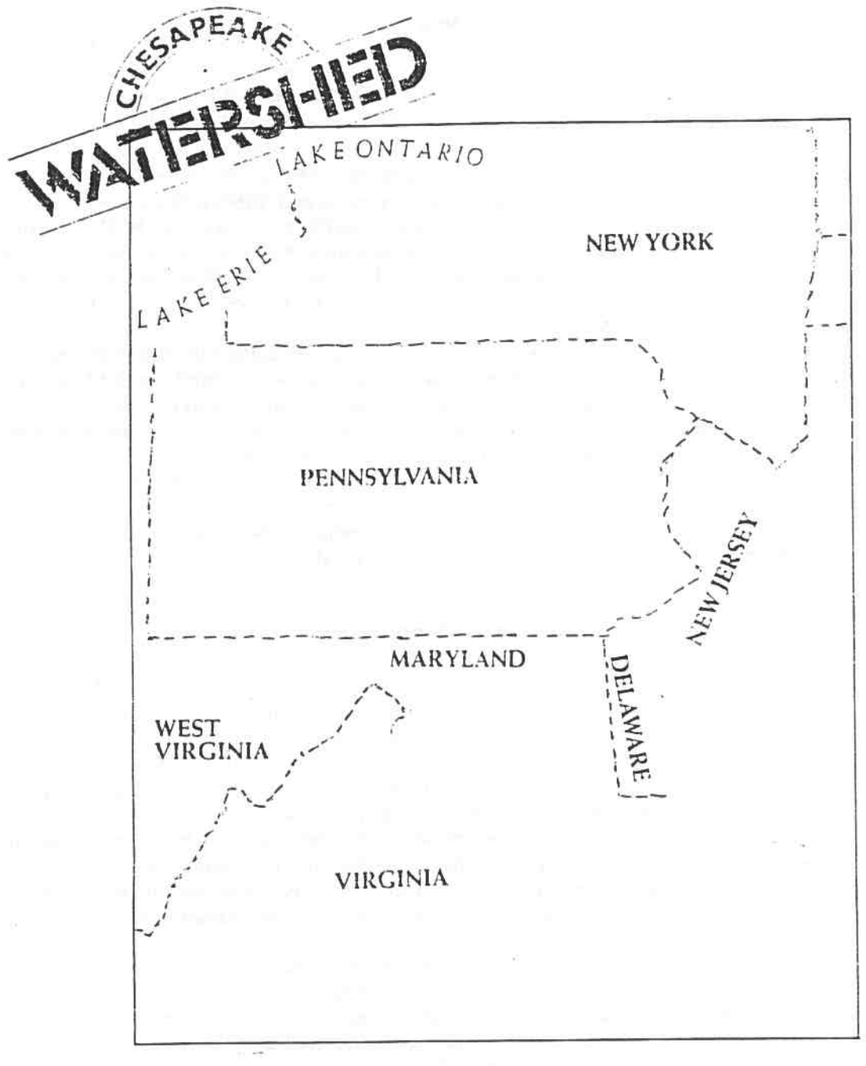
Population rates affect the environment in a number of ways. As population increases, so does the rate at which world resources are consumed. While humanity depends on the environment to sustain development, it also depends on the earth to absorb the by products of our activities. Therefore while increasing our consumption of resources, society is also effectively hindering the resilience of natural systems. Finally, an increase in population also requires an expansion of the social and institutional framework on which the functioning of society depends. The need for growth management is thus apparent. Growth management is not simply environmental management; nor is it simply an expansion of social programs. It is a holistic approach to managing and planning for the growing distribution and support of the population on a local, regional, national and global scale.

Maryland, the Chesapeake and Growth Management

Chesapeake Bay, located largely within the jurisdiction of the State of Maryland, is the largest estuary in the United States. It is a highly dynamic and sensitive system where inland fresh water and coastal sea water meet. The Bay itself is very shallow and for centuries has influenced the economy of Maryland. Gradually the health of this ecosystem has entered into a state of decline. It is no longer as rich in oysters and other fisheries as it used to be and the submerged aquatic vegetation which is so crucial to this ecologically productive area has begun to disappear. A number of human influences are responsible for the decline of the Chesapeake. Ultimately the issue becomes a question of an increasing population within the Bay's watershed. Neither the population nor the land on which development has occurred have been planned or managed properly. More and more of the rural land surrounding the Chesapeake has been paved over to accommodate an increasing influx of urban living.

The Chesapeake watershed, which ultimately empties into Chesapeake Bay in Maryland, extends some 64,000 square miles from southern New York and Pennsylvania through to Virginia (Figure 1) and houses 15 million people (Horton, 1991). Population rates within the watershed boundaries have increased dramatically since 1900 and are expected to continue well into the twenty first century (see Figure 2). The State of Maryland has increasingly become concerned with the decline of the Bay and has adopted a number of population and land use policies in attempts to not only halt the deterioration of the Bay but also to improve it from its existing condition. However, population issues affecting the Bay extend far beyond the political boundaries of the State of Maryland. Specifically, Maryland recently passed its *Economic Growth, Resource Protection and Planning Act* in efforts to address the source of the Bay's decline. Any efforts to improve the quality of the Bay must entail a cooperative effort not only between state and local governments but also between the governments of

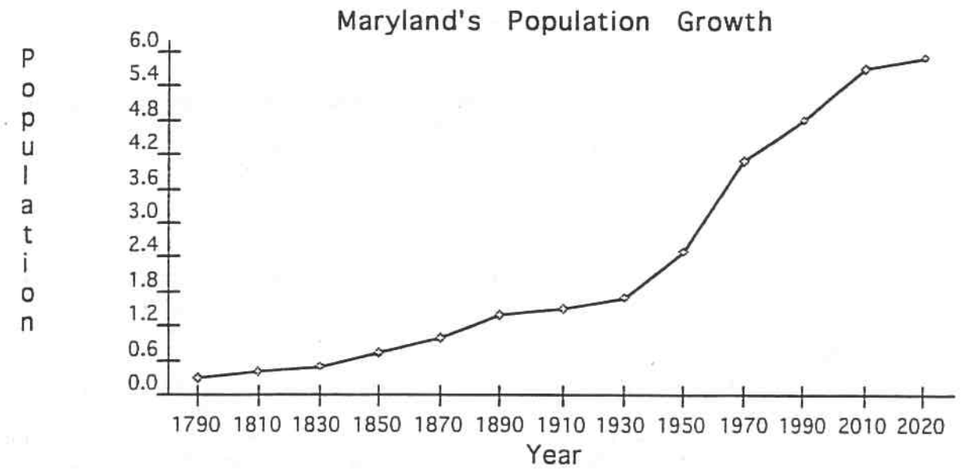
Figure 1



Home to over 13.6 million people, the Chesapeake Bay watershed extends 64,000 square miles, stretching from upstate New York to southern Virginia

Taken from: Maryland Department of the Environment, 1990.

Figure 2



those states within the Chesapeake watershed. An understanding of the effects of population on the Bay as well a coordinated watershed effort is required at all levels of government within the watershed boundary. While there are currently many programs in place which seek to improve the environmental quality of the Bay, Maryland's 1992 *Economic Growth, Resource Protection and Planning Act* is one of the first initiatives within the Chesapeake watershed to address the source of the Bay's decline as opposed to its symptoms.

Effects of Population Growth in Maryland

Concern for the health of the Bay has raised questions of growth management and how to minimize its effects on the Chesapeake. Immigration into urban areas is increasing, therefore requiring an expansion of available housing and services to accommodate these increasing numbers of people. Traditionally, an increase in urban infrastructure has ultimately meant that more and more land must be paved over to provide housing, roads, sewer systems and other services that the population has come to expect in urban areas. The loss of this open land is significant. First, an increase in paved surfaces ultimately results in greater amounts of water running off into surrounding water bodies at faster rates. Increased hazard planning and management are required to both monitor and manage higher water levels. Second, the loss of natural areas affects the natural filtration process by which water is slowed and filtered through vegetation and soils. This filtration process is key to water quality and with an increasing urban population, it is needed even more than before. A larger population means more waste, more urban effluent, more air pollution and a greater overall stress on the environment. Ultimately, the environment must be able to absorb more of everything.

Considerations of environmental health, water quality and the availability of open spaces raise quality of life issues. At what level does water quality affect the human quality of life? But there is also another, more social consideration of increasing populations and urban sprawl. The social atmosphere of many urban areas has deteriorated given increasing levels of crime, inner city poverty

and a general lack of any relationship to nature. In efforts to manage the physical, social and economic impacts of urban growth, planners have increasingly become concerned with creating a sense of place within the community. As Leffler reports, a sense of place means many things to a community:

> its essential spirit, or the quality of life there, or its livability, genius, flavour, feeling, ambiance, essence, resonance, presence, aura, harmony, grace, charm, or seemliness (Leffler, 1991).

To accommodate these concerns, planning decisions must now approach population growth and land use issues in a more holistic manner. Consideration must not only be given to the expansion of urban environments but also the natural and cultural uses of the countryside which should be protected.

Urban Development

In a five year period, from 1985-1990, the State of Maryland lost a total of 73,700 acres of agricultural land and 71,200 acres of forest land to development (Greer, 1991). This is a total of 144,900 acres of land that was developed in a short five year period. Of this total, 101,000 acres were developed for low density residential uses (Greer, 1991). Not only is this type of development highly consumptive in terms of land, it also increases the costs of infrastructure. Transit systems, roads, and utility pipelines must all travel farther to provide services to these newer areas. Fiscally and environmentally, this type of development spurred by escalating population rates, is wasteful. On average, the lot size for low density housing which occurred in the 1985-1990 time frame, was 0.5 to 5 acres (Greer, 1991). This type of development is reflective of the North American value system with respect to its land. However, the effects of a rapidly changing economy should not be discounted. Areas whose key economic basis was traditionally agriculture or fisheries are now having to turn to tourism or alternate uses of the land (such as land severances for development) due to either fierce competition in the agricultural business, over-exploitation of resources or decline of the environment on which these resources depend.

This is a dynamic time; many changes are occurring both locally and globally. It is also a time to re-evaluate attitudes and values and to consider how, in the midst of rapid economic change, to manage and plan for increasing growth and development.

Land Use & Development Controls:

Governments can achieve growth management through 4 types of controls: 1) regulatory controls; 2) public services; 3) revenue sources; and 4) direct and indirect expenditures (Stein, 1993). These controls are not mutually exclusive; they should be used in combination as part of a comprehensive planning program.

Regulatory Controls:

Regulatory controls include tools such as zoning by-laws and environmental regulations. Zoning can be used to regulate changes in population density through such means as downzoning or transfer of development rights. Environmental regulations (such as Maryland's Critical Area Program) provide criteria for designating protected lands as well as the degree of development permitted on those lands.

Public Services:

Public services (such as water and sewage connections) can be used to guide development through careful planning and through policies on availability of infrastructure to newer areas. However, the use of infrastructure is not an exclusive solution to growth management. For example, "in many Bayside counties [of Maryland] a five year sewer plan may be a better indication of where septic tanks are

failing, than of where growth is being guided" (Greer, 1991). Therefore, the establishment of public services is only one aspect of growth management.

Revenue Sources:

Expanding revenue sources of local governments can help regulate development by targeting particular types of development to generate revenue . For instance the introduction of impact fees, user fees or assessment fees will possibly influence a downsizing of development and increase consideration before development occurs. This however, may be a difficult program for municipalities to subscribe to in that local governments are often lured by the potential for increasing their tax base.

Indirect and Direct Expenditures:

Indirect and direct expenditures by government include such programs as land purchases and property tax incentives. Such programs require a vision, understanding and commitment to land and population management. This includes having a holistic approach to planning and an understanding of the function and value of limiting growth.

Monitoring:

The implementation of a growth strategy is simply not enough. Monitoring programs must be in place to ensure that policies and procedures are being followed. This is necessary for two reasons. First, developers and contractors must be monitored so that they do not cut corners and to ensure that they do in fact comply with legislation and policies. Second, Americans highly value the rights of the individual citizen. Therefore, it is sometimes difficult for American citizens to accept that the government is telling them what they can and can not build on their own personal property.

Education and Participation:

The key to compliance is understanding and education. Any top-down approach to policy will not be effective if it does not involve the public. It is critical that the public be part of the effort to address the various issues related to growth and development as well as understand why these measures are necessary. The State of Maryland provides a great deal of literature and references to involve the public in its various programs (Chesapeake Bay Critical Area Commission, 1984; Maryland Department of the Environment, 1990; Chesapeake Bay and Watershed Management Administration, 1993; Governors Office of Chesapeake Bay Public Information, 1984; Chesapeake Bay Population Growth and Development Commitment Team; 1988; Maryland Department of Natural Resources, 1992; Maryland Department of Natural Resources, 1991). However, participation in established programs should not be viewed as an alternative to participation in decision-making processes. Both activities are equally important.

Responses to Growth

In the past 10 to 20 years the effects of population and development on Chesapeake Bay have become evident . The health of the Bay is declining - so much so, that the State of Maryland has passed a number of new environmental policies within the past ten years. These efforts include: the 1983 Chesapeake Bay Agreement; the 1984 Critical Area Program; the 1989 Non-tidal Wetlands Program; the 1991 Forest Conservation Program; and most recently, Maryland's 1992 *Economic Growth, Resource Protection and Planning Act*. While each piece of legislation listed here is evidence of increasing environmental awareness, many of the solutions leading up to Maryland's growth legislation have been symptomatic in nature.

TABLE 1.0 Maryland: Land Use & Environmental Initiatives Since 1965

1965	State Department of Water Resources established
1969	Chesapeake Bay Interagency Planning Committee established
1977	Chesapeake Bay targeted for restoration and preservation
1983	Chesapeake Bay Agreement signed by the Governors of Maryland, Virginia, Pennsylvania, the District of Columbia, the Environmental Protection Agency and the Chesapeake Bay Commission
1984	Maryland Critical Area Program established
1987	Chesapeake Bay Agreement (1983) renewed and updated
1989	Maryland Non-tidal Wetland Protection Program established
1991	Maryland Forest Conservation Program established
1992	Maryland Economic Growth, Resource Protection, and Planning Policy established

Adapted from: Granata, 1993 & Greer, 1991.

Legislation & Land Use Solutions

In 1984, Maryland enacted the Chesapeake Bay Critical Area Act. The Act created a land and resource management program to mitigate the impact of non-point source pollution and loss of natural habitat (Critical Area Commission, 1984). The Critical Area outlined within the Act has been defined as, "...all lands within 1000 feet of the tidal waters' edge or from the landward edge of adjacent tidal wetlands and the lands under them." (Critical Area Commission, 1984). This area accounts for 10 per cent of Maryland's total land area and effectively establishes a natural vegetative buffer around the Bay and its tributaries. Further, the Act regulates land uses and future development within this buffer. These criteria are applicable to intensely developed areas (Figure 3), limited development areas (see Figure 4), and resource conservation areas (Figure 5). The process for the Critical Area Act is very regulatory in that it is founded on the use of regulatory permits and applications for development and land use designation. Essentially, Critical Areas are a first line of defense to improving the water quality of the Bay. However, the program still does not address the fundamental source of many of Maryland's environmental problems. That is, it does not address how to manage a rapidly expanding population. Although the Critical Area Act was followed by the Non-tidal Wetlands Protection Program in 1989 and the Forest Conservation Program in 1991, the 1992 *Economic Growth, Resource Protection and Planning Act* (herein referred to as the 'Planning Act') is the first piece of legislation which actually targets the source of Maryland's environmental issues; that is, it presents goals for accommodating population growth and development in a manner that will have the least effect on the environment.

Brief History of Planning in Maryland

Historically, planning issues have been the responsibility of each of Maryland's 60 individual jurisdictions. This power was given to local authorities when the Maryland State Planning Commission

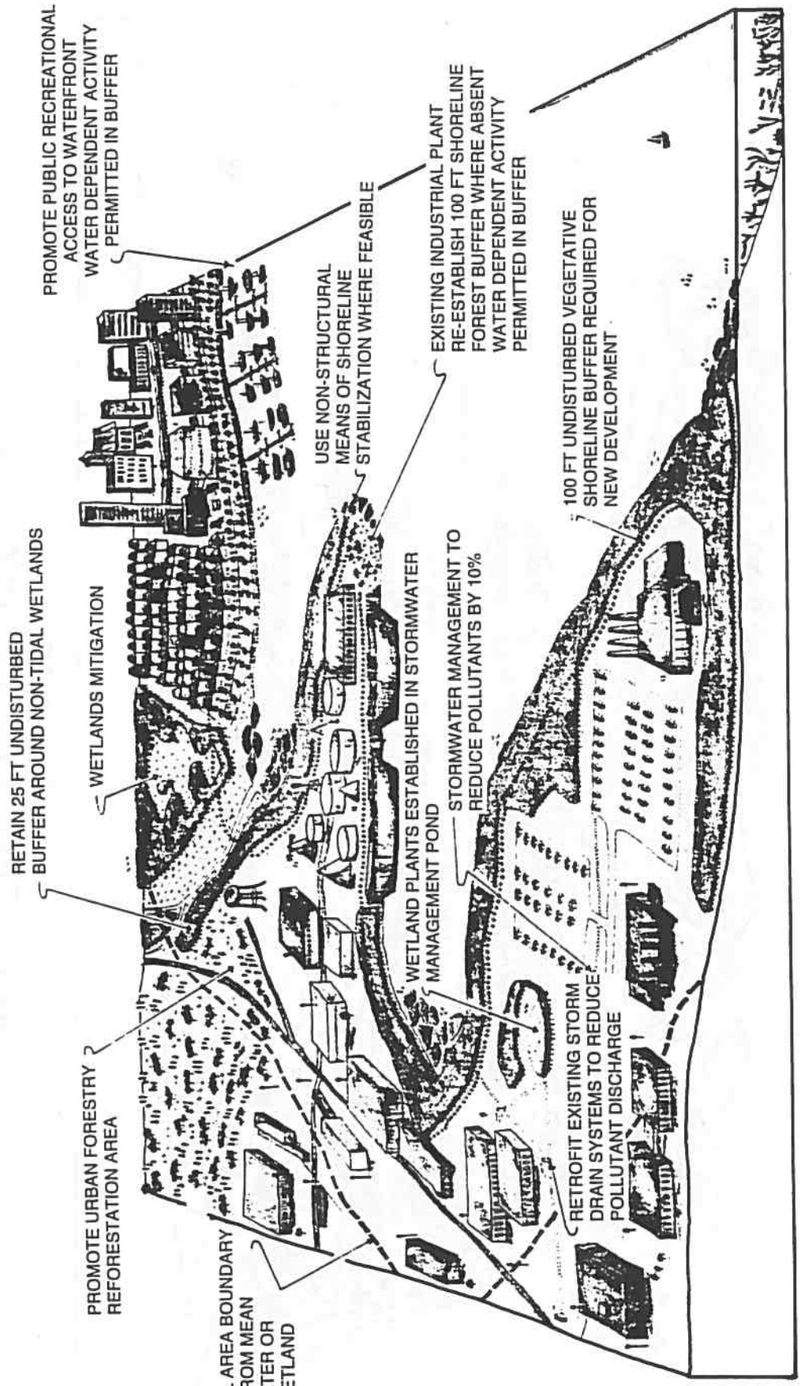
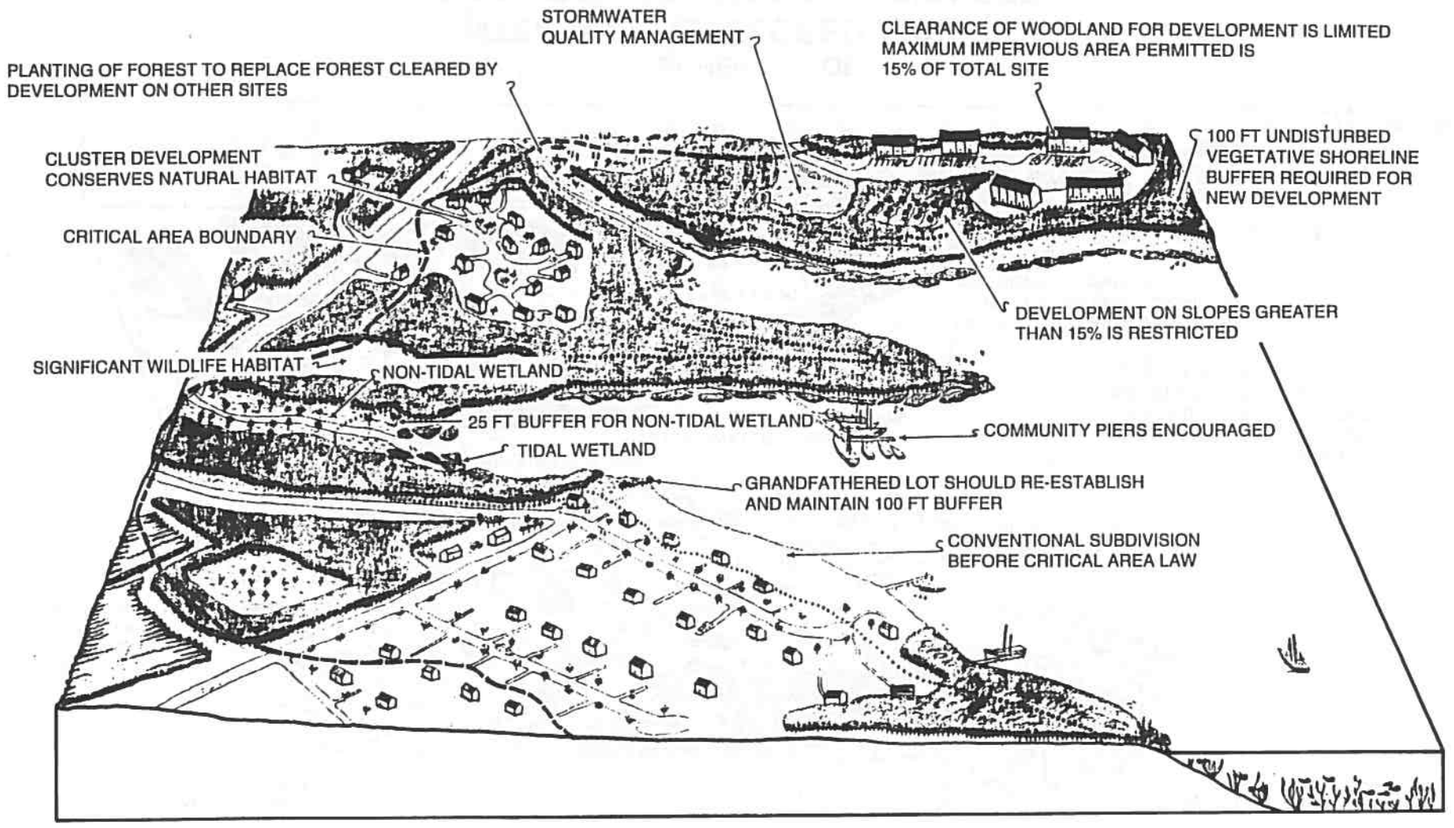


Figure 3

SCHEMATIC OF INTENSELY DEVELOPED AREA (IDA) RESIDENTIAL, COMMERCIAL, INDUSTRIAL & INSTITUTIONAL USES DOMINATE

Taken from: Chesapeake Bay Critical Area Program, 1984

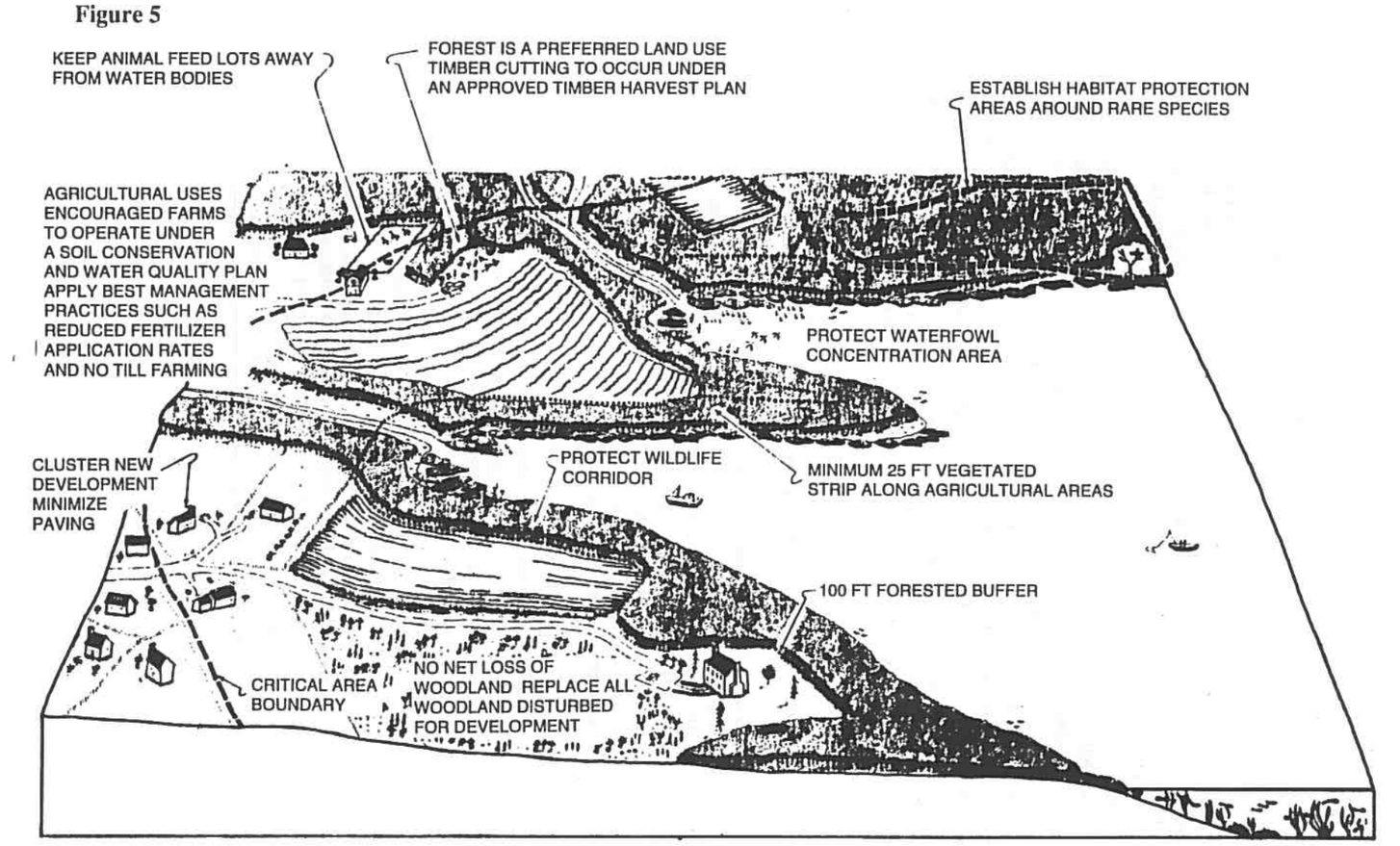
Figure 4



SCHEMATIC OF
LIMITED DEVELOPMENT AREA (LDA)
CONSERVING NATURAL & CULTURAL LANDSCAPE

Taken from: Chesapeake Bay Critical Area Program, 1984.

Figure 5



SCHEMATIC OF
RESOURCE CONSERVATION AREA (RCA)
NATURAL ENVIRONMENT PREDOMINATES

Taken from: Chesapeake Bay Critical Area Program, 1984.

was formed in 1933 (Brugger, 1988). The result has been ad hoc development and an overall uncoordinated effort to address planning and environmental issues alike. The 1992 State Planning Act will somewhat alter this process in that it presents these jurisdictions with a number of policies or targets to unify efforts and create state-wide standards. The State has given the jurisdictions until 1997 to formulate local plans for development. In Maryland, this has raised some questions as to whether it should be the State or the local jurisdiction that should have control over development procedures. Many local municipalities highly value their autonomy and are therefore not pleased with this legislation. In the U.S., growth legislation at the state level, is an up and coming trend; currently, however, only 11 states have any such legislation in place (See Table 2.0). Growth legislation is still pending in many other states (Stein, 1993).

The question of responsibilities for development rights then, is a fundamental one and is occurring throughout the United States. It appears that in a time of necessary growth planning, State policies will prevail. On the other hand, there are those members of the population who feel that the Maryland Planning Act is too vague to effect any change. It is important to realize that planning policies and procedures are dynamic. In fact, the initial bill for growth legislation (at the time referred to as the Maryland Growth and Chesapeake Bay Protection Act) failed in the Committee of the Maryland State Legislature in 1991. Failure of the initial bill has largely been attributed to its timing and the process through which it was presented. However, the State regrouped, addressed some of the key concerns expressed, and introduced the bill again in 1992 with better success. The State will undoubtedly modify and update its policies as development and growth patterns change over time.

TABLE 2.0 Growth Legislation In The United States

California:	Coastal Zone Conservation Act-1972
	Coastal Act of 1976
Florida:	Environmental Land and Water Management Act-1972
	State Comprehensive Plan-1985
	Local Government Comprehensive Planning and Land Development Regulation Act-1985
Georgia:	Coordinated Planning Legislation-1989
Hawaii:	Hawaiian Land Use Law-1961
	Hawaii State Plan-1978
Massachusetts:	Cape Cod Commission Act-1989
Maine:	Comprehensive Planning and Land Use Regulation Act-1988
Maryland:	Chesapeake Bay Critical Area Law-1984
New Jersey:	State Pinelands Protection Act-1979
	State Planning Act-1985
New York:	Adirondack Park Agency Act-1971
Oregon:	Land Conservation and Development Act-1973
Rhode Island:	Comprehensive Planning and Land Use Regulation Act-1988
Vermont:	Environment Control Act-1970
	Growth Management Act-1988
Washington:	Growth Management Act-1990

Taken from: Stein, 1993.

Maryland's Economic Growth, Resource Protection and Planning Policy

Maryland's Planning Policy encompasses 7 key initiatives to guide growth and development, encourage conservation of resources and foster an attitude of environmental stewardship towards the Bay. Explanation of these 7 initiatives has been summarized from a Maryland Office of Planning, 1993 document. The 7 initiatives are as follows:

1. *Development Shall be Concentrated in Suitable Areas*
Maryland will encourage new growth in existing communities or areas designated for growth through the investment and construction of water and sewage facilities, transportation infrastructure and community services. Specifically, the State supports compact, creative development that is consistent with the character of existing communities. Ideally, this development will be structured so as to minimize dependence on the automobile while expanding opportunities for alternate means of transportation such as public transit services, cycling or car pooling. Efficiency of these goals will be maximized by simplified permit procedures to allow for more timely processing and development decisions.

2. *Sensitive Areas Shall be Protected*
Designated sensitive areas within the State of Maryland will be protected from the impacts of development. Designated areas include steep slopes, habitat for endangered species, streams and their buffers, 100-year floodplains, prime and productive agricultural land, large forested tracts of land, fish spawning areas and historic properties. This can be achieved through the acquisition of parks, open space, and environmental easements as well as creating greenway linkages with a specific focus on a statewide system to link natural and urban environments. Providing adequate protection for sensitive areas also includes giving these lands consideration when designating growth areas and during the construction of new developments and facilities. It is critical that first priority be given to the identification, mapping and designation of sensitive areas to ensure future protection.

3. *In Rural Areas, Growth Shall Be Directed To Existing Population Centres and Resource Areas Shall Be Protected*
This policy, while related to the first one, recognizes the unique historical and cultural nature of rural communities in Maryland. Development for rural areas will be focused on existing communities in order to protect, retain, and conserve productive agricultural and forested land.. Therefore, cluster development (as opposed to strip commercial and residential development along State highways) in existing rural communities is encouraged so long as it is consistent with the scale and character of the community. Additionally, the State encourages the formulation of alternative modes of transportation, water supply and sewage treatment in order to preserve open areas and minimize reliance on the automobile.

4. *Stewardship of the Chesapeake Bay and the Land Shall Be a Universal Ethic*
Government programs and public education will address various issues fundamental to change: environmental degradation, inefficient use of land resources; individual lifestyle choices; and, the effects of sprawl development. Programs to achieve this include public outreach and participation programs as well as an expansion of educational programs at the elementary and secondary school levels. Specifically, a program is needed to inform citizens of the benefits of growth management.

5. *Conservation of Resources, Including a Reduction in Resource Consumption, Shall Be Practiced*
Conservation policies will be developed to enhance land development and land preservation policies. These policies will target such issues as water (both ground and surface water supplies), soil, air, energy, recycling, waste management, and low input or conservative agricultural practices. Equally important, policies must target the development of environmentally efficient communities by

encouraging rehabilitation and adaptive reuse of historic structures as well as alternative modes of transportation.

6. *To Encourage the First Five Policies, Economic Growth Shall Be Encouraged and Regulatory Mechanisms Shall Be Streamlined*

Regulations at the State and local level must be reviewed to assure that they support the economic development of planned growth areas while continuing to protect sensitive areas and landscapes within the State. Currently, there is a great deal of fragmentation of authority amongst State and local agencies. Interjurisdictional, multi-agency planning and permitting for development throughout the Chesapeake watershed is needed. Therefore, in the interest of efficiency, excess bureaucratic red tape must be eliminated to allow for better inter-agency coordination while at the same time retaining standards to ensure the health, safety and quality of life for the citizens of both Maryland and the watershed as a whole.

7. *Funding Mechanisms Shall Be Addressed to Achieve These Initiatives*

A number of economic programs at both the State and local level must be reviewed to allow for better implementation of these initiatives. First, economic incentives currently in place will be reviewed to encourage logical and efficient development programs. Second, agency funding programs must be analyzed to determine their impacts on growth and development. Third, priorities for the use of State dollars related to infrastructure and community services will give consideration to efficient development patterns.

These 7 initiatives then, will guide the implementation and strategies of Maryland's *Economic Growth, Resource Protection and Planning Act.*

Future Needs

The Maryland solution to growth management then, is a progressive one for the State. It represents a significant beginning to addressing the source of environmental decline within the Chesapeake Bay watershed.

The watershed concept which is just now being realized in public policy, is an important one and one which must be stressed at an inter-regional, inter-state level of government. Therefore, successful planning, while rapidly changing in the United States must involve a multi-disciplinary, multi-agency approach to address issues of quality of life and preservation of cultural and natural systems . It must be dynamic and flexible to accommodate the changes occurring in the rate and distribution of population growth as well as the sweeping changes to national and global economies. Planning then, in this newer, more holistic approach has become a basic means of growth and environmental management.

If Maryland is to adopt this approach to management and if the health of Chesapeake Bay is to be improved, the State of Maryland as well as other state governments within the watershed must recognize a number of concepts.

First, governments and citizens alike must recognize that natural environments or ecosystems do not adhere to political boundaries; nor do the by-products of human activities adhere to these boundaries. Therefore, government agencies must acknowledge and respond to growth and environment issues according to watershed or ecosystem planning mechanisms and discussion. Only a coordinated effort will truly effect any change to current trends and environmental conditions.

Second, these governments must also recognize the value of citizen participation and education. If a public is not educated, it can not participate in and make informed decisions. Each individual has a vested interest in the health of Chesapeake Bay. The State of Maryland does provide informative literature through its government agencies and should continue to do so. Maryland also has a number of project and programs through which citizens may participate to help improve the water quality and land use issues within the Bay watershed. However, citizens must also be encouraged to participate in the decision-making processes that affect the Bay. Within the State of Maryland, there is room to improve the effectiveness and democratic process of public involvement in decision-making processes.

Third, changes in the individual lifestyles of Maryland and other watershed residents are needed. It must be realized that individual changes or choices will make a difference. This includes such issues as a re-evaluation of basic values and attitudes, transportation issues and overall actions to encourage natural and cultural preservation of environments and people. The Bay will only provide for and support the people of the watershed as well as it is in turn, cared for by the population that depends on it. It is important then, that governments encourage the transition to growth and environmental management and planning by designating growth areas for development; identifying areas that are environmentally sensitive, unique, culturally or historically significant or critical to the natural functioning of the Bay's environment; and planning for, as well as providing, infrastructure to accommodate these changes. For example, the State of Maryland should stress the importance of establishing a network of linear green corridors throughout the state to allow for movement of wildlife, to connect urban and rural areas, and to provide an alternate means of transportation. However, before the state can plan for smaller cluster areas of growth or environmentally sensitive areas, it must take inventory of Maryland's resources and know where these landscape and cultural features are. Therefore, it is of the upmost priority that the State of Maryland undertake exercises to map and identify different landscapes before proceeding with strategies for growth management. Still, the Maryland's *Economic Growth, Resource Protection and Planning Act* is an excellent base on which to build and incorporate population and environmental policies.

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Land Trusts: Applications in Maryland and Ontario

Jennifer Gard

THE LAND TRUST

Introduction

Land is a most precious resource. Open space is valued for its obvious benefits, as scenery, and for recreation. However, open space also has an important ecological role as a site for the absorption of precipitation, groundwater recharge, wildlife habitat, and agricultural production. Development, however, limits the ecological potential of open space. Land development is permanent: land which has been developed can rarely be returned to its natural level of productivity.

Traditional urban developments, particularly residential areas constructed at a low density, are the primary threat to open space. Current planning practices, which permit, and sometimes encourage such low density development, do not effectively protect open space on the urban fringe. In Canada and the United States, many state and provincial governments are devising planning policies which encourage the development of higher density housing on new sites, and promote the intensification of existing communities.

The Commission on Planning and Development Reform in Ontario (Sewell Commission) has formulated some broad goals for the future of land use planning in the province. The Commission is promoting a more sustainable approach to providing housing, which includes a decreased reliance on the automobile and traditional subdivision models. At the local level in Ontario, the Regional Municipality of Niagara has established land use policies which address three key areas: the development of mixed use and compact urban form within current urban boundaries; the expanded use of existing infrastructure; and the preservation of agricultural lands including "good tender fruitlands", "good grape lands", and "good general agricultural lands".

The general public has lately become more conscious of the environment, and the manner in which we use land. However, the public's concern about the preservation of valued natural habitats and open space has not necessarily translated into the tax dollars needed for government to acquire threatened lands. In addition to the initial capital costs associated with land acquisition, land stewardship by government organizations also involves significant, ongoing management costs. Citizens can not afford to purchase all the land which merits protection, and consequently a very small percentage is actually protected.

It is not probable, or feasible, to expect a provincial or state government to protect all valuable lands through acquisition. Priority spending, that is, directing scarce resources to those sites most deserving of conservation also is often not a comprehensive enough solution. In combination with more sustainable planning practices, innovative options for land preservation must be explored. Land Trusts are an option.

Land Trusts are usually non-governmental organizations which have a mandate to protect environments which are valued for significant cultural or natural features. There are many preservation methods employed by the Land Trust organizations. The organization may: purchase land; accept donations of land; acquire easements; purchase development rights; purchase and lease the land back to the original owner; lease property; negotiate management agreements; offer positive incentive schemes; dispose of lands to a suitable management agency; acquire and resell land with

restrictions; participate in limited development projects; work co-operatively with landowners; provide environmental education programs; and lobby for protection priorities.[1]

There are several different models on which most Land Trusts are based; the two most notable are the Land Trust model and the National Trust model.

Models For Land Trusts

In 1891, Massachusetts resident Charles Eliot, feeling that the predominantly urban population was being deprived of the "beautiful natural scenery" of the countryside, founded an organization called the Trustees for Public Reservations. Eliot's goal was to provide passive rural recreation to the citizens. For this purpose, Eliot's Land Trust was given the power to hold lands free from taxes.[2] The Land Trust model is now commonly practiced in the United States, with 550 Land Trusts across the nation. The State of Connecticut alone has established 97 Land Trusts.

Land Trusts are generally managed by non-governmental organizations at the community or State level. The community-level organization allows for good connections with local government agencies. A grassroots approach is adopted by involving a large, highly involved membership in small projects which have a local focus. Dispersed in local trusts, many volunteers conduct projects in response to local threats and opportunities. Land Trusts commonly employ easements, donations and other innovative techniques in their land preservation efforts; direct acquisition is not as common.

In addition to the many Land Trust organizations in the United States, the Land Trust model has been duplicated throughout the world. In Britain there are 48 regionally-based Nature Conservation or Wildlife Trusts. In Canada, the Ruiter Valley and Brome Lake Land Trusts of Quebec correspond closely to the Land Trust model.

The other important trust model, the National Trust model, was developed in Great Britain's Lake District. The National Trust for Places of Historic Interest or Natural Beauty was established in 1894. In 1907, the British parliament ratified the Natural Trust Act which granted the Trust the power to designate exceptional properties as inalienable, meaning that they can never be sold, mortgaged or expropriated.[3] In Great Britain, trusts based on the National Trust model include the National Trust, the National Trust for Scotland, and the Woodland Trust. Landowner grants, agreements and easements are available through the National Trust .

Trusts based on the National Trust model are national in scope, and generally involve non-governmental organizations. The trusts execute their mandate to protect major projects of cultural or natural significance through a centralized power structure, which is well connected to senior governments: while most trusts which follow this model have a large membership, most members are not involved in the primary operations of the trust. The acquisition, and the subsequent management, of major projects is the most common preservation technique employed by organizations built on the National Trust model.

The model has been developed in many other areas of the world including Australia, New Zealand, Bermuda and the United States. The American National Trust for Historic Preservation, the Nature Conservancy, and the National Audubon Society are all applications of this model.

1 Ron Reid, *Bringing Trust to Ontario: A Study on the Role of Nature Trusts.* Washago: Bobolink Enterprises. 1988.

2 Virgil Martin, *The Prospects for a Natural Heritage Trust in the Grand River Watershed.* Waterloo: Heritage Resources Centre, University of Waterloo. 1991.

3 Ibid.

Land Trusts In Canada

Several trusts have been established in Canada. Most of these trusts have their primary focus on land acquisition. The Nature Trust of British Columbia was established in 1971 with a $4.5 million endowment from the Government of Canada. The organization has a mandate to conserve areas of ecological significance: as of 1988, 17,000 acres of natural areas had been purchased and managed by the Trust.

The Manitoba and Saskatchewan Habitat Trusts have both purchased valuable ecological zones. The Saskatchewan Habitat Trust was established in 1978, and charged with a mandate to purchase and manage critical wildlife habitat. As of 1988, the Trust had brought 23,000 acres under protection. The Manitoba Habitat Trust was founded in 1982, partly as a response to an donation of land. The Trust aims to encourage the protection of wildlife habitat through purchases, and leases. With the co-operation of landowners they are also drafting landowner agreements for the further protection of wildlife habitat.

The Prince Edward Island Nature Trust was established in 1979 to oversee a program of natural habitat protection. The organization is funded by provincial grants. Since 90% of the land in P.E.I. is privately owned, the Trust established a formal system of priorities, and makes contact with landowners in order to negotiate preservation agreements.

The Ruiter Valley Land Trust and The Brome Lake Land Foundation of Quebec are two newer trusts which follow the American Land Trust model which has been implemented in several neighbouring states, notably Vermont. While the Ruiter Valley Land Trust's initial projects have mostly consisted of land acquisition through donation, and purchase, within the Trust's structure there exists a future potential for the establishment of conservation easements.[1]

MARYLAND

Introduction

Maryland, being in the census-defined "megalopolis", is one of the fastest growing jurisdictions in the United States. In the past 30 years the state's population has increased by approximately 2 million people. During the same time frame, Maryland's farmlands have declined by more than 1.5 million acres. The equivalent of on 3/4 of an acre of farmland has been lost for each person added, and if this trend were to continue, all of Maryland's farmlands would be exhausted within 60 years.[2]

The state has also lost hundreds of thousand of acres of forestland, wetlands and numerous unique and natural and scenic areas to urban development during the past 30 years. New residential developments, many of them in forested and agricultural areas along the Chesapeake Bay and its tributaries, consume thousands of acres of land each year. From 1985 to 1990, Maryland lost a total of 73,700 acres of agricultural land and 71,200 acres of forest land, much of it in Central Maryland. The greatest growth during the period occurred in historically rural counties: Calvert County grew by 63%; Charles County saw a 39% increase; Washington County grew by 38%. [3]

Approximately 70% (101,000 acres) of the lands developed in Maryland were developed for "low density" residential use. The extent to which low density residential construction contributed to this decline can be illustrated: by 1985 16% of Maryland's residential units were occupying 67% of the

1 Ron Reid, *Bringing Trust to Ontario: A Study on the Role of Nature Trusts.* Washago: Bobolink Enterprises. 1988.

2 Maryland Environmental Trust, *To Preserve a Heritage: Conservation Easements.* Annapolis: Maryland Environmental Trust. 1992.

3 Ibid.

state's agricultural land, and 43% of residential development which occurred in the 1970's was on land designated for rural, agricultural, conservation, or open space uses.[1]

Maryland Environmental Trust

The Maryland Environmental Trust, created in 1967 by the Maryland General Assembly, has a mandate to "improve and perpetuate the state's natural environment". The Trust oversees the operation of two important preservation programs: The Keep Maryland Beautiful Program, and The Conservation Easement Program. The Keep Maryland Beautiful Program has a mandate to encourage the beautification of the state through anti-litter projects, environmental education, and highway and community improvements.[2]

The primary public purpose of the Conservation Easement Program is to "protect scenic open areas, including farms and forest land, wildlife habitat, waterfront, unique or rare and historic sites". Conservation easements, which are "legal agreements between a property owner and a conservation organization that protects the conservation value of the parcel by limiting the uses and changes an owner may make"[3], are acquired through landowner donation. To be eligible for an easement the candidate properties must possess one of the following valued land uses: cropland, pastureland, woodland, undisturbed open space, ecologically significant areas, scenic landscapes or features, historic sites or districts, or other significant or unique features. There is not a legal minimum property size; although, at least 20 acres of waterfront or 50 acres inland are preferred. Typically, the application is ratified within 3 to 6 months of application.[4]

The terms of the easements specify certain restrictions on the use of the land including: industrial or commercial uses, residential developments, display of billboards, dumping of trash and waste, excavation, dredging, mining, and removal of natural vegetation. Current land use practices including farming, and forestry are permitted and the enhancement of wildlife habitat is encouraged. Landowners retain the right to construct an additional residence on the property, and establish a vegetative buffer along rivers or waterways. Periodic inspections of the property are required under the easement agreement. In this program the easement is purchased on a perpetual term, meaning that the restrictions on land use are permanently registered on the deed, and are applicable to subsequent landowners.

The purchase price of the easement is determined by finding the difference between the fair market value and agricultural value. Tax benefits can be incurred through the donation of an easement to the Maryland Environmental Trust. The value of the easement can be applied to reduce, by 30%, the donor's federal taxable income. This tax deduction can be applied each year until the value of the easement is exhausted, to a maximum of 6 years; during this time, state income taxes are reduced by a comparable amount.

For estate taxes there are also benefits associated with the establishment of easements: the value of an estate on which an easement has been established is reduced to reflect the restricted-use value. The amount of tax, consisting of an estate tax and an inheritance tax, due upon the death of the donor is calculated based on the reduced value. A 100% state and local property tax credit for a period of 15 years is issued to the donor of a conservation easement on unimproved property. Subsequently, the property is reassessed for tax purposes, taking into account the restrictions required by the easement.

To date, the Maryland Environmental Trust has obtained voluntary conservation easements on over 39,000 acres of critical open space. The state's most valued resource, the Chesapeake Bay, has also benefited directly from this program; the Trust has protected 90 miles of shoreline on the Chesapeake Bay and its tributaries. This protection is critical to the Bay which has continues to suffer from high

1 Ibid.
2 Maryland Environmental Trust, *To Preserve a Heritage: Conservation Easements.* Annapolis: Maryland Environmental Trust. 1992.
3 Ibid.
4 Ibid.

sediment loading and habitat loss. By preserving natural areas, the Bay is protected from sediment and waste-contaminated run off which typically results from urban development.

Maryland Agricultural Land Preservation Foundation

The Maryland Agricultural Land Preservation Foundation is an office of the Maryland Department of Agriculture. The Foundation has a mandate to ensure that Maryland's farmland is protected and conserved, and to ensure that local agricultural operations continue to produce goods for the citizens of Maryland, as part of a viable agricultural sector. As a component of its mandate the Foundation established the Maryland Agricultural Land Preservation Program. Through this program the Foundation oversees the establishment of agricultural preservation districts, and the purchase of development rights easements.

Agricultural preservation districts are established when one or more landowners, with at least 100 acres of contiguous agricultural land, present an application to the Foundation. The Foundation assesses the eligibility of the area by examining factors, including soil quality. Foundation standards dictate that the soils in the district must be at least 50% prime agricultural land. The preservation district application must be ratified by the local governing body following which, the district easement is filed in the county land records. The conditions placed on the easement require that the landowner(s) voluntarily agree not to allow development on their farms for a period of at least 5 years following the signing of the easement agreement.

To be eligible for the sale of development rights easements the property must be in an agricultural preservation district and the applicant must have formulated a soil and water conservation plan. A local governing body must approve the application for the easement. Applications for development rights easements are accepted on properties greater than 100 acres; although, special consideration is given to lands adjacent to an existing district or easement. Typically, applications are processed within 24 to 30 months.

The following conditions apply to districts under easements: no development or subdivision for residential, commercial or industrial use, and prohibition of the display of most signs or billboards, and dumping trash on the property. A soil and water conservation plan must be implemented on the property. Finally, periodic inspections of the exterior property may be conducted by the Foundation to ensure compliance with the easement regulations.[1]

The development rights easements are purchased by the Foundation for a perpetual term; although, after 25 years, the law allows the landowner the option to buy back the easement, provided that it has been determined by the Foundation and local governing bodies that farming is no longer a viable enterprise in the region. The easement value is determined by the difference between the open market price for the unrestricted land, and the open market price for the land with the easement conditions applied. The average price paid to applicants for their easements is $816 per acre; although, the prices have ranged from $70 to $3,500 an acre. The landowner's revenue from the sale of easements on their property is taxable as income.[2]

Since the program's inception, 619 easements have been purchased, protecting 91,000 acres of Maryland farmland from development. In 1990 alone, there were 401 applications. 88 easements were purchased totalling 23,000 acres.[3] Recently the future of the Maryland Land Preservation Program has been put in jeopardy by state budget cuts despite the fact that the program is enthusiastically supported by Maryland's farmers.

1 Maryland Agricultural Land Preservation Foundation, *Comparative Description.* 1992.
2 Maryland Agricultural Land Preservation Foundation, *Comparative Description.* 1992.
3 Restoring the Chesapeake, *Maryland Resorting the Chesapeake.* Annapolis: Office of the Governor. 1991.

ONTARIO

Introduction

Ontario, like Maryland, has experienced phenomenal growth over the past 30 years. The province's population is currently 9 million, and is expected to grow to 10.5 million by the year 2000. Demographic profiles indicate that, as the Baby Boomers age, the population will be urban-centred, older and increasingly affluent. Another trend which is expected to continue is the declining household size; Statistics Canada estimates that the number of households in the province will increase at a rate three times higher than that of the population. Consequently, the market for housing is expected to escalate.[1]

Much of this anticipated growth is expected to occur in the Golden Horseshoe, a region which encompasses much of the Greater Toronto Area, and the Regional Municipalities of Hamilton-Wentworth and Niagara. It is anticipated that some natural ecosystems on the boundaries of the Golden Horseshoe will be threatened as urban growth expands into the prime farmlands and natural areas which lie along the urban fringe.

Niagara is currently feeling the effects of this type of urban growth. Along with the typical development of subdivisions on the urban fringe, hobby farms and estate housing sites are being developed. Indeed, the Ministry of Transportation, after identifying the region as a "high growth area" for the next 30 years, is considering a comprehensive transportation plan for the region. Elements of the plan include a proposal to expand the Queen Elizabeth Way, the major provincial transportation link in the area, in order to increase access to the United States. The increasing growth pressures in the area are viewed, by many, as a threat to the Niagara Fruit Belt.

Farmers in the Niagara region are under intense economic pressure to sell their scenic orchards. Many farmers opt to sell their land to developers because they can realize substantial profits; many active tender fruit farmers are facing difficult economic times. As these development pressures continue to escalate, they have put the future of the Niagara Fruit Belt in peril.[2]

The Niagara region is uniquely suited to the growth of tender fruit crops including peaches, cherries pears, apricots, plums, as well as grapes. Through Niagara's moderated winters and late springs, in the well-drained, light-textured soil, 90% of Ontario's and 70% of Canada's peaches are grown.[3]

Ontario Ministry Of Agriculture And Food Initiatives

The Ontario Ministry of Agriculture and Food has a mandate to execute policies which ensure the preservation of significant agricultural lands. In December, 1979 the ministry released a cabinet approved policy entitled *Food Land Guidelines.*

Under these Guidelines, the ministry established several key policies. A definition for provincial high priority agricultural lands was developed; it included speciality crop lands, lands where soil classes 1, 2, 3 and 4 predominate, and additional areas of ongoing viable agriculture. A mechanism for the establishment of agricultural designations in municipal official plans was developed; provincially significant agricultural areas, under this designation would be limited to agriculture and related, compatible land uses. In addition, a policy which regulated the redesignation of priority agricultural lands to non-farm uses was formulated; only in cases where the circumstances justified the redesignation

1 Ron Reid, *Bringing Trust to Ontario: A Study on the Role of Nature Trusts.* Washago: Bobolink Enterprises. 1988.

2 Minister of Agriculture and Food Conservation Easement Committee, *Agricultural Easements and the Niagara Fruit Belt: Sustaining a Unique Resource.* Toronto: Queen's Printer for Ontario. 1993.

3 Minister of Agriculture and Food Conservation Easement Committee, *Agricultural Easements and the Niagara Fruit Belt: Sustaining a Unique Resource.* Toronto: Queen's Printer for Ontario. 1993.

of land, in terms of necessity, consideration given to alternate locations, or the amount of land required, would redesignation be permitted.[1]

These important policies continue to be the basis on which the ministry makes land use decisions. The ministry's latest discussion papers reinforce the principles of the *Food Land Guidelines* by recommending that: the conversion of agricultural land to other uses be more closely monitored; severance policies again be reviewed; and that incompatible land uses continue to be discouraged or disallowed on agricultural lands.

The Ontario Ministry of Agriculture and Food has recently investigated several new programs to protect Class 1, 2, 3, and 4 soils, provincially significant agricultural lands, as well as specialty crop area such as the Niagara tender fruitlands. A variety of farmland preservation initiatives is being considered for inclusion in a new Agricultural Land Protection Program for Ontario, currently being formulated. Programs in Canada and in the United States are being researched, and their suitability for Ontario's circumstances is being determined.

A special approach for the preservation of Ontario's valued tender fruitlands, the agricultural easement, has been identified and investigated. The Minister of Agriculture and Food, the Honourable Elmer Buchanan, commissioned a Conservation Easements Committee to investigate this approach. Members of the Committee included Niagara farm organizations, the Preservation of Agricultural Lands Society, and Provincial and Regional Governments. The Conservation Easements Committee completed a report which examines the potential for an easement program in the Regional Municipality of Niagara, and determines a framework for the implementation of this program.

Proposed Niagara Trust

The proposed Niagara Trust will help to protect the unique and irreplaceable tender fruitlands of Niagara. Initially, the Program will be administered by the Niagara Agricultural Easement Committee as part of the Ontario Heritage Foundation as changes to the Ontario Heritage Act are enacted. Through a program entitled the Niagara Agricultural Easement Program the Trust will purchase conservation easements on properties with active commercial peach, apricot, cherry, pear, or plum producing orchards. In addition to the administration of the Program, the Trust will seek private donations to the Program Fund. Initially, primary funding for the Niagara Agricultural Easement Program will be allocated by the Provincial Government and the Regional Municipality of Niagara, at an annual rate of $3.75 million and $250,000 respectively.[2]

Farms eligible for an easement will be required to consist of at least 5 acres of active tender fruit producing orchards. Candidate farm operations must have a gross farm revenue greater than $15,000 per year, and must have been in active tender fruit production for at least the preceding three years. Lands designated under the Regional Policy Plan as "good tender fruitlands", along with adjacent lands in tender fruit production will be eligible; although, the applications may be prioritized by the Trust during the allocation of the easements.[3]

The easements proposed for the Niagara Trust will carry conditions: only agricultural uses and agricultural related uses, such as value-added processing activities or on-site fruitstands, would be permitted on the land. The land uses would be required to be in accordance with municipal, regional, and provincial policies and plans. No severances would be permitted except in the cases of minor boundary adjustments and farm amalgamations. Above all, the activities permitted on easement sites must result in minimal effects on the quality and quantity of soil.

The price for the easement will be set at a rate which reflects the quality of the lands being preserved. The average compensation rate is expected to be $10,000 per acre, although the rates may

1 Ministry of Municipal Affairs, *Guideline Directory.* Toronto: Queen's Printer for Ontario. 1993.

2 Minister of Agriculture and Food Conservation Easement Committee, *Agricultural Easements and the Niagara Fruit Belt: Sustaining a Unique Resource.* Toronto: Queen's Printer for Ontario. 1992.

3 Minister of Agriculture and Food Conservation Easement Committee, *Agricultural Easements and the Niagara Fruit Belt: Sustaining a Unique Resource.* Toronto: Queen's Printer for Ontario. 1992.

range between $8,000 and $12,000 per acre based on soil quality. The easement value will be determined by applying the rate of compensation to the farm acreage, less one acre for the farm residence.

While the program has not yet been ratified by the Minister of Agriculture and Food, there appears to be widespread support among local farmers. The program has been endorsed by all of the local major farm organizations including: the Niagara North Federation of Agriculture, The Niagara South Federation of Agriculture, and the Ontario Tender Fruit Producers' Marketing Board.

CONCLUSIONS

Findings

The examples of the Maryland Environmental Trust and the Maryland Land Preservation Foundation present useful models for the development of Land Trusts in Ontario. Based on these examples, and literature on this topic, the following advantages were identified: the protection is permanent; trusts are supported by farm communities; land is priced closer to its agricultural value; cash easements provide direct compensation to the farmer; the program costs, including management, are less than those associated with acquisition; fewer social disruptions occur because landowners remain residents; and easements are flexible and can be tailored to specific circumstances.[1]

The following disadvantages were identified: coverage may or may not be comprehensive; complementary measures are needed to preserve farmland; farmers receive only a one-time cash benefit; and landowners may be apprehensive about this new concept.[2]

Options and Alternatives for Ontario

Land Trusts and conservation easements may not be the solution to Ontario's problem of diminishing natural and open spaces; however they could be more cost effective and comprehensive than our current policies of selected acquisition.

Diminishing tax dollars for conservation have created an increasing impetus for government to enter into partnerships with private landowners in devising a land conservation strategy. Exploring options for tax incentives rather than cash payments may be more appealing for some donors; property tax exemptions, income tax reductions or estate tax credits could be employed. An option which could reduce the costs of creating Land Trusts would be to allow private citizens to form local Land Trusts: these grassroots organizations could be funded entirely through donations, or through a combination of private sector funds and government grants. The local Land Trusts could take actions in response to specific circumstances in their communities.

Candidate Selection

Many of Ontario's natural areas are owned privately; many of these sites contain significant open space or natural features. While the Niagara tender fruitlands are the logical top priority for such a program, a comprehensive system of Land Trusts, with the mandate to obtain conservation easements, could be an option for natural and open space preservation throughout the province.

Establishing a Land Trust is both an important and costly venture; consequently comprehensive cost-benefit analysis studies should be undertaken prior to adopting a province-wide Land Trust program. An evaluation framework should be designed in order to evaluate the significance of natural or open space features, as well as the threat to these candidate features. This analysis framework would

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1 Ron Reid, *Bringing Trust to Ontario: A Study on the Role of Nature Trusts.* Washago: Bobolink Enterprises. 1988.

2 Ibid.

facilitate comparisons among competing candidate trust proposals; for instance, the financing of the trust proposals through means other than government grants would clearly be an advantage for the candidate proposal.

In the future Land Trusts may be established for some of the province's most significant features: for Heritage Rivers such as the Grand River which passes through the Regional Municipality of Waterloo; for economically important farmlands such as the Holland Marsh; for significant landforms such as the Niagara Escarpment; for valued wildlife habitats such as provincially significant wetlands; or simply for undeveloped urban land such as the Rouge River Valley area in Scarborough.

An imaginative Land Trust agreement is a very powerful tool, suitable to be employed in a variety of circumstances; however the easement should not be considered in isolation. The implementation of such an agreement will not supplant the need for governments to devise other, supportive conservation programs and policies.

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Conservation and Management of the Critical Area in the Chesapeake Bay Watershed

Ann Kjerulf

Introduction

The Chesapeake Bay is one of the world's largest and most productive estuaries. Its watershed encompasses approximately 64,000 square miles of land, feeding the Bay with freshwater from six states--New York, Pennsylvania, West Virginia, Delaware, Maryland, and Virginia--and the District of Columbia. The estuary and its wetlands are important ecologically as the home for waterfowl and hundreds of different species of plants and animals. The Bay is a vital commercial resource--"the fish and shellfish industry, for example, is worth more than $850 million each year" (U.S. Fish and Wildlife Service, 1992). The Bay also provides a source of recreation for the people of Maryland and for visitors.

The Chesapeake Bay serves many purposes. However, its ability to function properly is continually being threatened by human activity. Nutrients, sediment, and toxins from point and non-point sources are the major factors contributing to the widespread degradation of the Chesapeake Bay. As the population in the Bay's watershed increases and development continues, the estuarine system is placed under even greater stress. Effective management of a growing population and controlled development in the Chesapeake Bay's watershed are the key to preserving the estuary. Maryland's Critical Area Law is one management tool that has been developed to restore the Chesapeake Bay.

The Chesapeake Bay Program

A decline in the Bay's underwater grasses, fish stocks, and oyster population was first noticed in the early 1970's. It then became clear that the Chesapeake Bay was in serious trouble. The Chesapeake Bay Program was created by Congress in 1975 to deal with environmental issues which were not adequately addressed under previous legislation (Imperial, et. al., 1992). From 1976 until 1983, a $25 million study was conducted by the Environmental Protection Agency to analyze deterioration in the Bay. The EPA found that population growth, increasing urbanization, intensified agricultural activity, and the loss of wetlands were contributing to a decline in living resources and submerged aquatic vegetation, increased nutrient loading, and higher levels of toxins entering the Bay (Imperial, et al., 1992). In 1983, the Environmental Protection Agency published a report that documented this deterioration. The report generated enough concern that the governors of Maryland, Virginia, and Pennsylvania established the Chesapeake Bay Agreement (Rome, 1991).

Maryland's Critical Area Law:

In 1984, the state of Maryland passed the Chesapeake Bay Critical Area Law in order to establish a resource protection program for the Bay and its tributaries. The law states that:

> "the state has a critical and substantial interest in fostering more sensitive development activity along the Chesapeake Bay shoreline so as to minimize damage to water quality and natural habitats" (Godschalk, 1987, p. 18).

The purpose of establishing the law was to ensure that untouched natural areas would be protected and that natural areas that had been degraded by development would be allowed to regenerate.

The area affected by the Critical Area Law is the Chesapeake Bay Critical Area, defined as:

> "the water of the Bay and its tributaries, the land under these waters, and all that is within 1000 feet of mean high tide" (Rome, 1991, p. 200).

The sixty jurisdictions (16 countries and 44 municipalities) within the critical area were responsible for developing their own resource protection programs according to the procedure specified in the Critical Area Law under the guidance of the Chesapeake Bay Commission. The commission was established to strive for three goals: the minimization of non-point source pollution; the conservation of natural habitat, and the establishment of land use development policies within the Critical Area to accommodate a growing population and manage the human activities which have adverse ecological impacts upon the Chesapeake Bay.

Development in the Critical Area:

According to the Critical Area Law, land within a Critical Area would be classified according to the intensity of existing development. There are three classes of land. First are Intensely Developed Areas (IDAs) with very little natural habitat. Most new growth should occur in IDAs or outside the Critical Area. Guidelines for development include improving water quality, conserving natural habitat areas, and addressing stormwater and water quality problems. New development or redevelopment projects are required to incorporate methods of preserving natural habitat and reducing pollution–this includes a 10 percent reduction in stormwater pollutant loading in order to improve water quality. The guidelines also encourage the use of permeable surfaces to reduce the amount of surface water runoff and cluster development as opposed to urban sprawl.

Limited Development Areas (LDAs) are areas of low to moderate intensity land uses where housing densities range from one dwelling unit per five acres up to four units per acre, and those areas which are not dominated by agriculture, wetlands, forests, surface water, or open space, or have sections with less than twenty acres of intense development (Godschalk, 1987). The guidelines for LDAs specify that development should not change the established density and dominant land use and must improve the quality of water and conserve natural habitat (Godschalk, 1987). Wildlife corridors must be established in LDAs to preserve wildlife habitat and vegetation. The amount of forested land in LDAs must be maintained or increased. In order to prevent soil erosion and an increase in surface water runoff, development is not allowed on slopes with a gradient of 15 percent or greater (Chesapeake Bay Critical Area Commission, 1992).

Resource Conservation Areas (RCAs) are areas which are dominated by natural environments or those areas which are utilized for agriculture, forestry, or fisheries activities. RCAs have a density of less than one unit for every five acres, or are dominated by agriculture, wetlands, forests, surface water, or open space. Within RCAs, development can not exceed a density of one unit for every twenty acres (Godschalk, 1987) and such lands may not be zoned for industrial or commercial purposes (Chesapeake Bay Critical Area Commission, 1989). The same guidelines for development in LDAs apply to RCAs.

Conservation and Management in the Critical Area:

The Chesapeake Bay Commission has established specific criteria for agriculture, forestry, surface mining operations, water-dependent facilities and for the protection of natural habitat. The criteria also require the establishment of natural buffers and wildlife corridors, and recommend programs for improving water quality, enhancing wildlife habitat, and protecting natural diversity (Rome, 1991).

Forests in the Critical Area:

Forests are classified as a protective land use according to the Critical Area Law. Forests are an effective means of preventing soil erosion, absorbing air pollutants, buffering noise and wind, and controlling the contaminated runoff from farms and developed areas. They also provide a habitat for wildlife. However, the amount of forested land in the Chesapeake Bay's watershed is decreasing, being developed for either agricultural, industrial, residential, or commercial purposes. Where land in the watershed was once completely forested, now only 60 percent of that land remains under forest cover (Horton, 1991).

One of the reasons that the Chesapeake Bay has deteriorated so badly is that it receives tremendous amounts of sediment--the result of runoff from cleared or agricultural land. With the continuing loss of forested land, sedimentation in the Bay's waters is increasing. The amount of surface water which enters the Bay is accelerating because more and more land is being developed and covered with impervious surfaces. Surface water can not penetrate into the soil, and as a result, this water is carried into the Bay or its tributaries. Sedimentation in the Bay is also a result of farming practices immediately along the shores of the Chesapeake Bay or along its tributaries. A large percentage of land has been cleared along the Susquehanna River in Pennsylvania for agricultural purposes. In many cases, the runoff from this agricultural land is often contaminated with fertilizers, pesticides, and animal wastes and leads directly into the Chesapeake Bay. Few rivers and streams in the watershed have adequate forest buffers to control runoff from cleared or agricultural land.

Since the enactment of the 1984 Critical Area Law, the Critical Area Commission has developed criteria with the intention of conserving, protecting, managing, and expanding forested lands in the critical area for the purpose of improving water quality and enhancing natural habitat. The criteria address forest land protection and enhancement in several ways including: the preparation of a forest preservation plan by local jurisdictions; requirements for conducting timber harvesting under a forest management plan; limitations on the clearing of forests during land development, and the protection of forests which serve as important natural habitat (Chesapeake Bay Critical Area Commission, 1990).

Regulations have been established for the cutting or clearing of trees associated with a new development. There are specific guidelines which have to be followed depending on whether the development is occurring in an Intensely Developed Area, a Limited Development Area, or in a Resource Conservation Area.

Timber harvesting must occur in such a way that forest resources are maintained and, hopefully, enhanced. Timber harvesting methods must be consistent with a Forest Management Plan approved by the Maryland Forest, Park and Wildlife service to ensure the quality of ground and surface water, the protection of wildlife habitat, and reforestation (Chesapeake Bay Critical Area Commission, 1992).

Agriculture in the Critical Area:

As one of Maryland's largest industries, agriculture is an important component of the state's economy. However, past agricultural practices are largely to blame for the Bay's deterioration. In order to prevent soil and nutrient runoff from cleared agricultural land, farmers are encouraged to practice Best Management Practices (BMPs) in accordance with Soil Conservation and Water Quality (SCWQ) Plans (Chesapeake Bay Critical Area Commission, 1992). The Critical Area Criteria specify that a 25 foot vegetated filtration zone be maintained above the mean high water line of tidal waters or tidal wetlands. The purpose of the filtration zone is to filter pollutants from surface water run-off and to provide natural habitat for plants and wildlife. Feeding and watering livestock are not allowed within 50 feet of the mean high water line (Chesapeake Bay Critical Area Commission, 1992).

Surface Mining Operations:

Surface mining operations may take place within the critical area beyond the 100 foot buffer zone of natural vegetation (landward from the mean high water line of tidal waters or tidal wetlands) as long as those operations do not occur in important natural habitat areas or in areas susceptible to erosion, do not reduce water quality, and will not result in a complete loss of agricultural or forested land. After surface mining operations have ceased, the land is to be reclaimed immediately.

Water-Dependent Facilities:

Facilities which require direct access to a shoreline, such as marinas, piers, and docks, are classified as water-dependent. There are specific requirements for these facilities. They are regulated according to their location and the function which they perform. Different guidelines exist for various facilities such as commercial marinas and piers, community piers, industrial facilities, public beaches, fisheries activities, and research facilities. Water-dependent facilities may be permitted provided that there is minimal disturbance to natural habitat and no threat to water quality.

Conservation of Natural Plant and Wildlife Habitat:

Within each jurisdiction, the preservation and maintenance of natural habitat areas are required. Such areas are: a naturally vegetated 100 foot buffer zone to minimize the negative impact of human activities within the Critical Area, non-tidal wetlands, habitat of threatened and endangered species, and anadromous fish-spawning areas (Chesapeake Bay Critical Area Commission, 1992).

Non-Tidal Wetlands:

The non-tidal wetlands along the streams and waters leading into the Chesapeake Bay perform a function similar to forests. Like forests, "they are a least polluting land use" (Horton, 1991, p. 141). They filter contaminants from the water that runs through them which is vital to the maintenance of the quality and productivity of adjacent or downstream waters, and provide flood control benefits. Non-tidal wetlands are also valuable areas for plant, fish, and wildlife habitat. Non-tidal wetlands are the bogs, swamps, freshwater marshes, parts of floodplains, and ponds which represent approximately three percent of the Chesapeake Bay's watershed (Horton, 1991).

Losses in non-tidal wetlands can be attributed to filling or draining for industrial, commercial, agricultural, and residential development purposes. The EPA estimates that approximately 60,000 acres of non-tidal wetlands were lost between the 1950s and the late 1970s (Horton, 1991).

The Chesapeake Bay Critical Area criteria require that non-tidal wetlands be identified and protected by local jurisdictions. The criteria specify two types of protection measures. First, a minimum 25 foot buffer zone is to be established around the identified wetlands where new development activities, or other activities that may disturb the wetland, are prohibited. The buffer zone is a vegetated area which surrounds the wetland area and protects it from the adverse impacts generated by activities occurring in adjacent areas such as timber harvesting or on-site sewage disposal. Second, local jurisdictions are responsible for the protection of water flowing into and from the wetland by minimizing land disturbances in the wetland drainage area (Chesapeake Bay Critical Area Commission, 1987). Any alterations to non-tidal wetlands are permitted only under special circumstances and require mitigation.

Tidal Wetlands:

Tidal wetlands comprise approximately 250,000 acres of land in the Chesapeake watershed (Horton, 1991). The functions of tidal wetlands include: providing habitat for plants and wildlife, preventing shoreline erosion, providing flood control, and absorbing and filtering the contaminated runoff from agricultural and urban land.

Losses in tidal wetlands over the years are mainly a result of human activities such as the installation of shoreline protection mechanisms (eg. bulkheads), the development of power plants, marinas, and sewage treatment facilities, and natural processes such as rising sea levels and shoreline erosion. Tidal wetlands are important to the quality of surrounding waters. Maryland's Critical Area criteria state that local jurisdictions must establish a minimum 100 foot buffer landward from the mean high water line of tidal waters or from the edge of tidal wetlands or tributary streams.

Conservation of Forest Interior Dwelling Birds:

There are specific criteria for forest interior dwelling birds and their habitat. According to the Chesapeake Bay Critical Area Law, protection is to be granted to riparian birds and their habitat. Many of these species of birds are dependent on relatively large, undisturbed, and mature forests. The Critical Area Commission developed these protection requirements because these species of birds have declined significantly in parts of Maryland over the past 30 years (Chesapeake Bay Critical Area Commission, 1986). The decline is the result of the loss of forest habitat. The criteria suggest that riparian forests of 300 feet in width or wider, and upland forests of at least 100 acres, are likely to be habitats for interior dwelling birds (Chesapeake Bay Critical Area Commission, 1986). The Critical Area criteria also identify the survey methods which are to be used in determining the presence of different species of forest interior dwelling birds and identifying their habitat.

Development activity (eg. timber harvesting) is not prohibited in these areas but should be conducted in a manner which will conserve these species and their habitat. Protection measures include: minimizing disturbances during the breeding season, focusing development in areas adjacent to the forest, retaining the closed canopy and understory vegetation of a forest, and adopting timber harvesting techniques that maintain or improve habitat for forest interior dwelling species (Chesapeake Bay Critical Area Commission, 1986).

Anadromous Fish Spawning Areas:

Anadromous fish are those which have travelled from the ocean to spawn in freshwater streams. Anadromous fish are included in the Critical Area criteria because they are dependent on the Bay's tributaries, are valuable for both recreational and commercial purposes, and because their numbers have declined significantly in recent decades. The criteria contain protection measures to maintain or improve the condition of spawning streams and to minimize land disturbances from the watersheds of these streams (Chesapeake Bay Critical Area Commission, 1986).

Significant work has to been done in the area of conservation and management of natural habitat areas in the Chesapeake Bay watershed. The Critical Area criteria apply only to natural habitat within the Critical Area itself. This area includes the Bay and its tributaries and the land within 1000 feet of mean high tide. However, much of the Chesapeake Bay watershed remains unprotected because a large percentage of the watershed is not located in Maryland, but within other states whose environmental protection policies are not as stringent.

POPULATION GROWTH

Human activities, when improperly managed, can have adverse effects upon the environment. Waste disposal, timber harvesting, agriculture, overfishing, dam construction, and the draining of wetlands for development are all examples of human activities which have made a significant contribution to the degradation of the Chesapeake Bay.

> "Make no mistake, most of the problems with Chesapeake Bay are the cumulative impact of every one of the nearly 15 million people who live in its watershed" (Horton, 1991, p. 190).

Over the past few decades there has been a population explosion in the Chesapeake watershed. This is not the result of a high birth rate but of heavy migration to the region. Population growth is most evident in landscape changes over time. Over a relatively short period of time, much of the agricultural and forest land in the watershed has been developed as residential space. The Maryland Office of Planning has determined that between 1985 and 1990, 73,700 acres of agricultural land and 71,200 acres of forest land were lost; approximately 101,000 of the 144,500 acres were developed for low density residential purposes (Breer, 1991). There has been a very inefficient use of land in the form of low density development or "urban sprawl". Other results of population growth in the region include: the development of more complex transportation systems, an increase in waste products, and an increase in energy consumption. The increase in the number of automobiles has caused the problem of air pollution to become severe.

It is obvious that the population of the Chesapeake watershed is on the rise. It is estimated that by the year 2020 there will have been a 20 percent increase in population (Horton, 1991). That means the addition of 2.6 million people to an area of land that long ago reached its capacity for human inhabitants. If the watershed is to be maintained in an environmentally stable condition, the population will have to change its lifestyle.

> "...and environmental protection measures that do not consider the habits and lifestyles of individuals are generally assured of under-shooting their target or failing outright" (Horton, 1991, p. 190).

Sprawl development, energy consumption, waste production, water consumption, and the number of automobiles using the existing transportation system will have to be curbed. If these detrimental activities persist, the Chesapeake Bay will continue to deteriorate in spite of the fact that a serious attempt has been made to restore the Bay to its once healthy state with the extensive planning policies of the Critical Area Law.

Conclusion

Clearly, a substantial effort has been made in developing, amending, and upholding the Chesapeake Bay Critical Area Law and its criteria within the state of Maryland. At this point in time, each of the sixty jurisdictions within the Critical Area have developed and implemented their own programs under the guidance of local planning departments. For the state of Maryland, this is a large step towards restoring the Chesapeake Bay. The next step will involve persuading the other states in the watershed to develop similar environmental policies. Virginia has passed the Virginia Preservation Act although it is not as comprehensive as the Critical Area Law. The state of Pennsylvania is probably responsible for the largest contribution to the Bay's decline, with vast amounts of sediment and nutrients being washed into the Susquehanna River from the agricultural land along its shores. Yet, it has no management policy in place to control surface water runoff or to require a vegetation buffer between agricultural land and the Bay's tributaries.

Although the Critical Area Law has criteria for land development and the conservation and management of plant and wildlife habitat, the criteria apply only to the Critical Area. This represents only a fraction of the watershed. The activities and changes which occur outside of the Critical Area also have a significant impact upon the water quality and living resources of the Bay and its tributaries. It is the nature of human activity which will ultimately determine the Bay's future. If people are willing to alter their lifestyles and adapt to changes in the way they live, there is a chance that the Chesapeake Bay estuary will survive.

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