

WHITE LAKE
INTEGRATED RESOURCES MANAGEMENT LAKE PLAN
PART I
BACKGROUND INFORMATION

LANARK AND RENFREW COUNTIES
MINISTRY OF NATURAL RESOURCES

by
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December, 1985

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2. ^{tables, graphs} Maps for report
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APPROVAL PAGE

The White Lake Plan has been prepared by the Carleton Place District of the Ministry of Natural Resources. It is an Integrated Resource Management Plan involving both land and water resources and is intended to guide ministry programs and activities within the study area. Changes in our knowledge of the resources, resource management and expected changes in resource demands will necessitate amendments to this lake plan. Such revisions may occur periodically as required, but will normally occur every five years when the plan is reviewed.

M.S. Millar

District Manager
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December, 1985

SUMMARY

Bold Type
Lake planning has been undertaken by the Ministry of Natural Resources, Carleton Place District to identify lake resource problems and provide a means of ameliorating present and future environmental impacts that result from continued and uncontrolled shoreline development, growing recreational use and commercial development of White Lake. This Integrated Resource Management Plan for White Lake will aid the Ministry in their plan review and input in providing the district's response to development and other management proposals as they affect the lake resources. The second part of the plan, Part II a Management Plan for White Lake, provides guidelines and recommendations for Official Plans and Zoning By-laws that will help direct planning and future development of White Lake to be considered by the Townships of Bagot, McNab, Pakenham and Darling. Part II also includes alternatives for the ministry management programs. These management alternatives if implemented, can result in a substantial improvement in the White game fishery and other resources. Amongst ~~all~~ the fisheries management options, a fisheries quota system was selected as that which could most effectively control the overharvesting due to increasing angling pressures. Two development alternatives were presented for consideration by the four municipalities. *also* a variation of the existing traditional form of shoreline development but includes more restrictive development controls, and cottage development. The latter is ~~the~~ preferred form of development when presented with continued shoreline development. *approved by Region*
public meeting held?

Two resource areas are ~~of the~~ ^{of} primary ~~focus of~~ interest for fisheries and water quality. Shoreline development and ~~discussed~~ in relation to its affect on these two resources as others. As of June, 1983 there were 488 seasonal and permanent private cottages, 11 commercial/tourist establishments, approximately 500 tent and trailer sites and 35 mobile homes. Continued ~~growth of~~ shoreline developments is expected to result in a latent negative pressure on the fishery and other lake resources. The development sectors that are currently experiencing the most rapid growth are tent and trailer parks and mobile home parks. ~~Both~~ These types of recreational development are not subjected to any form of ministry review or input, and yet contribute the same degree of stress on angling and the lake environment as other forms of development. At this time, approximately 200 new tent and trailer park sites and 56 mobile home park sites are proposed. *True?*
young changes in culture?

White Lake is defined as being ~~between~~ ^{as} a mesotrophic and eutrophic ~~lake,~~ ^{lake,} state and ~~having~~ ^{with} a low flushing rate. Trophic status, indicated by secchi disc and chlorophyll ~~a~~ ^{measurements}, indicates that White Lake has below average water quality in comparison to 68 other lakes in Southeastern Ontario. Prior to the implementation of the Water Quality Management Plan (1977) water quality was declining. Lake morphology, low flushing rate, and drainage basin characteristics all contribute to White Lake being sensitive to nutrient inputs. ~~As a result~~ White Lake is vulnerable to water quality changes.

The White Lake pickerel fishery has been declining since the early 1960's, and is primarily attributed to the growing recreational popularity of White Lake and the subsequent steady increase in angling pressure. It is estimated that White Lake is currently overharvested

by approximately 30,000 rod hours annually. The loss of traditionally spawning areas due to shoreline alterations, infilling, siltation, algae growth and obstructions of spawning creeks have also been significant contributing factors for the decline of the pickerel. The fishery is experiencing a modest comeback since initiation of the Water Level Management Program (1977).

The ability of a water body to accommodate particular types of uses and a given number of users within defined levels of ecological disturbance and interuse conflicts is termed its carrying capacity. For angling, White Lake is just beginning to exceed its capacity in terms of total development. This is however, based on the total fishery, and not the game fishery portion, which is substantially overharvested. Using water quality as an index, development is ~~already~~ ^{currently} over capacity.

The White Lake Integrated Management Plan recognizes that there will be a resultant change in the lake environment with continued shoreline development, even with improved management programs and upgraded development controls. Despite this, it is ~~indeed~~ possible, to have, an improvement in major components of the lake environment with existing shoreline and new developments, provided shoreline development controls and rehabilitative measures are adopted. A Lakes Program was suggested as the primary means of implementing many of the lake plan recommendations and goals.

PREFACE

The Ministry of Natural Resources has the responsibility of providing for outdoor recreation and resource development for the continuous and economic benefit of the people of Ontario and, for administering, protecting and conserving public lands and waters. Integrated Resource Management Lake Planning is one method of achieving this goal. The ministry has Interim Lake Planning Guidelines (1977) intended primarily for lakes ~~that are~~ surrounded by Crown land (such as Northern Ontario) where development is being planned for the first time. Unlike Northern Ontario, many lakes within the Carleton Place District are surrounded in total or in part by private lands with extensively developed shorelines. In 1975, two reports were prepared outlining concerns regarding resource management and general development potential for fifty-one lakes in the Tay Valley and North Lanark planning areas. In addition, detailed lake plans have been prepared for Otty and Mississippi Lakes.

Lake planning recognizes the importance of water resources and the recreational opportunities it provides, while concurrently recognizing the lands component and the resources and development capabilities it provides. Planning for these two components simultaneously requires an analysis of the lake resource users and the degree to which development and use affects recreational and other lake values.

The White Lake Management Plan has, as a primary function, to provide current, relevant policies and guidelines that will enable the Ministry to assess the suitability and compatibility of existing and new land use proposals in the planning area, being the immediate shoreline area and areas set back from the lakeshore within the lake watershed.

Lake roles are described in the Carleton Place District Land Use Guidelines (DLUG, 1983). The lake role broadly defines what type of land uses are to occur on the lake. Specifically the role reflects the nature of the activity and management programs that are to occur in the vicinity of the lake. Lake planning is necessary to determine the "feasibility of fulfilling the assigned role" and which areas on the lake are suitable for specific recreational land uses (MNR, An Approach to Municipal Planning of waterbodies and their Shorelands, August, 1983).

White Lake's role relates to the DLUG's fisheries classification of that waterbody. Lake Planning is embodied in the DLUG's policy on Integrated Resource Management, which states;

The Carleton Place District will have particular emphasis on public lands for all ministry programs. Where individual programs require the use of private land as may affect adjacent land, the ministry's resource management will be coordinated with other land uses such as agriculture and residential development so that conflicts and inefficiencies are avoided or minimized. It is anticipated that greater cross-program efficiencies may be achieved through integration of activities on lands now managed by the ministry.

The DLUG (1983) also states that the Ministry will provide or encourage areas of modified management along all shorelines and in other areas as necessary in order to protect important fisheries.

As part of the Ministry's strategy for Integrated Resource Management the District is preparing lake plans for individual waterbodies. This lake management plan has attempted to integrate the management objectives of those programs which have an interest in the lake and shoreline area around White lake (Carleton Place, DLUG, 1983). The White Lake Plan intends to establish a framework for land use management surrounding the lake in support of a fisheries management plan and other important ministry resource management plans.

The White Lake Integrated Resources Management Plan consists of two parts; Part I, BACKGROUND INFORMATION, which serves as a comprehensive reference document for the Ministry, municipalities, lake residents, and any other interested parties. PART II, A MANAGEMENT PLAN FOR WHITE LAKE, states the purpose and rationale for the white lake plan and provides detailed management direction to ministry staff.

Subsequent to review by Regional Lands, this district will prepare a Municipal Summary, which will inform the respective municipalities of the Ministry's program intentions for White Lake and, provide suggestions as to how the municipalities can achieve some real and positive benefits from a formal recognition of natural resource use in their Official Plans and Zoning By-laws. This document will emphasize a municipal context within which this important client group can act supportively.

The White Lake Integrated Resource Management Plan is one in a series of "Lake Plans" for lakes in the Carleton Place District. This form of planning will enable the ministry to take a more positive, pro-active approach to multiple resource use and integrated management.

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1.0 INTRODUCTION

In recent years, pressure on the recreational lake environment has increased dramatically due to population growth, greater disposable income and leisure time, (elasticity of recreation), new technology (~~ie~~ recreational vehicles) and an active promotion of their use through lifestyle advertising that exploits back to nature values, increased accessibility to recreational areas, and an aggressive governmental encouragement of tourism (Lang and Armour, 1980).

Recent development proposals and the concerns expressed by municipal councils, local cottage owners and cottage associations have warranted the need for lake plans. The Ministry of Natural Resources (Carleton Place District) has perceived this demand for lake plans as part of our plan input and review function to review our own programs and to guide our comments on plans of other agencies or municipalities.

Lake planning has been an evolving process in this province since the late 1960's. The first major step was the Lake Alert Manual, developed for use by the Ministry of Natural Resources. Guidelines have since followed, but were primarily intended for cottage developments on Crown land in Northern Ontario.

1.1 THE STUDY AREA

The White Lake Planning Area is located in the townships of Bagot, McNab, Darling and Pakenham, in the counties of Renfrew and Lanark. The lake planning area proper is located in the northern portion of the Carleton Place District (Figure 1). The study area has been delineated as a watershed unit from the drainage area outlined in the Operational Plan for the White Lake dam, forming part of the northern boundary for the M.V.C.A. watershed area (Engineering Services, MNR, 1980), (Figure 2).

Covering 215.5 sq. km., the drainage area is part of the greater Madawaska River drainage system, draining 195 sq. km. of land within the Carleton Place District from the Waba Creek outlet (Figure 1). Use of the watershed as a unit of study is widely accepted across Canada and elsewhere, forming the basis for numerous regional studies. The geographic coordinates of the lake proper are centered at 45°18' north latitude, 76°31' west longitude (Appendix A). The mean lake level is 162 m (AMSL). White Lake is one of the larger recreational lakes in Lanark County, with a total surface area of 2,269 hectares (5,609 acres). The lake is relatively shallow, having a maximum depth of 9 metres and a mean depth of 3.4 metres. The shoreline traverses a total of 97.8 km., being very irregular and broken, having numerous bays and inlets.

1.1.1 GEOGRAPHIC AREA MANAGEMENT

White Lake is within four townships representing varying rates of development and local concerns by the respective townships. The lake also has natural geographic areas characterized by terrain types,

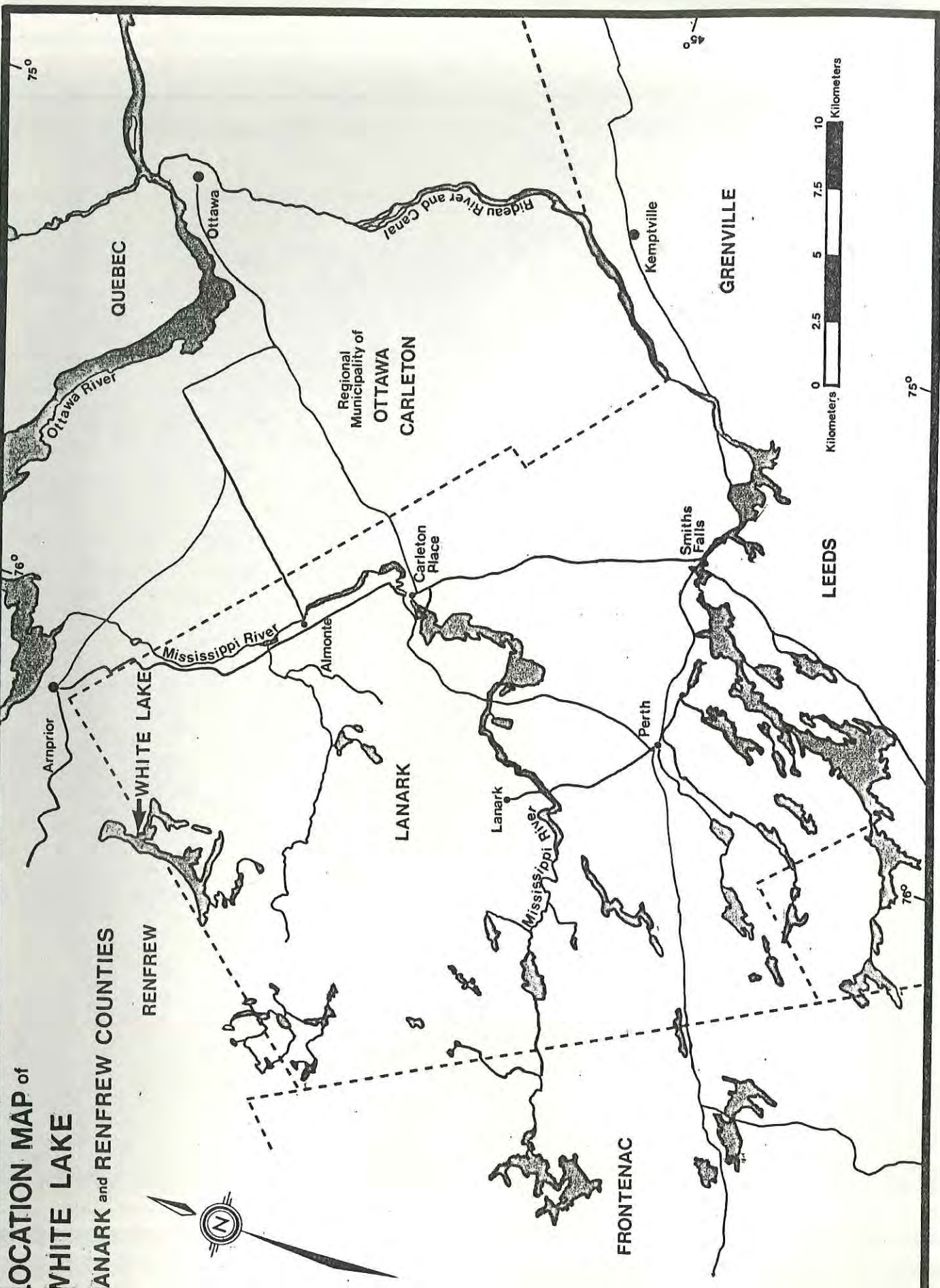
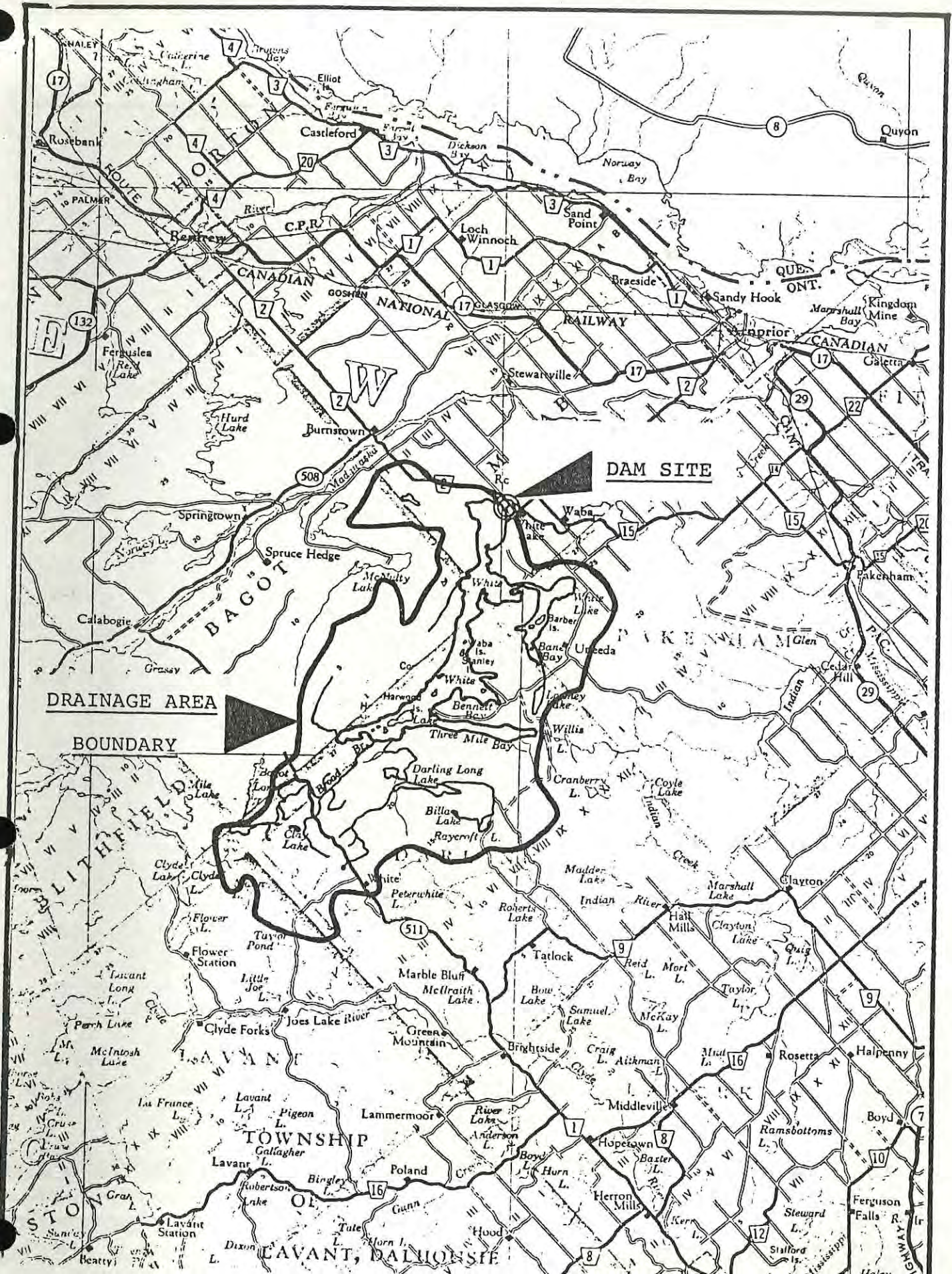


FIGURE 1

FIGURE 2 - White Lake Drainage Area



shoreline features, lake morphometry and water quality. It is suggested that for ministry management purposes, where a particular area of concern is noted, area specific management programs be used. This approach recognizes the individual characteristics and concerns occurring in different areas of the lake as well as municipal boundaries and varying policies on use. Geographically, the lake is arbitrarily divided into seven geographic areas (Figure 1) .

1. The North Basin (White Lake Village)
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3. The Narrows (Stanley Island to North Basin)
4. Pickerel Bay (including Hardwood Island)
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6. Southwest Bay (includes Hardwood Island)
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1.2 MANAGEMENT OBJECTIVES FOR WHITE LAKE

White Lake, as are most lakes in the district, is surrounded by large amounts of private lands and thus requires a different approach to lake planning than the standard approach for crown lands. Lake planning in this district, ~~and specifically White Lake,~~ must recognize the needs and the important role of the private land owner in lake management.

Existing uses and desired management direction as perceived by the public, municipalities and the ministry have formed the basis for determining the White Lake plan objectives. Municipal objectives for the White Lake Planning area indicates an interesting mix based on four municipalities and three planning areas. Darling and Pakenham townships were formerly part of the North Lanark Planning Area, encompassing the southern portion of the lake (Appendix A). The townships objectives are derived from the Official Plan for the North Lanark Planning Area, which states:

Through effective use of the Official Plan the quality of the environment will improve.

All forms of environmental pollution will be kept to a minimum.

Unique natural or man-made features will be protected as much as possible.

Existing land uses and natural amenities will be protected as much as possible.

The Official Plan will attempt to ensure the compatibility of all permitted land uses.

A variety of development alternatives will be provided.

The Official Plan will encourage the controlled development of the natural resources within the planning area.

Individual township objectives are implemented in the respective comprehensive zoning by-laws for Darling and Pakenham. McNab township objectives are determined from the policies of the Official Plan for the Lower Madawaska Planning Area. Bagot township objectives are determined from the land use policies of the Official Plan for the Bagot and Blythfield Planning Area. General development control policies have been adopted by all four townships, but so far only Darling and McNab townships have policies specific to development on White Lake. All municipalities bordering White Lake have expressed a wish to prevent a deterioration of the lake and area, but do not agree on the means to do so.

~~Correspondingly,~~ the ministry's overall objectives for White Lake are to provide shoreland land use policies the ministry can follow to protect and enhance the ecological and recreational value of the lake planning area. These are:

To implement the land/water use policies of the Carleton Place District Land Use Guidelines (1983) and other ministry resource management plans.

To enable the ministry to provide input into Official Plans and Zoning by-laws.

To provide guidelines and policies that will enable the Ministry to carry out its plan input and review in a manner that is consistent with resource management objectives for White Lake.

To provide municipalities and other government agencies with information that clearly outlines the ministry's management policies for White Lake.

To inform the public and lake resource users of the issues of lakeshore development resource use, and of the management possibilities for the improvement of the lake resource.

The ministry has assigned specific objectives reflective of its management concerns. Primarily, this means a concern for the lake fishery, notably the pickerel species. Secondly, our lake plan objectives reflect other lake resource areas such as timber, wildlife, and other interrelated resources whose management and use has a direct impact on the lake environment, its use, development and other resources management.

Specific resource objectives are detailed in the respective sections of this plan. The ministry has classified White Lake according to its fishery potential and its sensitivity to development. White Lake is a Class 2 Principal Fishery Waterbody, that is to be managed for a good angling experience with other recreational values as secondary. A catch quality target of 1.5 fish per day for all sports fish combined is desirable. Development ceilings may have to be imposed to maintain this quality (DLUG, 1983). Day trip angling and limited shoreline

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development is preferred and water level adjustments should be tailored for maximum fish and wildlife benefit. The ministry discourages any development within 30 metres of the high water mark of White Lake.

The ministry's and the municipal objectives for White Lake should be one of improved resource management integration between the ministries of Natural Resources, Environment, the municipalities, lake and area residents and users of the lake resources.

1.3 HISTORICAL BACKGROUND

In 1862 White Lake was known as Waba Lake. The Johnston Royal Atlas in 1860 illustrated the lake as Waba or White Lake. Origin of these two names is not known.

The history of White Lake was founded in the logging industry, beginning in the 1820's with the development of the white pine squared timber market. With the growth of surrounding settlements and a growing demand for timber to meet local needs, small sawmills began to develop. White pine, white spruce and white cedar were cut and floated down Waba Creek to the Madawaska River and eventually shipped to Great Britain and the United States (Management Plan for Lanark Crown Management Unit, 1978-1998). Construction in 1858 of the Canada Central Railway line from Brockville to Renfrew, along with the Kingston-Pembroke (K&P) line through Lavant township in the 1880's opened up this area to sawlog markets and the harvesting of hardwoods. Continual harvesting and highgrading of these stands resulted in large areas of low grade hardwood and scattered residual white pine throughout the area. Fire in Darling township in 1868, 1910 and 1935 has played a significant role in re-establishing good stands of white pine, which remained untouched until recently. White Lake was used from the late 1800's until recently, to power a sawmill on Waba Creek. This necessitated frequent drawdowns in order to move timber downstream to the mill.

In the 1920's, the introduction of yellow pickerel resulted in the growth of a strong fisheries based tourist industry. At that time, the lake was subjected to intensive recreational shoreline development, with shoreline development expanding rapidly during the 1960's. This caused the lake to be subjected to new pressures. Lake residents requested that a new dam be constructed at Waba Creek in hope that it would prevent fluctuations in water levels while maintaining high water levels for boating and other forms of recreation. Resultant high water levels resulted in a dramatic decline of water quality and the pickerel fishery. Consequently, the White Lake Water Quality and Fishery Rehabilitation Program was implemented in 1977, scheduled to run until 1986, at which time its continuation will depend upon favourable assessments. An interim assessment indicated a moderate success, with an improvement of the spawning areas and water quality. *Bold type*

White Lake is currently experiencing renewed pressures for development. Several development proposals are presently before municipal councils. These include a subdivision proposal, numerous severances, and the expansion of existing tent and trailer, and mobile home parks. As a result of the declining quality of some of the lake resources and the

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ever present pressure for development, the Darling council and lake residents have taken a more direct action in the form of development control.

1.4 PHYSICAL ENVIRONMENT

The White Lake area is within the southern portion of the Precambrian Shield. The Wisconsin was the last period of glacial activity (12,000 ybp), resulting in a variety of landforms that characterize the landscape. Glacial advances and retreats have left sporadic accumulations of soil, sand and gravel; being deeper in the depressions, valleys and flat lying areas, with little soil left on higher rock ridges (Lanark DLUG, 1980). The planning area is characterized by thin, erosion prone, droughty and marginal soils.

During post-glacial times the Champlain Sea extended west to the White Lake area. This was a saline waterbody that left deposits of sand and clay sediments, recognized today as sand and clay plains (Lanark DLUG, 1980). A large sand and clay plain is found east of Hayes Bay in Pakenham township. These marine clay plains (locally known as Leda Clays) exhibit unusual geotechnical properties because of their deposition characteristics; resulting in soils prone to instability and landsliding. The principal factors affecting slope stability are; slope height, inclination, properties and characteristics of the soil, groundwater conditions, and the local structure and stratigraphy. ~~(ibid)~~. Most slopes in the planning area have a high factor of safety given the relatively flat topography found in the eastern sector of the study area. Soils along the streambank of Waba Creek are known to be unstable marine clays which have been subject to extensive erosion (Fish and Wildlife memo, August 17/82).

1.4.1 TOPOGRAPHY

The White Lake area topography reflects bedrock geology typical to Precambrian Shield terrain. Moderately broken uplands dominate the northwestern part of the district, extending south to Dalhousie Lake and east to cover the majority of Darling township (Lanark DLUG, Background Information, 1980).

The lowest points of elevation are the eastern and northern ends of the lake (161.5 m ASML). Much of the shoreland near Hayes Bay, Bane Bay and Lowney Lake is inundated with swamp and marshland (Appendix A). This eastern land area is relatively flat and characterized by poorly drained peat soils.

1.4.2 GEOLOGY

White Lake is located within the southern edge of the Canadian Shield, part of the Grenville geological (physiographic) province. East of the lake, the St. Lawrence Lowlands physiographic province (Paleozoic era) dominates the bedrock landscape.

Bedrock types in the White Lake area are late Precambrian in origin, characterized by folded and metamorphosed bedrock. Bedrock is of the Proterozoic era or older (Grenville Supergroup and older). Most

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bedrock formations are Paragneisses. Much of the area is underlain by marble and associated rocks, with the marble characteristically white and light grey and coarse-grained. Bisecting the lake on an east-west axis are interlayers of amphibolite and biotite-hornblende gneiss and schist, with subordinate granite and granitic gneiss (Map 136, GSC). A contact zone between the marble and quartz-hornblende complex and amphibolite extends in a north-south axis, east of Lowney Lake. Small areas of intrusive rocks (Grenville Supergroup), being red granodiorite and granite extend north-south, east of Three Mile Bay.

The area northeast of the north basin is underlain by Paleozoic bedrock (< 500 million years old), consisting of the Ottawa formation grey limestone (middle Ordovician). To the east, sections of the Mississippi River delineate the geological boundary between the Precambrian and Paleozoic eras.

1.4.3 TERRESTRIAL VEGETATION

White Lake is located within the Great Lakes - St. Lawrence Forest Region, subdivided into the Algonquin section covering the Precambrian Shield. Forest cover is heavy around White Lake, providing a mixture of coniferous and deciduous tree associations.

White pine, red pine, birch and poplar are the dominant species south of Three Mile Bay. In the wetter areas south of the lake near Raycroft Creek, cedar and spruce are commonly associated with this type of poorly drained environment. Maple and elm are also found in this area south of the bay.

On the north shore, white pine and red pine in association with birch and maple predominate to give a heavy forest cover. Because of limited access, this area is not heavily developed with cottages and thus retains much of its pristine nature.

Hayes and Baner Bay areas are poorly drained and dominated by spruce, cedar in the wetter areas and elm, birch, maple in the better drained areas. Oak trees are found south of Hayes Bay, on the North Shore peninsula between Bennetts Bay and Three Mile Bay and the north end of White Lake. These and other hardwood species (maple and hemlock) exhibit better growth and vigour in the deep, well-drained spots (Lanark, DLUG, 1980).

Swamp and associated wetland vegetation complexes are found in the Raycroft Creek area, the east arm of Three Mile Bay, Eggshape Bay, Hayes and Baner Bay, as well as shallow shoreline areas of the north end of the lake (Appendix C).

1.4.4 CLIMATE

The climate of Lanark County can be described as one of extremes, with cold winters and warm summers and a maximum-minimum range of 70°C. The overall climate can be described as continental, characterized by predominate cold polar northwesterly winds in winter and warm southwesterly winds in the summer (Lanark DLUG - Background Information, 1980). A summary of climatic data is presented:

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Mean annual temperature	5 - 8°C
Mean winter temperature	-10°C
Mean annual snowfall	190 - 221 cm
Mean summer temperature	18°C
Mean annual precipitation	71 - 90 cm
June - August total precipitation	23 cm
Average growing season	190 -195 days
Frost free period	117 - 135 days
Ice off dates (1983)	4th week - April
(earliest - 1st week in April)	(latest - May 6 - early 1960's)

1.5 LAKE ENVIRONMENT

The physical and chemical characteristics of lakes are unique and vary from area to area depending upon the lake environment and interaction of factors. Lake environments are determined by five main factors:

1. Geologic formations underlying lake basin determine amount of nutrients from adjacent lands entering lake.
2. The size and shape of the drainage system affects the amount of minerals and sediments being eroded into the lake.
3. Shape of lake basin - broad shallow lakes with a long shoreline are more productive than a deep lake with steep sides.
4. Wind has a major effect - overturning and mixing sediments.
5. Human activity alters the natural eutrophication process.

(Source: Lang and Armour, 1980)

1.5.1 SHORELINE

White Lake is a crescent shaped waterbody with an irregular shoreline 97.8 km. in length. Two major bays and an irregular shaped shoreline provide for increased water-land contact and larger areas of shallow water for growth of aquatic vegetation in the littoral zone (Appendix I) as well as a reduction in the extent of exposure for wave swept shoals. The shoreland has the following composition: Sand 5%, Gravel 5%, Boulder 60%, Bedrock 10% and detritus 20% (Fish and Wildlife, White Lake Trap Net Study).

The littoral zone comprises 90% of the total lake area. This is an area of high biological activity and diversity that is extremely sensitive to environmental degradation, especially the root systems of benthic plants (Appendix I). The littoral zone is of high biological significance to the lake ecosystem as warm water fish use this zone for spawning and as a nursery. It also provides the permanent habitat for amphibians and mammals, such as the muskrat which depend almost entirely on this zone, as do waterfowl for nesting, brood raising and feeding.

1.5.2 BASIN FORM AND COMPOSITION

SP. The extent of the original lake basin, and the pre-development lake level is unknown. A dam was built at the outflow in the 19th century to provide water power for local sawmills. In the early years, water levels fluctuated frequently. The basin form of White Lake can be inferred from the fisheries contour map. White Lake is a shallow lake with a discontinuous basin shape. The southern portion of the lake has a basin with moderately steep sides, ~~such~~ as between Hardwood Island and the northwest shore. Portions of Three Mile Bay, and Bennett Bay to Fishers Point are characterized by moderately sloping sides. Hayes Bay, Bane Bay and the north section of the lake are characterized by gradual sloping basin sides with shallow waters, commonly less than 1.5 metres deep.

The degree of steepness of the lake basin has a direct effect on the biological decomposition and productivity of the lake. On the steeper slopes, less sedimentary material accumulates. Decomposition in these areas is restricted to shallow shoal areas and the bottom of slopes. In the gradual sloping areas, biological productivity is increased, with sediment and materials forming a continuous blanket over the entire basin. The bottom is comprised of 10% rock, 10% silt and 80% detritus (MNR: Lake Survey, 1982).

Basin form is known to be a significant determining factor between eutrophic and oligotrophic lakes (Welch, 1951). Given that the overall basin form of White Lake is dish shaped, that, combined with the low flushing rate and limited outflow, sediment and other materials accumulate and decompose, making the lake biologically very productive. The effect of the bottom sediments on water quality is discussed in section 2.6.

1.5.3. AQUATIC VEGETATION

Aquatic vegetation occurs over much of the lake area, concentrated in sheltered bays, shallow areas and inlet creeks. Areas of dense vegetation include Hayes and Bane Bay, the Canal, the Eastern Bay area adjacent to the canal, Eggshape Bay next to Pickerel Bay, the eastern end of Three Mile Bay, the inlet area to Raycroft Creek, the western Bay, and Donnelly's Bay at the north end (Appendix C). An aquatic vegetation survey was undertaken by the Ministry as recently as 1979. The common submerged vascular plants include: Eurasian water milfoil, wild celery, Bladderwort, curly leaf pondweed, Sago pondweed, Threadleaf pondweed, Floating leaf pondweed, and bassweed. The common emerged vascular plants include: duckweed, white water lily, cattails. Occasional emerged vegetation includes spotted joe-pyweed, Sweetgale, water plantain is rare on the lake, concentrated in the inlet bay area on the northshore, opposite Fishers Point. Chara is quite common on the lake, usually found in protected bays. Varieties of algae exist on the lake but is discontinuous and not concentrated in any one area. There are a variety of grasses to be found on the lake: wild rice, manna grass and reed grass (Appendix II).

Flooded shorelines are common to White Lake, with dead and submerged shoreline trees and vegetation. The canal area (south bank), north bay of White Lake and the Raycroft Creek area are prominent examples. These and other areas that are prone to flooding are depicted in Appendix A.

1.5.4 Water Levels

Prior to 1968, water levels on White Lake were unregulated and fluctuated up to 1.2 m. For the first 100 years of the dam's operation, water from the lake was used to drive logs and power a sawmill downstream from the dam. This required sporadic and drastic drawdowns, particularly during low periods. This form of unregulated water level management kept the lake flushed regularly, exposed the shoals to sun and wind and subjected the weedy foreshore areas to the influence of winter frosts. During this time the lake contained a ^{viable} substantial fish population, which supported a ^{thriving} ~~viable~~ tourist industry and enticed many people to build summer recreational homes. ^{sustained}

In 1968, the old dam was defective and replaced with a concrete structure. Water levels were stabilized to comply with requests from lakeshore residents, thereby improving boating conditions throughout the summer. Many problems resulted because of this ^{type of} water level management. Increased boating activity from larger and faster motors disturbed bottom sediments. Water enrichment from shoreline activity caused algae blooms. The regular flushing which the lake had experienced for 100 years did not occur. As a result, spawning beds silted over, reproduction of smallmouth bass and particularly the yellow pickerel failed. Fish populations suffered severe declines, had a negative effect on angling quality and affected the local fisheries based tourism. Encroachment of aquatic vegetation in many open water areas caused impairment of recreational activities, such as swimming. These symptoms pointed towards one predominant cause; the overall deterioration of the aquatic environment caused by enrichment and flow pattern changes.

Consequently, public requests for the restoration of White Lake increased. It was felt that water quality could be improved if the lake were allowed to flush itself out and siltation of the spawning beds could be prevented. To address these environmental concerns a committee was formed in June 1977, composed of four major interest groups; the White Lake Water Quality Committee, Tourist Camp Operators, anglers and the Ministry of Natural Resources personnel. An experimental water management scheme which would assure a continual flow for Waba Creek downstream and upgrade the lake water quality while still permitting a reasonable boating experience was agreed upon (Almonte Gazette, May 24, 1978).

A water level rehabilitation management scheme was effected in July, 1977. This required a scheduled gradual summer drawdown of .82 metres. This programme has been adhered to with slight adjustments since 1977, with a noticeable decrease in algae blooms, an improvement in the lakes' oxygen household, and a recovering fish population (Fish and Wildlife, memo).

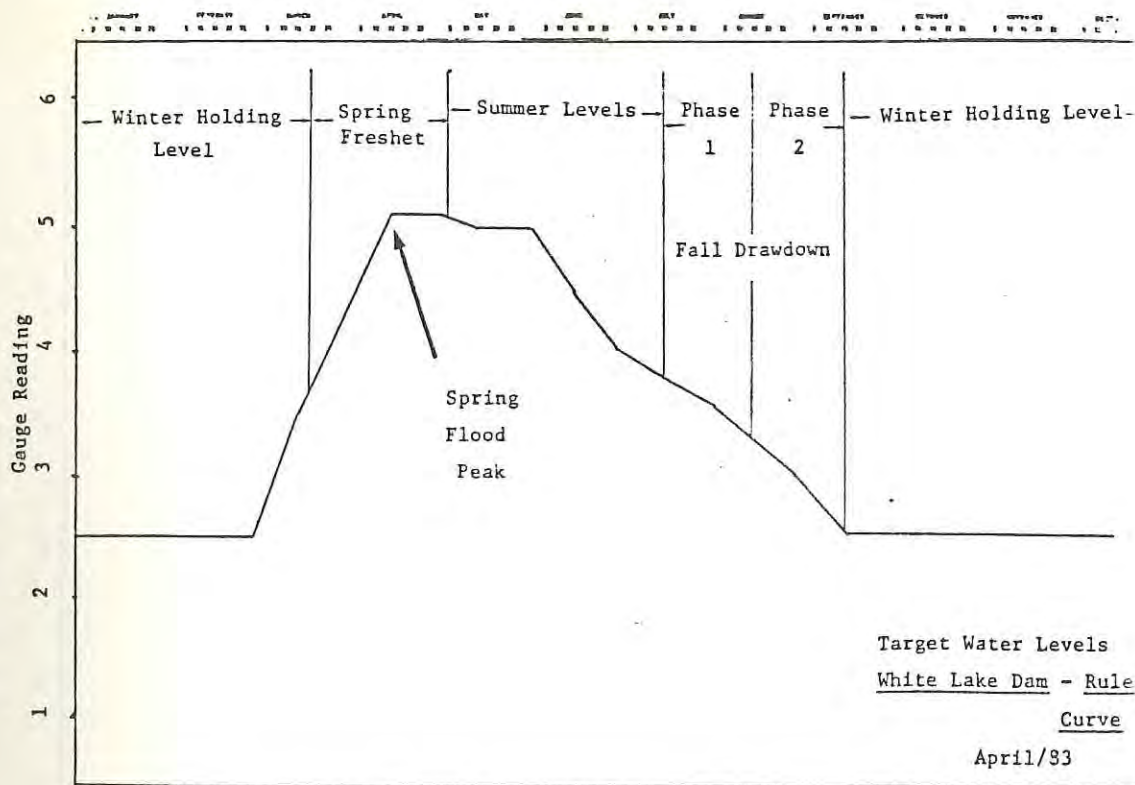
In 1978 the ministry stated that it took 100 years for White Lake to develop to its present condition, while it only took 10 years of inappropriate water management coupled with the impacts of development to degrade the water quality and the fishery (Almonte Gazette, Fish and Wildlife files).

The current purpose of the dam is the maintenance of water levels in White Lake conducive to fishing, boating, water-skiing, waterfowl

hunting and trapping (Operation Plan, White Lake Dam, 1983). The operational plan's goal is to provide suitable water levels for recreational purposes during the tourist season and to provide adequate water levels for fish and wildlife concerns. The operational plan is currently in its seventh year of a ten year experimental management program.

The rule curve for the dam indicates the target levels at specific times of the year (Fig. 3).

FIGURE 3



The water level drawdown currently operates over three periods. The first phase, April, May and early June levels are determined according to fish requirements (pike, pickerel and bass) and nesting waterfowl. The reasoning is that the greatest resource production can be achieved if natural recruitment occurs in stable water levels.

The second phase involves gradual drawdowns in late June, July and early August to facilitate the rehabilitation of the spawning beds, by exposing the shoal areas to drying by the summer sun and winds, thereby

to be
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subsequent
updates

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destroying calcareous algae growing on the spawning substrate. Discharging of the surface water in midsummer results in the spilling of the most nutrient laden waters, as these provide the optimum medium for algae production. This reduces the biological oxygen demand of decaying aquatic vegetation and retards the process of sedimentation.

The third phase, (winter water levels) is stabilized for the benefit of hibernating amphibians, muskrats and beavers. Levels must be stabilized prior to September 15. Field services monitors the water levels on a regular basis, adjusts water flow according to the operation plan and provides a guaranteed downstream supply of 250 C.F.S. at any one time, while maintaining high levels throughout the pike/pickerel spawning and hatching period (April 1-May 31).

1.5.4.1 Flushing Rate

White Lake has a flushing rate of 0.89 yr., with a response time of once every 13.5 months (Appendix I). This is a relatively low flushing rate. Flushing rate is an important controlling parameter in determining water quality. A high water volume turnover (high flushing rate) means that sediments and other material will not accumulate as quickly. Conversely, a low flushing rate tends to accelerate the process of eutrophication. With the introduction of water management program, the flushing rate has increased. The flushing rate of White Lake is restricted due to the single outflow at Waba Creek, and the relatively small amount of inflow streams.

1.5.4.2 Water Level Concerns

Determining the water levels of White Lake has been a long standing problem. This was addressed by the lands branch during the administration of the Ministry's Water Lot Program. The original, average high water mark on any waterbody had to be determined if licences of occupation could be granted. Investigation of the original field notes for Pakenham and McNab Township (1983) indicated that the shoreline of White Lake was very similar to what it is now (Lands memo, February 27, 1976).

Although there are seasonal fluctuations, there has been very little change in water levels since 1823. Water levels have not increased by more than 20 cm. vertical and 9.1 m. horizontally. It was concluded that;

The lake level is artificially maintained.

Levels have been controlled (totally or partially) since the 1800's.

The 1970 level is not more than 8 inches (0.2 m.) over the historical average water mark.

A maximum increase of 8 inches has not caused any significant flooding of shoreline, but has made wet areas wetter, and increased shoreline erosion in some areas.

No riparian owner on White Lake has suffered any gross injustice or loss of land through the years.

1.5.4.3 Hydrology

White Lake has been described as a shallow lake with flushing rate problems. The flushing rate, a measure of water volume turnover, is directly related to the inflow and outflow characteristics of the waterbody. White Lake is characterized by eleven (11) inlet streams, of which four (4) are permanent creeks. Most of the streams flowing into White Lake traverse through swamps and wetlands making stream gauging difficult. Discharge from five measureable creeks is as follows:

Broad Brook Creek	5 cfs	(0.14 m . sec. ⁻¹)
Three Mile Bay Creek	3 cfs	(0.09 m . sec. ⁻¹)
Raycroft Creek	2 cfs	(0.06 m . sec. ⁻¹)
Lowney Lake Creek	3 cfs	(0.09 m . sec. ⁻¹)
North Basin Creek	3 cfs	(0.09 m . sec. ⁻¹)
TOTAL	16 cfs	(0.45 m . sec. ⁻¹)

The Waba Creek outlet has an outflow of 30 cfs (0.85 m . sec.⁻¹). Approximately 50% of the inflow into White Lake is from seasonal, intermittent streams and creeks. Given the seasonal nature of water inflow into White Lake it is expected that water quality problems can persist late into the summer. Most of the inlet streams can be described as freshet streams.

Groundwater flow plays a significant role in a lake's water budget and water chemistry. Information on groundwater flow into White Lake is very limited, but given the high water table and the geological contact zones in the area, it is expected that groundwater flow significantly contributes to the water regime of White Lake. Groundwater information is available from well water records in the area, but is of limited value. The Geological Survey of Canada (Terrain Sciences Division), is compiling related data on lakes in this area. As this information becomes available, it will be included in this plan.

1.5.5 Lowney's Lake

Lowney's Lake is within the White Lake watershed area. Surrounding a hunt camp on the west shore (Appendix A) wetlands drain into Lowney's Lake which eventually drain into Bane Bay of White Lake (Appendix A).

Two commercial tourist establishments are found in this area (c/f s. 3.3), Lowney's Lake campsites and the Frontier Ranch respectively. A hunt camp and a few cottages can be found on the west shore.

Lowney's Lake has a surface area of 45.39 ha. (112 acres), maximum depth of 4.9 m. (16') and a mean depth of 1.9 m. (6.3'). The lake supports a warm water fishery of northern pike and largemouth bass.

This lake can be classified as being homothermous. Because it is shallow, stratification does not develop and is therefore relatively insensitive to nutrient inputs from outside sources.

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2.0 RESOURCES INVENTORY

2.1 FORESTRY RESOURCES

Much of the contribution to the district forestry targets (Carleton Place DLUG, 1982) will be met from private lands, which account for 95% of the land area in the district. Crown land accounts for the remaining 5%, much of it within Lavant and Darling Townships. Given that Crown land accounts for approximately 50% of the land area in the White Lake area, Crown land is expected to make a significant contribution to the overall Crown land wood target, which is presently 3.6% (← 453,069 m. of wood). The White Lake portion is expected to increase to 6.2% with increased forestry management.

Fuelwood blocks in the White Lake Planning Area contribute 507 m. to the district fuelwood targets, representing 4.7%. In addition, the White Lake area contributes approximately 13% of the Lanark Crown Land Management Unit's 4000 m. of fuelwood.

2.1.1 FOREST INVENTORY

The forest cover around the lake area is heavy, comprised of coniferous and deciduous trees. The Ontario Land Inventory rates Land Capability for forestry based upon climate, soil depth, soil texture and moisture conditions. Despite the shallowness of the sandy loam soils in the area, the soils have extensive high capability for forestry classes 1, 2, and 3 (Lanark DLUG, 1980). Generalized timber capability for much of the land south of the lake is high, (class 1 and 2). This can be evidenced by the healthy stands of White Pine and hardwoods in the area. The area immediately adjacent to the lake is classified as having moderate potential (class 3, 4, and 5). Although the productive forest on both Crown and private lands has been high-graded in the past, the area has a moderate to good capability for producing timber (Lanark DLUG, 1980).

A species list for those trees common to White Lake is provided in Appendix II. Typical shoreline vegetation species types are indicated in Appendix C.

Important seed production and collection areas are located in the lakeshore area, between Bennett Bay and Lowney Lake and Three Mile Bay.

2.1.2 PROGRAMS

Forestry management will be undertaken in the White Lake Planning Area on a sustained yield basis for production, protection and amenity purposes (DLUG, 1983). Ministry Forestry programs for the White Lake area are detailed in the Management Plan for the Lanark Crown Management Unit, 1978-1998. The Operation Plan covers the first ten year period of the management plan and serves to lay out specific work programs. Previous to 1978, work was scheduled on an annual basis due to the absence of an operating plan. Annual plans detail the cut, harvest, tending, replanting and other operations←.

* To be updated.
Pl.

Forestry harvesting programs in the White Lake area include:

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A large portion of the ministry's forestry work in the White Lake area is ~~on~~ tending, involving upgrading of various stands, increasingly by improvement cuts. A high priority is given to both seed collection and tree improvement programs, to ensure that there is sufficient high quality seed for planting on private land under the Woodlands Improvement Act (WIA) as well as the artificial regeneration of cutovers.

Forestry access roads have been built south of White Lake with further access roads planned for the upcoming decade.

Many ministry forestry programs are directed towards the private landowners. Under the Woodlands Improvement Act, the ministry assists private landowners with reforestation and stand improvement. Given the large amount of Crown land in the White Lake area, the number of WIA's are few when compared to other areas of the district. A total of six WIA's are operational in the White Lake area at present (Appendix A). None of these agreements are on productive farmland.

2.1.3 CONCERNS

Private lands are considered the primary means of meeting the ministry's forestry objective. This is complicated by the large number of individual owners, frequent change in ownership and often small size of holdings (DLUG, 1983). At this time there are no Private Land Extension programs operating in the White Lake Planning area.

In recognition of the intergrated nature of lake resource management, forestry services concerns are that:

1. The forest resources be included in any ministry or other agency mangement plans and alternative programs.
2. No reservations be implemented around the lake excluding forestry management programs. The forestry objective is to manage timber resource, rather than removing it from use. The alternative is to incorporate forest Modified Management Areas (MMA's) into the lake planning area allowing for selective forestry management. Such areas are to be set aside following the consistent application of a clear set of guidelines.

The control of insects and disease through the use of insecticides, herbicides and fungicides around the lake area is worthy of considerable concern in forestry and lake environmental management.

The construction of forest access roads could have significant impact on the lake planning area. Permanent and temporary access roads are scheduled for the lake area in the Crown forest management plan. New and upgraded access roads in the lake area and lakeshore could eventually open up the lake area to more intensified use.

2.2 MINERAL RESOURCES

The mineral aggregate production target for the district is a total cumulative supply of 199 million tonnes to meet local demand between 1982-2000. Much of the aggregate resources for Lanark County in the future will come from Darling and Lavant townships, portions which are

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within the planning area.

2.2.1 INVENTORY

In eastern Lanark County, the main surficial features are the Paleozoic limestone and Pleistocene marine beaches. The surficial features in the western portion of Lanark County are predominantly bedrock, glacial till and glaciofluvial deposits. The sand and gravel reserves reflect the diverse nature of the local terrain. Darling and Lavant townships have significant aggregate reserves. Approximately 22.69.10⁶m³ of available sand and gravel, with large amounts of this being high quality aggregates are found in Darling township.

The largest deposit within the lake watershed area (634.7 ha.) is a glaciofluvial assemblage in the northwest corner of the township (lots 15-27, Conc. II and III having 83.1% of the available material. Much of this is high quality aggregate. Another large deposit is located on the Darling/Lavant border. This is a large esker of lower quality aggregate material (.33 10⁶m³). The other sizable deposit (7.47 ha) is an esker ^{located} northwest of California, with approximately 0.47 10⁶m³ of material in reserve (Appendix C).

There is a licenced sand and gravel pit operation in the near lake vicinity located on the south shore of Three Mile Bay, NE Lot 22, Concession 8 (Appendix A). This is a small operation, of only 5.2 hectares, that has been used primarily for local road maintenance and private cottage use.

2.2.2 ECONOMIC GEOLOGY

The Grenville Province which includes the lake area has a long history of mineral production, but many commodities are now of historical interest only (OGS, Map 1976-5, Ontario Mineral Potential). Extensive marble formations exist west of the lake, but there are no current producers in the lake area. Iron is a promising commodity for exploration to the area west of the lake towards Calabogie. There is one major occurrence of iron south of the lake, near Broadbrook Creek. Minor occurrences exist east of the lake between the canal and Pickerel Bay. Minor occurrences of Marl (Ma) north and west of the lake are the only other mineral occurrences known at this time (Appendix C).

2.2.3 CONCERNS

The supply of aggregates in Carleton Place District is in short supply, especially so close to the large urban area of Ottawa and in the southwest portion of the district. The quality of quarries in the north part of the district are high quality sand and gravel. Given the growing demand for aggregates, this planning area is expected to supply much of that need in the future.

The Ministry is concerned that no aggregate resource should be removed from contributing to the demand for this limited resource. This lake plan or associated lake development should not exclude the extraction of, or affect the viability of such resources. The MNR district policy is that no excavation and/or disturbance of the natural ground be permitted within a minimum of 30 metres from the lakeshore, wetlands or water courses.

The abandoned pit on the south shore of White Lake is aesthetically displeasing to lake users and residents (Section 2.2.1). However, this pit area is slated for rehabilitation and conversion to cottage building lots (Appendix A).

Four aggregate source areas ~~to be~~ used in the reconstruction of highway 511 in 1983 are within the planning area (Appendix C) just north of the village of White Lake; combined there is a total of 470,000 tonnes. Extraction of this amount of material, as well as upgrading of highway 511 may have possible adverse effects on the lake watershed. Increased sediment load may possibly find its way into White Lake. An increase in traffic and access to the lake areas may result in increased recreational use.

omit ↑

2.3 SOILS

Soil formation in the White Lake Planning Area is a result of glaciation, topography and drainage characteristics. Unconsolidated surficial deposits are of glacial origin, being mostly till maraines (10,500 - 12,000 ybp). This is made up of fine grained sands and angular pebbles with a silty sandy matrix. Deep deposits of clay, silt and sandy loams occur in the area (Appendix B). Hilly, thin soil deposits with numerous rock outcrops are characteristic of the area.

Most agricultural land in the area is used for pasturing and is not arable. Soil complexes in the area have a higher potential for wildlife, recreation and forestry uses (Soil Survey of Lanark County, Agriculture Canada, 1961).

2.3.1 INVENTORY

In Lanark County, Monteagle soil is the dominant unit, with smaller areas of the Tweed and Farmington series. The three soil unit areas are depicted in Appendix B.

Monteagle sandy loam soils, being the dominant soil type are developed on greyish sandy loam till. The parent rock is granite, making these soils acidic. This series has a high content of medium and coarse sand in till, with numerous stones and boulders. Monteagle sandy loam rock complexes are found on the northwest shores of White Lake, having irregular slopes. This complex has no agricultural potential, but does have significant value for forestry, recreation and wildlife.

Monteagle sandy loams are well drained, with considerable overland flow occurring on stony slopes and a rapid water percolation through porous materials. White pine has good potential on this soil. With sufficient soil depth, hardwood species such as sugar maple, red oak and basswood are also quite productive.

Tweed sandy loam soils series are closely associated with Pre-Cambrian limestone. South and east of the lake, this soil varies in thickness and is exceedingly stony with numerous rock outcrops. The Tweed sandy loams to the east of Hayes Bay are better drained and can be used for agricultural purposes, primarily hay and pasture crops, but low soil fertility, droughtiness and resultant low yields are characteristic.

White Lake sandy loam rock complexes are found to the north of the lake, the Canal/Hayes Bay area, as well as localized areas near Waba Creek. This complex consists of muck, granby sandy loam, and some shallow Monteagle sandy loam. The Tweed series produces the same tree species as the Monteagle, but production of white pine is lower, with maple, basswood, beech and red oak comprising the majority of the stands.

The Farmington series extends into the southern portion of the study area. Soils are shallow, with less than 0.3 metres of sandy loam over limestone and sandstone bedrock. Normally, these soils are well-drained, but depressions and accumulation of water from surrounding soils is indicated by numerous shallow bogs. ~~Muck~~ ^{organic} soils (~~organic~~) occur in the Bane Bay area, and north of Hayes Bay, where drainage is poor, allowing for the accumulation of organic materials.

2.3.2 ACID RAIN SENSITIVITY

Acid precipitation in the form of rain, snow and dry fallout is recognized in Canada and the United States as an environmental problem that is not restricted solely to the immediate sources of pollution (Wang, et al, 1981). There is much scientific literature on the impact of acid fallout on forests, agricultural crops, and waterbodies, but there are few studies as to the sensitivity of soils to acid precipitation.

The wet form of acid precipitation affecting soils in Eastern Canada has been calculated to be 20-45 kg./ha. per year (Calcium carbonate -CaCO equivalent). Dry fallout is estimated to be 40% of the wet form based on sulfur deposition data (Wang, et al, 1981). Total acid precipitation for this area is in the range of 28-63 kg./ha./year. Calcareous soils (CaCO -limestone free carbonates) have high exchangeable bases relative to CEC (Cation Exchange Capacity) and thus can release bases easily. Surface calcareous soils are not considered to be sensitive to acid precipitation (buffering capacity is greater than 15 meq./100g.) (Appendix II).

Non-calcareous soils are of special concern with respect to acid precipitation. With the geological bedrock surrounding White Lake and the general absence of calcareous soils, it is thought that the soils and bedrock surrounding White Lake are more sensitive to acid rain than has generally been believed since most of the surrounding soils are non-calcareous.

Sandy loam soils may be sensitive to acid precipitation due to their relatively low acid buffer capacity and low pH. North and west of the lake, the marble is the parent bedrock which is basic, offers a good buffering capacity. Generally the sandy loam soils in the White Lake area are acidic, with areas of exception.

Acidification of soils may result in the mobilization and leaching of soil bound metals. Aluminum (AL) and other metals, Manganese (Mn) and Iron (Fe), become soluble due to acidification and leach into surrounding waters. Aluminum and Manganese are good indicators of watershed acidification since they are readily removed from soils by acid precipitation and are naturally found in low concentrations in Precambrian lakes (MOE, 1981). Soil bacteria are very sensitive to acid precipitation, and exhibit a decrease with increasing acidity. Other changes such as a reduction in soil respiration and loss of clay minerals may occur with a low pH precipitation (ibid).

2.3.3 SOIL PHOSPHOROUS RETENTION CAPABILITY

In a lake-cottage environment, phosphorous retention capabilities of in-situ soils or soils imported for raised tile bed construction is critical for maintaining and improving water quality. The exact phosphorous retention capability of soils in the White Lake Planning Area is not known, but may be inferred from studies of similar type soils in South Sherbrooke (Christie Lake Integrated Resource Management Plan, 1983).

The main concern for soils used in septic tank-tile bed installations is soil permeability and phosphorous retention capability. Coarse

gravels and sands are highly permeable but may not necessarily be efficient at retaining phosphate ions. Silty clay size fraction sands have low permeability which could affect the operation of a sewage system. Much of the material used for tile beds around the lake comes from in-situ soils or materials taken from sand and gravel pits in the area. Usually sand and gravel pit material is too coarse for good phosphate retention (low percentage of fines, ie. clay size fraction) but does provide the required percolation rate.

Much of the glacial soil deposits found elsewhere in the western portion of the district provide a minimum acceptable retention capability acceptable for the construction of tile beds (40 mg/100 g).

2.3.4 Concerns

Limiting factors for soil suitability for receiving and absorbing nutrients in a lake environment are; soil depth, slope, grain size (texture), organic compounds, density, moisture content, chemical properties, physical properties (plasticity) and others.

Phosphorous is usually the most limiting factor in freshwater, because on land it is tightly adsorbed onto the soil and does not leach out readily (see Section on acidification). Phosphates which come into the water system adsorbed by soil particles tend to remain in the system and become readily bound in the bottom mud and sediment when oxygen is present. When oxygen near the bottom is absent (anoxic), phosphates are easily released to be taken up by algae, and are recycled repeatedly.

Because phosphates are tightly adsorbed by soil, the significance of shoreline ^{vegetation} removal and accelerated erosion is critical to the lake ecology as a whole. Lake sediments can have 1,000 times the amount of phosphates as water, indicating the vast storage potential of phosphorous waiting to be released under anoxic conditions.

The importance of soils with good phosphate retention capability is essential to maintaining the lake water quality and preventing further degradation. On White Lake, many cottages have septic tank/tile fields constructed on soils with little or no P retention capabilities, in addition to other problems. ^{phosphorous}

A 1973 survey to determine the pollution potential of cottages revealed that there were many defective sewage disposal systems on White Lake. This indicates that either the systems are being used to overcapacity, ~~are~~ defective, ~~are~~ too close to the water's edge, or the soil does not have sufficient absorption/adsorption capacity for all the nutrients and allow for the decomposition of bacteria.

2.4 WILDLIFE

Given the large amount of Crown land, the relatively low population and small amount of development in Darling and Lavant townships, the White Lake Planning Area is expected to contribute significantly to the district wildlife targets. A lesser amount of private land will be required in this area to meet wildlife targets than elsewhere in the district.

2.4.1 Inventory

The White Lake Planning area, contributes significantly to the district wildlife resources (District Land Use Guidelines, 1983).

The lake planning area is within the Wildlife Management Unit Area No. 63. Management units are based upon geographic rather than administrative boundaries for the purpose of homogeneous wildlife management.

The Ontario Land Inventory (OLI) has determined that the White Lake area has a moderate to high capability for producing wildlife. Species found in the area include deer, black bear, wolf, coyote, red fox, beaver, muskrat, marten, fisher, squirrel, skunk and a host of smaller mammals.

Two major deer yards are located in the lake area. The Lavant deer yard west of White Lake provides habitat for approximately 100 deer; and the Pakenham deer yard east of Hayes Bay, 80 deer (1982 Assessment). A new deer yard area is being used in the Broad Brook Creek Area. Approximately 15 deer were estimated in this area as of the January 1983 aerial and ground survey. This is currently a seasonal yard but indications are that deer are using this yard on a regular basis (per. comm., P. Auger - F&W).

Muskrat populations frequent numerous locations around the lake shoreline such as low lying, swampy areas having reeds and bullrush type vegetation. Beaver concentrate in the wetland areas on the north shore, notably the backwaters of the Fish Creek Area. Numerous waterfowl nesting sites exist on White Lake and in the backshore area. The marshy areas of White Lake, North End, Hayes Bay, Bane Bay, and Darling Long Lake area are locally known waterfowl areas (Appendix C).

Furbearers are managed within Fur Management Units, with an established quotas for the number of individual trappers in the unit. White Lake is within Fur Management Unit VI. In 1981-82, some 690 pelts were harvested, representing 3% of the annual district target of 27,000 fur pelts. In the Pembroke District (Unit IV) section of White Lake, approximately 200 fur pelts are harvested annually, contributing a minimal amount to this district's annual target of 40,000 pelts (pers. Comm., K. Buckingham - Pembroke District, MNR).

The Planning Area is significant in that it contains the only known populations of marten and fisher in the district (pers. comm., H. Von Rosen, F&W). Bullfrogs are an important wildlife resource, managed on a management unit basis, (Unit 2) with set quotas for harvesting.

2.4.2 Programs

Resource management priorities are for the maintenance and preservation of the species, and the provision of recreation

opportunities ~~firstly~~^{firstly}, for residents of the province firstly and ~~for non-residents~~^{secondly}. The wildlife management program emphasis will be, in order of priority; big game (deer & moose), waterfowl, small game (upland game mammals and birds), fur-bearers and bull-frogs (Carleton Place, DLUG, 1983).

Deer hunting contributes significantly to wildlife recreation targets. Wildlife management for deer contributes to both hunting and viewing targets while having some side benefits for furbearers such as beaver who benefit from the planting or retention of aspen groves for deer browsing. Aerial deer survey programs have been undertaken in the area over the past 20 years. The ~~last~~^{latest} aerial survey in January, 1983 was followed by an intensive habitat browse survey later in 1983 and 1984.

Concurrent with the deer survey, a ~~Predator~~^{Predator} survey was undertaken to determine the wolf population in the area. A beaver density assessment is being undertaken in White Lake and area to determine trends in population.

In the White Lake drainage area (Carleton Place District) there are approximately 15 trappers. There are 3 licenced trappers in the Pembroke district that trap the lake area, with 2 trappers taking the large majority of pelts in the area.

Wildlife management programs are now being integrated with forestry programs in the area. Consultation between services will reduce the amount of habitat destruction and improve program understanding. Forestry harvesting can be compatible with wildlife goals, creating additional habitat for deer and small game populations.

2.4.3 Concerns

Habitat destruction is one of the main concerns for wildlife management in the lake area. Wildlife habitat is lost due to the timber harvesting in the area, and increasingly from lakeshore development, shoreline alterations, and related recreational use of the shoreland areas.

Wetlands are of special concern to the lake's wildlife and waterfowl. While providing a much needed habitat for waterfowl, furbearers, moose, and other non-game animals, wetlands also play an important role in flood management control, as biological filters and as nutrient sinks.

Water level~~s~~ fluctuations on White Lake in the past had a significant impact on wildlife. The White Lake Water Quality and Fisheries Management Program follows scheduled water level drawdowns to reduce the impact on denning furbearers. Especially susceptible to late fall drawdowns are beaver, muskrats and amphibian populations which den below water level. Should water levels be lowered after the denning (hibernation) period, significant portions of the populations would be adversely affected.

Lakeshore development and associated recreational use ~~has and~~

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will continue to have an impact on wildlife and habitats. Shoreline alterations, tree and natural vegetation removal reduce habitat and inhibit wildlife migration to the lakeshore. Intensified development will cause an increased encroachment on deer wintering yards, waterfowl habitats and a general higher level of wildlife harassment. Lakeshore linear development to date has resulted in the infilling of marshes, construction of docks and artificial beaches, and a general disturbance of the littoral zone.

Darling Round Lake (Raycroft Creek Outlet) is an established waterfowl nesting and brooding area, that is under consideration for a development proposal. Birchwood Falls subdivision proposals in this area could dramatically change the nature and viability of this unique wetland site, as backshore sites front onto this wetland area (Appendix A).

This may no longer be applicable.
(but type in for now)

2.5 FISHERIES

2.5.1 INTRODUCTION

Waterbodies in the Carleton Place District have been designated Class 1 (Wilderness), Class 2 (Principle Fishery) and Class 3 (General Recreation). The classifications are based upon lake surveys and fisheries management data incorporating a standardized ranking system using; trophic status, flushing rate, water level control, natural recruitment, boating, day-trip, tourist camp and cottager angling, and a stress factor (Carleton Place District Fisheries Management Plan, 1982).

White Lake is classified as a Class 2 warm water principal fishery. Class 2 waterbodies are to be managed for optimum angling benefits with other recreational values as secondary goals. White Lake is to provide for the maximum amount of allowable angling opportunity for the three sports fishery sectors; resident day users, tourist camp guests and cottagers.

White Lake has been known to be a major fishery in the past and has the capability of regaining this status provided rehabilitation of water quality and spawning sites is successful and the angling pressure is reduced to a self-sustainable level.

The fishery is currently subjected to an excess of 86,000 rod hours of angling pressure (Appendix I), significantly more than the management goal of an allowable fishing pressure of 54,000 rod hours. The current angling pressure level represents a 42% increase since 1978. White Lake has a total potential yield (Appendix I) of 17,520 kg. of fish annually, (DLUG, 1983). This translates into 45,884 recreational opportunities (Appendix I). White Lake is to be managed for a sustained annual production of 12,000 high quality angling opportunities with a catch quality target of 0.3 (CUE, Appendix I) for combined gamefish and 4.0 (CUE) for other fish (White Lake, Fisheries Management Plan, 1982). The lake is currently managed as a yellow pickerel fishery. (54,000)

2.5.2 Species Inventory and Spawning Sites

The lake supports various populations of; gamefish species - yellow pickerel, northern pike, smallmouth bass, largemouth bass; panfish species: yellow perch, rock bass, pumpkinseed, bluegill; coarse fish species - brown bullhead, common white sucker, eel, and baitfish populations of banded killifish, bluntnose minnow, blacknose shiner, common shiner, golden shiner, fathead minnow, northern red belly dace, and brook stickleback. Muskinonge was stocked in 1968 for the first time, but has not yet proven to be a viable population (Appendix II).

While the quantity of spawning sites in the lake is thought to be adequate, a history of declining water quality has substantially reduced the viability of many of these traditional areas. Spawning and rearing areas are listed in Appendix II for lake specific species, including their spawning season and relative sensitivity to disturbance. Some of the better known pickerel spawning sites are listed in Appendix II and exhibited in map Appendix C.

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* This section (2.5) has to be updated in light of the new fisheries data on White Lake.

2.5.3 History of the White Lake Fishery

Historically, frequent and recurring water level drawdowns created a highly productive lake with rocky shores and numerous spawning sites, especially suitable for the pickerel species.

The original native fish species composition of the lake is unknown. Alteration of the native species composition dates back to 1903-1904 when smallmouth bass were introduced into the lake. Pickerel was first stocked in 1921 and up to 1982 (Appendix II). With the introduction of pickerel, the species flourished, resulting in a strong commercial tourist industry based on a self-sustaining game fishery. From 1920 - 1960 the lake was a reputable yellow pickerel fishery. Largemouth bass were first introduced into the lake in 1957.

Since the 1950's, deterioration of the old dam on Waba Creek resulted in a gradual loss of water throughout the summer, exposing shorelines in June and July and clearing the spawning substrate by wind and sun action. The combination of increased shoreline residences and fluctuating water levels resulted in renewed public pressure for the construction of a new dam in 1968, designed to maintain high summer water levels for boating recreation.

Water quality analysis (1959-1983) indicated that environmental changes to the lake had occurred which resulted in apparent shifts in species composition. By 1969 it was evident that failure in the recruitment of yellow pickerel had occurred. The once abundant pickerel were now being replaced by small and largemouth bass and pumpkinseed. This change in species composition is attributable not only to organic pollution but also to increased angling pressure.

Between 1968 and 1972 water levels were managed to satisfy cottagers and boating interests, stabilizing water levels during the summer and drawing levels down for the winter. This caused siltation of spawning beds, increased growth of aquatic vegetation, failure of pickerel recruitment stock and consequently failure of the pickerel fishery, reduction of the muskrat population and a drastic reduction in the bullfrog population (Fish and Wildlife Files, August, 1982).

In 1972 the Ministry decided to place less of an emphasis on the pickerel fishery designation and concentrate on managing the lake as a bass fishery. This created an immediate and negative reaction from the locals as the pickerel fishery was and still is the basis for much of the tourist industry on the lake. Consequently, the Ministry initiated a pickerel restocking programme where it supplied pickerel to the Arnprior Fish and Game Club for rearing. By 1976/77, yellow pickerel had all but disappeared from the lake, with the lake environment thought to be no longer suitable as a pickerel fishery. The Ministry again reviewed its decision to forego the pickerel fishery designation, only to be met with further local pressures to maintain a pickerel fishery. The Ministry continued to supply eyed egg (EE) pickerel to the Arnprior Fish and Game Club. The overall success of this private restocking program was very poor and was subsequently discontinued in 1980. Currently, stocking of White Lake is thought to be a waste of pickerel stock and management efforts without rehabilitated spawning grounds and fish habitats which would make the pickerel fishery more self-sustaining.

2.5.4 White Lake Fishery Assessments and Programs

The Ministry of Natural Resources has been involved in fisheries assessment programs on White Lake since 1959 (Table 1).

One of the initial reasons for initiating studies on White Lake was to assess and determine the reasons for the decline in the pickerel population (Fish & Wildlife, memo; July 11, 1978). The MOE fisheries habitat assessment is based solely on water quality and is ~~and~~ not sensitive enough to monitor a species habitat requirements (Fisheries Management Plan, Carleton Place). Fisheries strength is known to be a more sensitive indicator of water quality than other man-made standards. The decline of the game fishery, specifically pickerel, is recognized as a problem of declining water quality and loss of spawning areas, and increased fishing pressure coincident with heavy tourist and cottage development.

In response to public requests to rehabilitate the water quality and consequently the pickerel fishery, the Ministry initiated a **White Lake - Bold Type** Water Quality and Fisheries Rehabilitation Plan in 1977. This ten year plan (1977-1986) is designed primarily to rehabilitate the pickerel fishery by improving spawning grounds and water quality. This allows for sun and wind action on the spawning shoals, reducing algae growth and also allowing winter levels to be reached early enough to benefit beavers, muskrats and bullfrogs. A secondary benefit is the anticipated improvement in overall water quality which is expected to rejuvenate the tourist industry by increasing the lake's recreational potential.

Concurrent with the rehabilitation of the pickerel fishery was a pickerel restocking programme, the Ministry recently completed the last season of stocking (1982), as there is now an adequate number of spawners to rehabilitate the fishery into a self-sustaining fishery.

Three interest groups initially formed the joint committee in co-operation with the Ministry for the lake rehabilitation plan, these being the; White Lake Tourist Outfitters, Arnprior Fish and Game Club and the White Lake Quality Committee. The management plan is now run entirely by this Ministry.

An interim assessment of the program in 1980 exhibited moderate success, with pickerel returning to former spawning areas as well as a noticeable improvement in water quality. Shoals are now cleaner and bait fish which had all but disappeared have re-emerged while a significant amount of the 10,000 pickerel fingerlings that were planted in 1976 as spawning stock replenishment have survived. A 1981 assessment also showed that pickerel fishing for that season improved significantly over earlier years.

Adverse public reaction to the program has lessened since 1977, when there were many complaints about the water regime changes. In 1978, there was some public approval concerning the improvement in overall water quality. However, cottagers and boaters still make up the majority of those opposed to the water management plan. As successes of the program become evident, it is expected that the public and private opposition will lessen considerably.

TABLE 1 - WHITE LAKE MANAGEMENT HISTORY

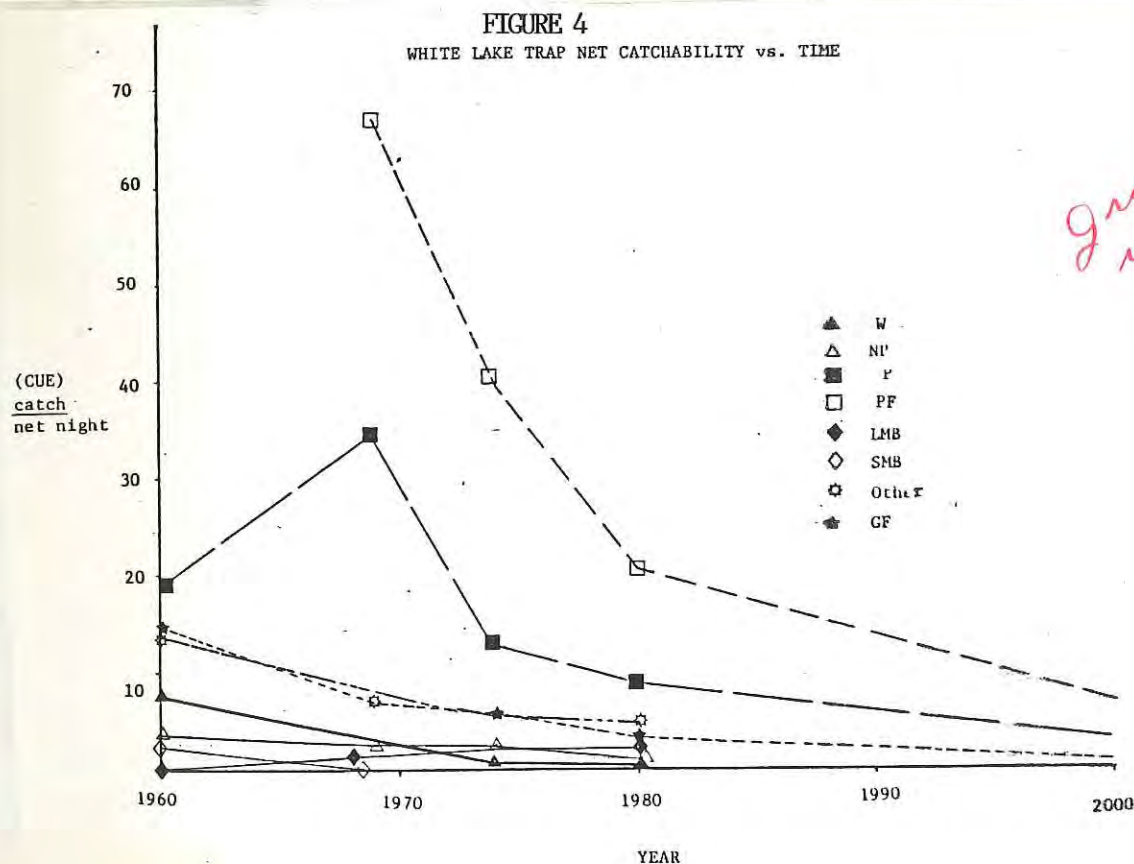
29

YEAR	LAKE SURVEY	MNR-CREEL CENSUS	AERIAL ANGLING PRESSURE	OTHERS	REPORT
1959				Biological Report on White Lake	L.H. Keman C.O.
1964		Summer Creel			Conservation Officer →
1965		Summer Creel			Raine
1967		Winter Creel			Raine
1968		Winter Creel			Raine
1969		Winter Creel			Stork & Beduhn
1969	Lake Survey				
1969		Summer Creel		Trap Net Study	Ellah Raine
1970		Summer Creel			Raine
1970		Winter Creel			Conservation Officer
1971		Winter Creel			Baldwin
1971		Summer Creel			
				Yellow Pickerel Stocking Project Stream Improvement Long Lake Creek 300 Plankton Study	Arnprior Fish & Game Club
1971					
1972		Summer Creel			Fralt & Tupling
1973					
1974		Summer Creel			Thomas
1975					Thomas
1976				Trap Net Study Ecological Study (1)	Thomas
1976					Bond (1)
1976/					Mulholland & Clayton
1977		Winter Creel			
				White Lake Management Plan	Von Rosen
1977					
1977			Creel Aerial		Kehoe
1977		Winter Creel	Creel		Hamilton (1)
1977				(1)	Kehoe & Strachan
1977		Summer Creel			Gopsill & Mulholland
1978			Aerial Creel Full		
1978			Aerial		Gopsill
1979			Aerial Creel		Lashley (1)
1979				(1)	
1980		Summer Creel		Study	Hamilton
1981			Aerial		

Sp

2.5.5 Current and Past Status of the Fishery

Since 1960, there has been a significant decline in trap net catchability - C.U.E. (Appendix I) of yellow pickerel, a gradual decline of northern Pike, and a decline in smallmouth bass. Over-harvesting of pickerel, northern pike and bass has occurred previous to 1980 (Fisheries Management Plan, 1982). Only largemouth and rock bass have increased in C.U.E. since 1960. Since the introduction of largemouth bass into the fishery in 1957, their relative numbers have increased dramatically. Rock bass have also increased by 302% over the same period indicating that the bass species have occupied portions of the former pickerel niche. Trap net catchability for gamefish and non-gamefish species for 1959-80 is exhibited on Figure 4.



Graph to be redone

2.5.5.1 Angling Pressure

The White Lake fishery is currently subjected to a 10.5 month fishing season, with the majority of the pressure received during the months of June, July, August; reflecting the heavy cottaging periods and other recreational uses. In the winter months the lake is subjected to 12,475 rod hours (1981) of pressure, representing 14.5% of the annual fishing pressure. In 1966/67 the winter fishery represented 20% of the total annual pressure of 60,000 rod hours.

Approximately 74% of the total annual fishing pressure in June-August accounts for 22% of the total pickerel harvest; whereas the winter pressure represents 14.5% of the annual pressure, accounting for 77% of the total pickerel harvest. The winter angling success rate is higher for December - February since an average of 1.8 lines are used, food sources are scarce and the pickerel are easier to catch just prior to spawning time. The first ice in December experiences the greatest impact on pickerel.

The winter fishery harvest is much more selective towards the sports fishery. While the summer fishery has a strong smallmouth bass component, the winter fishery has a significant impact on the pike and pickerel populations (F&W, Winter Creel, 1976-77). In the summer, 75% of the pike caught are kept, whereas in the winter 90% are kept. The difference can be attributed to difficulty in catching other species and, that pike are better eating during the winter months. All other species are susceptible to the heaviest fishing pressure during the summer months, with little during the winter months.

Of the total fishery, 100% of the total pickerel catch is kept, whereas 51% of northern pike, 40% of smallmouth bass and 56% of largemouth bass are kept. For other species only 31% of the total catch is kept (Table 2). At all times of the year pickerel are the preferred angling species.

TABLE 2

WHITE LAKE FISHERIES HARVEST (kg)

	<u>Pickerel</u>		<u>Pike</u>		<u>Smallmouth Bass</u>		<u>Largemouth Bass</u>		<u>Other</u>	
	<u>Kept(%)</u>	<u>Catch/Release</u>	<u>Kept(%)</u>	<u>Catch/Release</u>	<u>Kept(%)</u>	<u>Catch/Release</u>	<u>Kept(%)</u>	<u>Catch/Release</u>	<u>Kept(%)</u>	<u>Catch/Release</u>
May										
June	49(100%)	(49)	2450(45%)	(53)	648(40%)	(1621)	1621(56%)	(2919)	1189(27%)	(4439)
July										
Aug.										
Sept.										
Oct.	1(100%)	(1)	35(45%)	(78)	9(39%)	(23)	23(55%)	(42)	17(27%)	(64)
Nov.										
Dec.										
Jan.	169(100%)	(169)	762(90%)	(847)	-		-		439(83%)	(822)
Feb.										
kg	219(100%)	(219)	3247(51%)	(6315)	657(40%)	(1644)	1644(56%)	(2961)	1645(31%)	(5325)
kg/ha/yr	.10	(.15)	1.43	(4.35)	.29	(1.13)	.72	(2.04)	.72	(3.67)

TOTAL Kg 7 412 kg

Northern Pike make up the largest portion of the total harvest on a per weight basis, contributing a significant amount to the district fisheries target. Table 3 indicates the allowable harvest levels for selected species based on SPOF #12 guideline for optimum sustained yield (OSY - Appendix I).

TABLE 3 - Fisheries Harvest Distribution

SPECIES	PRESENT HARVEST			OSY (kg.yr. ⁻¹)	ANNUAL ALLOWABLE HARVEST(AAH) at % of OSY (kg)		CURRENT OVER/UNDER HARVEST	
	(kg)	#FISH	Avg. Weight (kg)		85% (#Fish) kg	67% (#Fish) kg	kg	% of Harvest
GAMEFISH								
Pickereel	226.9	(334)	(.68)	249.65	212 (312)	167 (246)	under - 22.7 kg	(9.1%)
Northern Pike	3 245.4	(4 773)	(.68)	1 951.80	1 659 (2 439)	1 307 (1 922)	over + 1 293.0 kg	(-66.3%)
Smallmouth Bass	658.2	(1 463)	(.45)	272.30	232 (516)	182 (405)	over + 386.0 kg	(142.0%)
Largemouth Bass	1 634.1	(3 631)	(.45)	2 655.00	2 257 (5 015)	1 779 (3 953)	under - 102.0 kg	(38.5%)
TOTALS	5 764.6	(10 201)			4 360 (8 282)	3 435 (6 526)		
COARSEFISH								
Panfish Perch	1 657	(15 061)	(.11)	12 369.00	1 001 12 369 + (112 445)		Under Harvest - 3 650%	

The 1981 Aerial Boat-Angling Pressure Assessment indicated that White Lake experienced the largest overall increase in fishing pressure of all district waterbodies surveyed, (an increase of 63.1% to 40.8% respectively). An estimated total of 285,504 rod hours of pressure is experienced on district lakes, or 26.2 rod hours/hectare with White Lake experiencing 30% of the total, representing 37.9 rod hours/hectare. The majority of fishing pressure is experienced during the week (55.4%) (weekends account for 44.6% of pressure). Traditionally, July experiences the heaviest fishing pressure (11.5 rod hours/hectare) with the June fishing showing a significant increase (almost 100%- White Lake, Fisheries Management Plan, 1981).

It has been estimated that the waters in Lanark County are able to support fishing pressures of 35 rod hrs/hectare/year (H. Von Rossen, MNR 1981). Angling pressure on White Lake now exceeds this figure with the lake experiencing an average of 37.9 rod hrs/hectare of annual fishing pressure. This angling pressure increase does not appear to be a result of changing behaviour patterns (ie. greater number of people fishing compared to other forms of recreation), but that more people are using the lake, as evidenced by 33% more boats observed in 1981 over 1978 (1012 - 761 respectively, MNR Aerial Creel, 1981). During this same period, the number of boats fishing increased (52% - 419 to 638 boats respectively). Overall, the percentage of angling boaters increased from 55.1 (1978) to 63.6% (1981), an 8% increase.

A 1977 creel census indicated the following breakdown of angler origin:

-Campers	32%
-Cottagers	14%
-Tourist Camps	45%
-Day Trippers	75%

Boating recreation accounts for 32% use of the lake, therefore 68% of lake boating use can be attributed to angling (1977 Creel Census - White Lake).

The current fisheries status of White Lake is summarized in Table 4.

TABLE 4 - White Lake - Fisheries Data Summary

TDS (mg.l ⁻¹)	MEI	Total Potential Yield (kg.ha ⁻¹ .yr ⁻¹)	Theoretical Yield by Species (kg.ha ⁻¹ .yr ⁻¹)	Present Capture and Release (Creel) (kg.ha ⁻¹ .yr ⁻¹)	Present Harvest (kg.ha ⁻¹ .yr ⁻¹)	Optimum Sustained Yield (OSY) Z by wt. kg.ha ⁻¹ .yr ⁻¹		Total Potential Yield for Lake (kg.ha ⁻¹ .yr ⁻¹)
130	38.8		Pickereel 2.16	0.10	0.10	1.4	0.11	
			Northern Pike 1.85	2.78	1.43	11.2	0.86	
			Smallmouth Bass 1.93	0.72	0.29	1.6	0.12	
			Largemouth Bass -	1.30	0.72	15.1	1.17	
			Perch 10.00	-	-	15.2	1.17	
			Panfish -	-	-	46.6	3.60	
		7.72	Other -	-	0.72	8.9	0.69	17 520.54
			TOTALS	7.25	4.17		7.72	

Based on Ryder's Index

Source: (White Lake Fisheries Management Plan,
CARLETON Place District, MNK.)

A comparison of theoretical yield (Appendix I) to current harvest of fish on White Lake reveals some interesting facts. The theoretical total yield for White lake is 7.72 kg/ha/yr. Presently the actual harvest is 4.17 kg/ha/yr which indicates that the lake is underharvested. It is necessary to examine a breakdown of harvest by species to appreciate the impact angling has on the fishery. For each species, an optimum sustained yield (OSY) figure has been calculated. The actual harvest figures show that coarsefish essentially go unharvested on White Lake. Among the gamefish species, pickerel are close to the optimum sustained yield, white pike and smallmouth bass being overharvested.

Calculations for OSY show a breakdown of 29.3% of total biomass (by weight) for gamefish and 70.7% for coarsefish. This is the optimum. Actual breakdown by weight shows a harvest of 78% gamefish and 22% coarsefish.

	optimum sustained yield	present harvest
gamefish	29.3	78
coarsefish	70.7	22
	100%	100%

A rebalancing of the fishery harvest towards the coarsefish species is preferable.

In summary, it can be said that the game fishery has crashed, but the lake is presently holding its own with respect to the mean annual increment of gamefish and the annual harvest, particularly the pickerel species.

2.5.6 Concerns for the White Lake Fishery

There are a number of ministry, municipal and physical restraints on the fishery resource and the achievement of targets.

Development pressure cause a direct stress to be placed on the fishery. Dredging, draining and infilling that is often associated with shoreland development has serious detrimental impacts on the fishery and the littoral zone. Shoreline development results in ~~increased or~~ accelerated land run-off and sedimentation of the nearshore area as well as a subsequent decline in water quality. As water quality declines, an imbalance between sportfish and coarsefish occurs. Manipulation of water levels also has an adverse impact on fish communities. The lowering water levels after spawning reduces production (DLUG, 1983).

*rolling
not
rolling*

Littoral zone disturbances cause a detrimental impact on fish species which inhabit the shoreline shallows area. In the past, dredging and infilling of the littoral zone on White Lake has destroyed fish habitat. The effect of outboard motor propeller wash is especially noticeable on White Lake since ~~as~~ it is shallow over much of its area. The rolling action by outboard motors on lake bottom sediments causes the sediment to resettle on sandy and rocky shoals and substrate, which are preferred spawning sites for pickerel and bass. The rolling action also causes a resuspension of nutrients, normally trapped in the bottom sediments, causing increased growth of aquatic vegetation and declining water quality.

The more sensitive fish species such as smallmouth bass, northern pike and pickerel spawn and rear their young in the areas that would be most seriously affected by continued and uncontrolled shoreline development, shoreland alterations and increased use of the littoral zone. The more resilient species (rock bass, sunfish, perch) are more adaptable to changing lake environmental conditions and are not expected to suffer extensive population declines as the shoreline becomes built up (New Official Plan, Background, LDNS Planning Area, 1983)

At this time the effects of acid precipitation on fish spawning stock in White Lake is unknown. It is probable that the acid shock/loading phenomenon has a related impact on the natural recruitment capabilities of gamefish, and may serve to explain the absence of a year class of fish.

Fish and Wildlife of MNR has identified variables that affect the fisheries habitat and populations (Appendix II).

2.5.7 Fisheries Management Options

Fisheries management for White Lake can be thought of as a three phase process involving both the environment and habitat.

1. The water level management plan was the initial step in a fisheries rehabilitation program by improving the spawning areas and water quality.
2. The rebuilding of the parent fish stock to a level affording a sustained natural reproduction.
3. The lake environment is now slowly being rehabilitated to provide suitable spawning conditions for pickerel and the lake has been modestly stocked an adequate number of pickerel fry to produce the required spawn. The only other fisheries option left where the ministry has direct control is to reduce angling pressure by various methods. Recognition and achievement of fisheries management objectives requires a drastic season cutback and/or an increase in size limits and/or lower creel limits and/or establishment of fisheries harvest quota system and/or gear limitations. While the potential yield has been determined, it would be poor fisheries management practice to allow the removal of the equivalent of the sustained yield annually (Lavant, Dalhousie and North Sherbrooke; New Official Plan, Background Report, 1982). A margin of safety (0.85) is incorporated in calculation of OSY values to allow for unpredictable events such as fish kills increased development and angling pressure. Additionally, fishing pressures on a fish community made up of several species may have a greater impact on some species than others (abid.). For White Lake, this impact species is the pickerel population.

It is recommended that the allowable harvest for White Lake should be 0.67 of the OSY value in order to enable faster rehabilitation of the fishery and to allow a greater factor of safety. Other reasons for adopting the 0.67 level are:

1. In anticipation of the 0.67 recommended allowable harvest level in the new official plan for Dalhousie, Lavant and South Sherbrooke Planning area.
2. To have compatible management policies with this planning area, and to avoid a shift in angling pressure from one lake to another if the allowable harvest levels were different as has been stated.
3. In anticipation of increased angling pressure.

Current fisheries management programs and target levels are based upon a percent of the optimum sustained yield (OSY), approximately 0.85 of the OSY value. Elsewhere, Lake Joseph (Lindsay District), a trout lake, has a recommended allowable harvest of 42% of the sustainable yield for the trout. Total harvest for all species is 67% (McCombie, 1981).

It is believed that the only feasible and direct management control that will significantly upgrade and sustain the gamefishery are more restrictive harvest controls. Various season harvest control options

were presented in the District's Fisheries Management Plan (1983). These are presented below, representing a range of results.

OPTION 1: Season and Creel Limit Combination

Closing fishing season from September 1 to June 1 of next year, including adjustment of daily catch limits of sports fish to an aggregate of 6 of which no more than two may be of any one species, plus increase size limit on pickerel to 40 cm and bass to 30 cm.

OPTION 2: Gear Limit

Limit of 1 line in winter.

OPTION 3: Season Limit Only

Reduce Pickerel and Pike season to; the first Saturday in June- September 8. The second Saturday in January- third Sunday in February. Possibly total closure of winter fishing. ~~White Fishery Rehabilitation.~~

OPTION 4: Location Limit

Designate Sanctuary Areas at specific times of year, where species are known to congregate during spawning.

OPTION 5: Catch Limit Quota

Manage Lake on a Quota System. Establish an acceptable annual sports fish harvest ceiling, expressed in angler days. This could be translated into individual sports fish day angling permits. Permits could be distributed at one or more strategically placed locations and day stamped. The sports fish season ends regardless of time of year, when all permits have been used. Lake specific legislation enacting a day permit fishery would be essential. Harvest level would be set at a percentage of OSY levels.

While all five options would provide a measure of improvement over current fisheries management, the first three options would not reduce the harvest of pickerel, pike or bass in sufficient numbers to allow for a full rehabilitation of the game fishery. Advantages and disadvantages for each respective option is listed in Appendix II.

2.5.8 Discussion

Currently, the only available management techniques are for seasonal and harvest controls to achieve a balance between existing harvests and optimum sustained yield. Continued increase in use pressures due to increasing development and day use activities will eventually require a shortening of the fishing season in order to reach a sustainable fishery. However, specific season adjustments are presently ~~thought to be unfeasible~~, since seasons must be established by regulation. In the past it was believed that lake specific seasons would result in the shifting of pressure from one lake to another. However, this has ~~not yet to been proven to be the case so far~~. This also suggests an underlying fisheries policy that allows for the downgrading of waterbodies, rather than implementing individual restrictive lake management regulations that recognizes the unique and significant nature of individual waterbodies. Individual lake regulations would be more compatible with the district's waterbody classifications.

2.6 Water Quality

White Lake has been described as a waterbody bordering between the late mesotrophic and early eutrophic state (Robinson; MOE, 1982). Eutrophication, (Appendix I) which describes a complex series of changes in a waterbody due to increases in the rate and supply of plant nutrients, is normally a slow process, but can be greatly accelerated by cultural influences. Algae production is not only regulated by nutrients, but also by environmental factors, such as; temperature, sunlight intensity and duration, and physical factors of lake size, depth, shape and flushing rate (see section 1.5). On thermally stratifical lakes in the shield area, advancing eutrophication is evidenced by; increased phytoplankton levels in late summer, reduced pH and dissolved oxygen levels in the deeper water, siltation of spawning beds and higher carbon dioxide, iron and nutrient levels, particularly evident in the deeper waters where reduction conditions exist (MOE, submission to USEPA, 1981). All of these conditions have been indicated in White Lake at one time. Water quality on White Lake is specifically affected by the amount of nutrient inputs, the lake water regime and previously described environmental factors.

2.6.1 Trophic Status Measurements: Chlorophyll $\bar{a}$ and Secchi Disc *Depths.*

The trophic status of White Lake was described in the preceding paragraph (2.6). A trophic classification involves many parameters; *including;* Phosphorous *and* nitrogen concentrations, Secchi Disc depths, *etc.* Chlorophyll $\bar{a}$ concentrations are recognized as the most useful criterion, as it is a parameter which integrates various physical, chemical and biological factors affecting the trophic state of a lake (MOE, 1983). The MOE trophic classification is presented below.

TROPHIC CONDITION vs CHLOROPHYLL $\bar{a}$

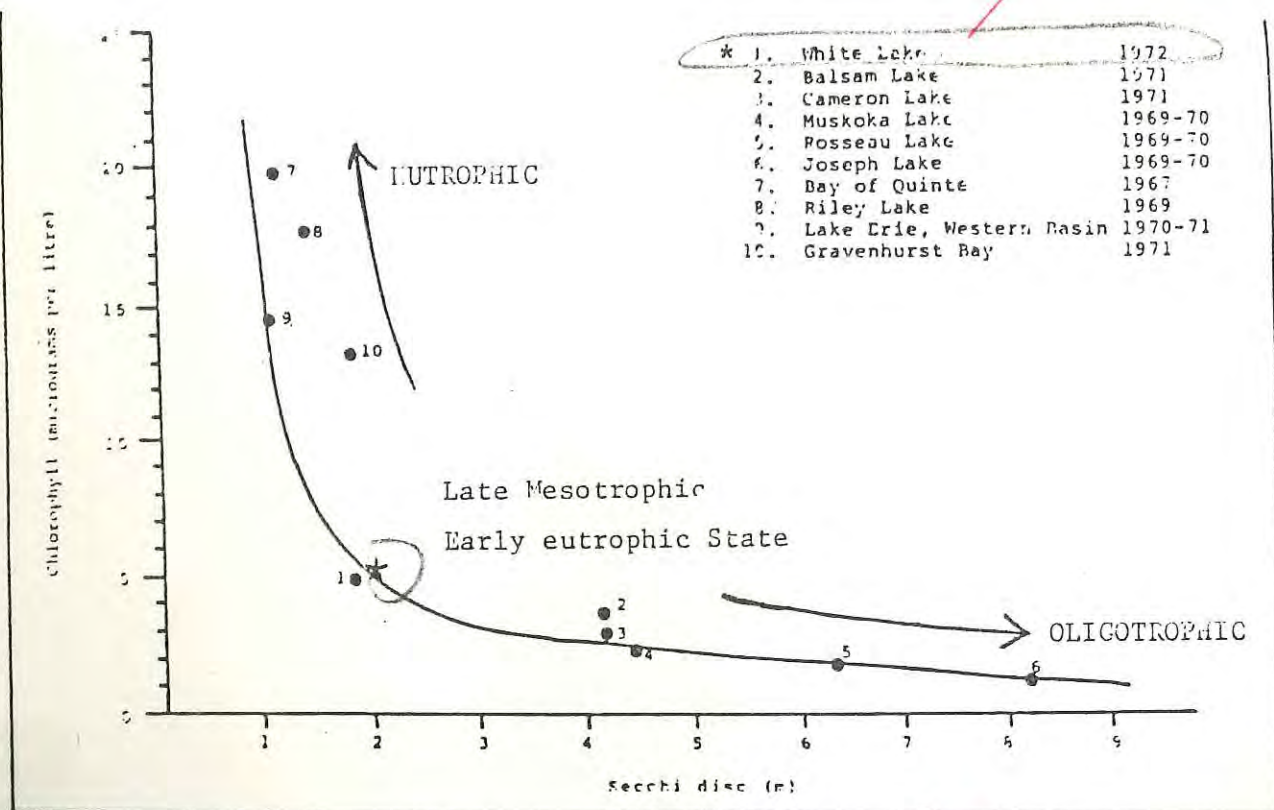
Trophic State	Secchi: Disc (m)	Chlorophyll $\bar{a}$ (ug/l.)
Oligotrophic	5.0 m	0 - 2
Mesotrophic	3.0 - 5.0 m	2 - 4
Eutrophic	3.0 m	>4

(Source; MOE, 1982)

The Secchi disc - chlorophyll $\bar{a}$ relationship is a well established indicator of trophic states. In comparison to 68 other lakes in Southeastern Ontario, White Lake was found to have below average water quality when using the trophic status indicators (Robinson; MOE, 1982) (Figure 5).

FIGURE 5
SECCHI DISC/CHLOROPHYLL A RELATIONSHIP

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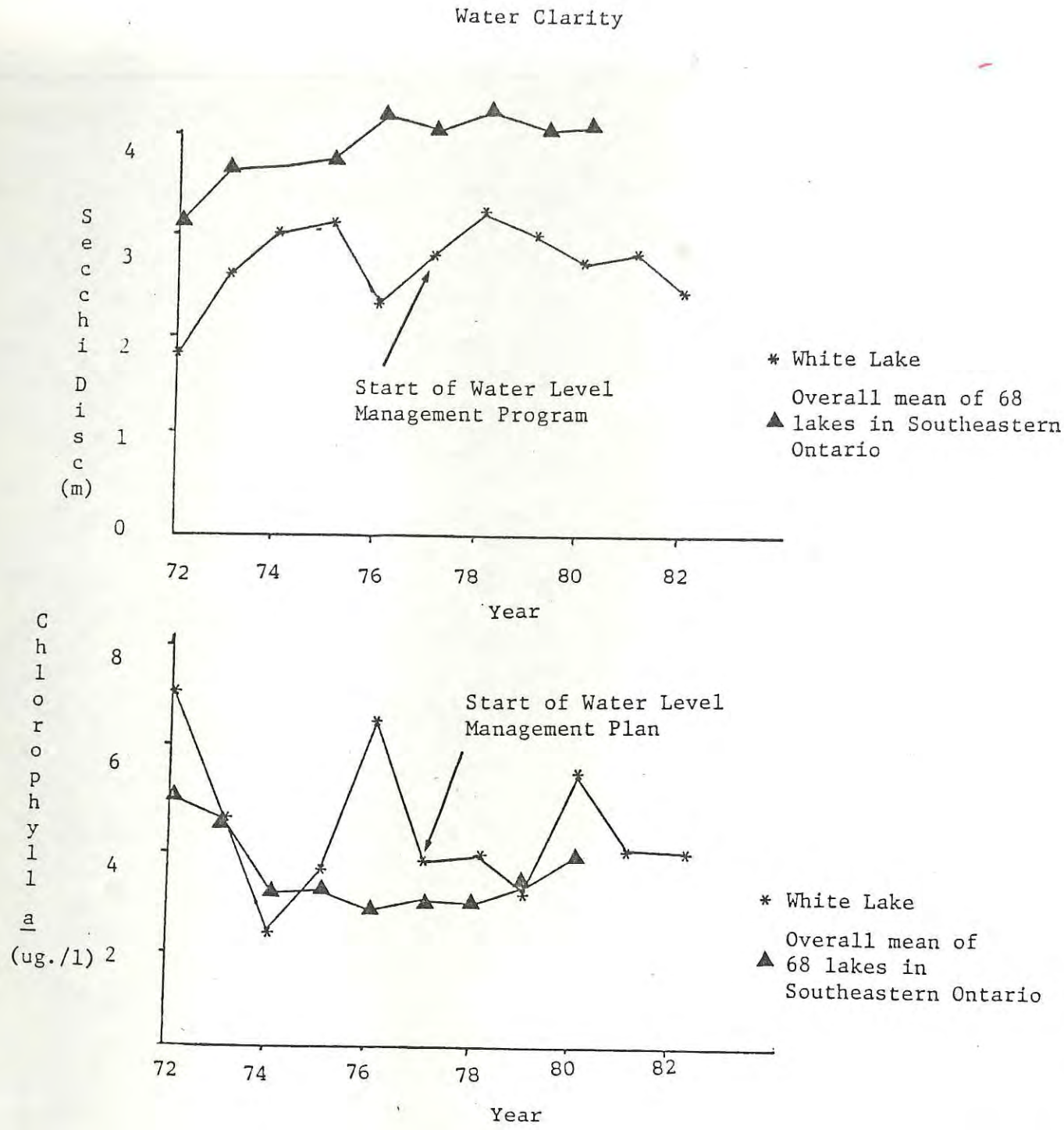


The relationship between Chlorophyll a and Secchi Disc for White Lake and for other well used recreational lakes in the province. All data are yearly means.

In 1972, secchi disc and chlorophyll a measurements indicated serious water quality problems, with the lake exhibiting an early eutrophic state.

The trophic status of a lake fluctuates over the summer period depending on temperature, degree of lake use and upstream activity; wide fluctuations can become evident during sampling periods. Water quality-trophic status values do not differ greatly between 1972 and 1982, (Fig. 6). Prior to implementation of the White Lake Fisheries and Water Quality Management Plan (1977), which restored the annual drawdowns to historic levels, water quality was declining noticeably.

FIGURE 6
White Lake Water Quality (1972-82)



Chlorophyll a concentrations of 3.9 ug/l (1981) and a high of 6.4 ug/l (1970) reflect occasional moderate to high algae densities. This level of chlorophyll a concentration is considered acceptable for most water-oriented recreational pursuits by the Ministry of the Environment (Michalski, 1972). White Lake has exhibited impaired quality in the past (1972), having a high chlorophyll a concentration of 9.0 ug/l in August. A water sampling project initiated in 1973 by MOE, conducted by the White Lake Water Quality Committee (WLWQC) and continuing under the Self-Help program, indicates that White Lake differs from other lakes. Other lakes exhibit algae blooms in the early spring and again later in the year, conversely White Lake exhibits none or little spring algae with a build-up in late~~x~~ summer, peaking in mid or late August (WLWQC report, 1973 Activities).

Seasonal fluctuations in chlorophyll a correspond to simil~~x~~ar fluctuations in water clarity. With an increase in chlorophyll a concentrations, turbidity increase, as indicated by reduced secchi disc depths (Figure 5) (1981 Self-Help Water Quality results).

Nutrient enrichment is associated with sedimentation and increases in the dissolved mineral content of the lake, specifically phosphate, nitrates, carbonates and trace elements. Increases in these nutrients occur as a result of rainfall, erosion and associated shoreline development, and precolation of soil water to the lake. The estimated annual supply of nut~~x~~rients to White Lake is listed below.

	kg.	% Total
Upstream Lakes	N/A	N/A
Land runoff	1842	45
Atmosphere	1702	42
Shoreline Development	507	13
Waste Discharge (unknown)		
Totals	4501 kg	100 %

(MOE, 1972)

Phosphorous (Phosphates) is the most significant contributing nutrient associated with eutrophication; stimulating the production of green plants (chlorophyll). The least desirable form of plant production is algae. The addition of more shoreline cottages and permanent home developments is often the principle cause of increased phosphorous supply to inland recreational lakes (M. German, MOE, 1980).

Lakes that are most vulnerable to water quality changes from increases in nutrient supply are those with shallow mean depths, small surface areas, low flushing rates, and incomplete mixing during spring drawdowns (MOE, Vol. II, 1980). White Lake exhibits varying degrees of the above factors, and as such is highly sensitive to nutrient inputs.

2.6.2 Bacteriological Water Quality

The presence of total and faecal coliform bacteria in water constitute important health considerations for drinking and water recreation. The presence of faecal coliforms are more likely to represent recent contamination and is of greater concern because of the risk of disease causing agents also present in the water being higher (MOE; Cottage Country, 1983).

2.6.2.1 Survey Results

A 1973 White Lake summer cottage pollution survey. *sampled 374 locations* In most cases the coliform counts were either very low or non-existent. Only nine samples had coliform counts exceeding 1,000. The higher figures were obtained on July 29, a peak cottaging period (MOE; Doyle, 1975).

The survey also determined that on May 27, 72% of all locations had water unsuitable for drinking and on July 29, 83% of all locations were unsuitable.

Of the 374 locations out of a possible total of 414 possible surveyed locations (75%) the following results were:

	Total %	Total %
Cottages with Pit Privies	62%	(232)
Cottages with Hydro Service	77%	(288)
Cottages with Septic Tanks	41%	(154)
Cottages with Seepage Pits (dry wells)	35%	(131)

	Locations with Measurable Counts 0/100 ml	Locations with Counts 10/100 ml
May 27/73	138 (36 %)	19 (5.1%)
July 29/73	210 (56 %)	-
Sept. 16/73	34 (9.1%)	38 (8.6%)

space The 1973 survey concluded that a large number of cottages were found to have defective/substandard disposal systems, and three island cottages were found to have no approved waste disposal system at all. As a result, the district health unit closed 3 cottages on the islands, prohibiting use of the cottages until approved systems were installed.

Subsequently the 1974 survey concentrated on 7 of the suspected worse areas. The sampling period covered the period August 8 to September 15. Coliform counts, however, were generally higher than in 1973. Except for seven (7) individual cases, all were within the MOE limits, and these seven samples only exceeded the limits once in the season. The geometric mean over the season was well below MOE limits for recreational water. ✓

In 1975 a MOE bacteriological survey concentrated on Three Mile Bay and Pickerel Bay, sampling 225 cottages and 5 tent and trailer parks with marinas. Twenty per-designated areas were sampled including an area near each of the commercial operations on White Lake. Those areas

A total of 196 cottages (84%) import their drinking water. Only 36 (16%) having on-site capabilities; such as wells, chlorinators, etc.

Except for the odd sample, 1975 results throughout the lake were generally good. The geometric mean of samples is thought to represent a truer picture of lake water quality.

2.6.2.2 Discussion

Many of the sewage disposal systems now used by cottages are substandard with respect to the 1975 regulations (other than setback distances), and remain operational only because of low use. However, additional use of the cottage over the year could lead to failures of the systems, which would require immediate rectification (Doyle-MOE, 1975). ~~The identified substandard systems were not requested to upgrade their systems.~~

The Ministry of the Environment concluded from the three years of results that the origin of the high counts could be organic material other than sewage and/or contamination due to animals. In essence, it is nature that has placed the lake in its present state. MOE feels that the lake is in a stable condition (ibid).

The 1973 survey indicated no evidence of a major bacteriological crisis but that cottages (lake users) do pollute the lake bacteriologically to a measurable extent, with a few 'dirty spots'. Bacteriologically the White Lake Water Quality Committee (WLWQC) concluded that there was remarkably low pollution and relatively good water quality. The lake is not a reliable source for drinking water, but is in safe condition for water recreation as swimming.

The reports illustrated that while many property owners are becoming more environmentally conscious, the lake is still being treated in numerous small and in some large areas as an organic garbage dump (WLWQC, 1973). This was thought to have serious implications on the lake's oxygen supply, and could deteriorate the water quality having serious implications for a number of recreational activities, particularly game fishing.

2.6.3 Dissolved Oxygen and Water Temperature Profile

The amount of dissolved oxygen is a critical factor in determining the suitability and ultimately the survival of fish species. Pickerel have a lower oxygen limit of 5ppm. White Lake has sufficient dissolved oxygen to support the warm water classification ~~has~~ assigned to the lake (Fisheries Management Plan, 1982).

White Lake is a shallow water body with water depths reaching depths of 10 m. in some places. Below 6.1 metres, oxygen levels are unsuitable for pickerel and other species, with less than 5 ppm concentration (Figure 7). Dissolved oxygen concentration is one indicator of water quality that may be a direct result of nutrient inputs and increased plant production. Oxidation of organic material utilizes the dissolved oxygen in water. The amount of dissolved oxygen is also dependent on water temperature. Generally deep cold water lakes have higher oxygen concentrations than shallow, warm water lakes. Winter is known to be a critical time for oxygen depletion especially in shallow warm water

lakes, (Everhart et. al., 1975).

Temperature profiles taken since 1959 indicate a warming trend over the years 1959-74. Summer profiles exhibit clinograde conditions. (Figure 8). Water temperature is determined by a number of factors including; depth, flushing rate, amount of nutrients and suspended organic matter, and the intensity and duration of sunlight. Temperature also determines the amount of dissolved oxygen in water, as well as determining the lethal limits for fish. Growth rates of various species are particularly dependent upon water temperature.

Figure 7

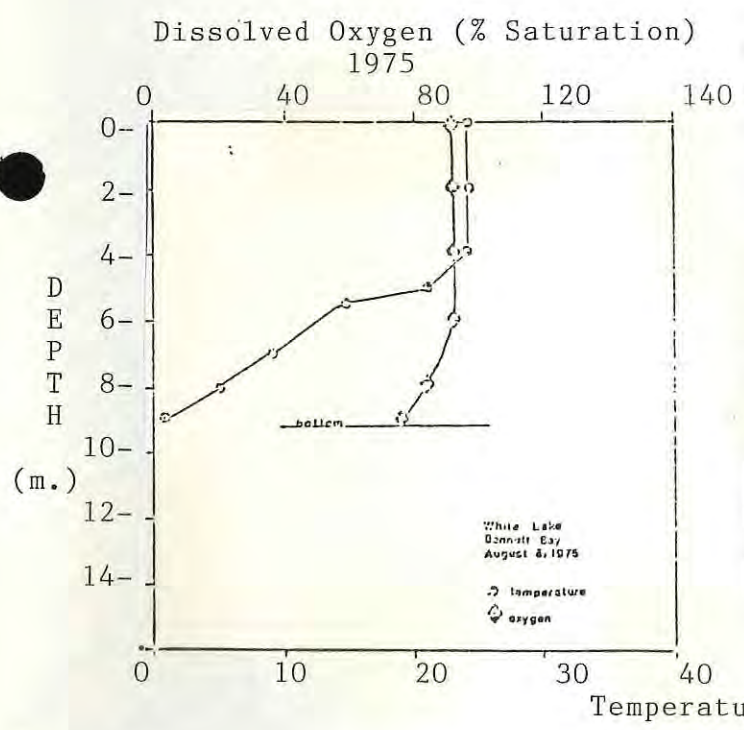
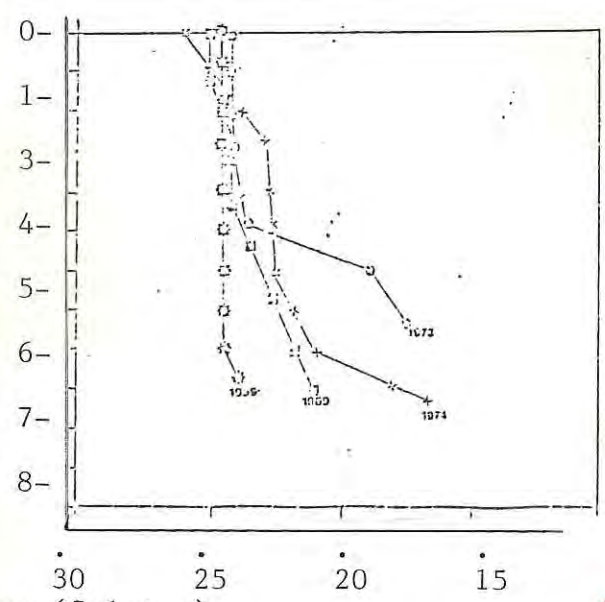


Figure 8

Temperature Profiles (1959-74)



2.6.4 Water Level Fluctuations

White Lake is an artificial lake that has always been subject to annual and seasonal drawdowns. From 1860-1960 a dam was operated by Stewarts Sawmill on Waba Creek with the floodgates opened regularly to allow for the floating of timber downstream. The frequent water fluctuations maintained a good flushing rate which kept the water clear, rocks clean and maintained a good pickerel fishery. Up to 1968, water quality (trophic status) at this time was good, with a satisfactory fishery. In 1968 a new concrete dam was constructed, with water levels kept high for cottagers and boaters. Water levels were kept high for the summer season followed by a winter drawdown. From 1968-76 stable water levels resulted in accelerated eutrophication with rapid growths of aquatic vegetation, reduced water clarity and subsequent failure of the pickerel fishery.

A ten year water management plan introduced in 1977 moderates the

extreme fluctuations while allowing for a gradual drawdown with fluctuations of approximately 0.76 m/year. Firstly, the purpose is to flush the lake throughout the summer, thereby eliminating the stagnate water. This is designed to reduce algae growth, and re-establish the pickerel reproduction by cleaning up the traditional spawning grounds. Secondly, the water drawdown exposes the spawning substrate to sun and wind action, which will effectively destroy calcareous algae growth on the shoals and substrate.

A second and subsequent purpose is to improve the water quality. Preliminary and subsequent assessments have indicated a measurable improvement in water quality.

Pickrel are now spawning on the re-emerging shoals, with the return of some fish species known to favour clean water (F&W file correspondence, Nov. 30/82). Figure 2.6.2 exhibits an increase in secchi disc depth and decrease in chlorophyll a concentrations in the first year following the start of the program.

2.6.5 Water Chemistry

Geochemistry is a critical element in determining the water quality of a waterbody. Results from a 1975 water chemistry study by MOE are presented in Table 5.

Given the size and varied morphology of White Lake, variability in water chemistry is to be expected. Despite the restricted nature of the 1975 sampling, obvious conclusions can be drawn. Firstly; nutrient levels (Nitrogen, Phosphorous) increase in concentration over the summer cottaging period. Alkalinity increased slightly over the same period, indicating that the buffering capacity is increasing also. Iron (Fe), while being an indicator of acidification, is in small relative concentrations, ~~so as to not initially indicate a potential problem.~~ ^{indicating that at this time there is not} Aluminum (Al), one of the major indicators of acidification, was not analyzed in this sampling, but should become a regular part of water analysis.

From this limited sampling, there does not appear to be a strong correlation between location and water quality. However, areas of extensive cottaging (ie. ^{higher} Three Mile Bay) tend to exhibit pH values and generally higher phosphate values than for the rest of the lake as a whole.

Subsequent water surveys by ~~Fish & Wildlife services~~ indicated slight increases in alkalinity, pH, total dissolved solids (TDS), indicating that the lake is becoming increasingly buffered against the effects of acid loading. An increase in erosion, sedimentation, siltation and nutrient deposits results in higher TDS and conductivity readings (Fish & Wildlife-White Lake Survey Summary, 1982).

Table 5

WATER CHEMISTRY - WHITE LAKE

Date	Secchi Disc (m)	Chlorophyll a (ug/l)	Colour Hazen	Alkalinity mg/l	Hardness (Ca Co ₃) mg/l	TDS mg/l	pH	Total P ug/l	Total N ug/l	Iron mg/l	Silica (clay particles)
*1975 STN											
May 1	2.9	-	15	104	110	136	8.5	18	320		1.9
May 2	2.9	-	15	114	118	150	8.4	16	350	.05	1.6
May 15 3	3.5	-	10	112	116	150	8.2	14	380		1.2
May 1	3.1	1.8	-	-	-	-	-	-	-	-	-
May 28 2	2.7	2.9	-	-	-	-	-	-	-	-	-
May 28 3	3.7	4.9	-	-	-	-	-	-	-	-	-
June 1	5.7	2.2	-	-	-	-	-	-	-	-	-
June 2	4.3	3.8	-	-	-	-	-	-	-	-	-
June 9 3	4.0	2.8	-	-	-	-	-	-	-	-	-
June 1	4.3	3.3	-	-	-	-	-	22	510	-	-
June 24 2	4.0	3.4	-	-	-	-	-	20	490	-	-
June 24 3	3.0	4.0	-	-	-	-	-	24	500	-	-
July 1	2.7	4.4	-	-	-	-	-	32	600	-	-
July 14 2	3.4	4.9	-	-	-	-	-	26	550	-	-
July 14 3	2.4	4.6	-	-	-	-	-	24	590	-	-
July 1	2.7	3.2	-	-	-	-	-	18	550	-	-
July 22 2	3.7	2.7	-	-	-	-	-	26	540	-	-
July 22 3	3.7	3.6	-	-	-	-	-	22	480	-	-
Aug. 1	3.0	3.0	-	-	-	-	-	20	470	-	-
Aug. 6 2	2.4	3.5	-	-	-	-	-	20	250	-	-
Aug. 6 3	2.4	4.5	-	-	-	-	-	20	480	-	-
**Aug. 1	4.1	-	5	108	116	120	8.5	36	640		2.2
Aug. 6 2	3.8	-	15	108	118	114	8.4	26	220	.05	2.0
below 3	2.6	-	10	108	118	121	7.8	34	400		2.1
above 1	-	-	10	108	118	124	8.4	34	370		2.3
2	-	-	15	112	120	120	7.5	18	550	.05	2.3
3	-	-	10	108	108	118	7.8	18	510		2.3
Sept. 1	3.7	5.6	-	-	-	133	-	30	480	-	-
Sept. 2	2.9	8.5	-	-	-	138	-	26	500	-	-
Sept. 3	3.4	4.6	-	-	-	136	-	20	500	-	-
Sept. 16 1	4.9	2.9	-	-	-	-	-	18	400	-	-
Sept. 16 2	3.0	5.9	-	-	-	14	-	20	300	-	-
Sept. 16 3	2.4	2.5	-	-	-	136	-	38	1000	-	-
MEAN 1	3.5	3.5	10	106	113	130	8.5	22	469		2.1
MEAN 2	3.3	4.7	15	111	118	136	8.4	21	384	.05	1.8
MEAN 3	3.2	3.9	10	110	117	136	8.0	23	513		1.7

* SURFACE TO BOTTOM COMPOSITE SAMPLE

** 1 METRE BELOW SURFACE & 1 METRE ABOVE BOTTOM

ALL OTHER DATES ARE EUPHOTIC ZONE COMPOSITE SAMPLES

STATIONS 1 Three Mile Bay
 2 Bennett Bay
 3 North Basin

Source: (NOE, 1975; Water Quality/White Lake)

2.6.6 Other Water Quality Concerns

2.6.6.1 Acid Precipitation

The normal pH of atmospheric precipitation is ~~pH~~ 5.6 in equilibrium with atmospheric carbon dioxide (CO₂). Precipitation in the Carleton Place District averages pH 4.2; but has been recorded as low as 3.2 (Ontario Ministry of Environment, Submission to USEPA., 1981).

Wet acid precipitation in eastern Canada is 20.45 kg/ha/yr. in CaCo₃ (Calcium Carbonate) equivalent. Dry fallout is characteristically 40% of wet disposition. Total wet and dry acid precipitation is in the order of 28-63 kg/ha/yr. The total acid precipitate (fallout) falling on White Lake (area 2,269 ha) is in the order of 70-148 tonnes annually. The district and planning area is in the area of heaviest fallout of acidic precipitation for Eastern Canada (ibid).

2.6.6.2 The Effect of Acid Deposition on Aquatic Systems

It has been stated that lakes in eastern Ontario are not affected by acid precipitation due^{to} the good buffering capacity of surrounding soils (German; MOE, 1981). However, local variations and exceptions are known to exist. The Precambrian Shield has been categorized as being sensitive to acidification and White Lake is on the edge of the Shield. Few, if any limestone soils (CaCo₃) are found in the immediate lake area, thus the surrounding White Lake soils are not well buffered and may be susceptible to acidification.

As a general rule, lakes in the Shield are surrounded by insoluble silicate rocks resulting in soft water sensitive lakes. It is well documented that locally variable glacial deposits are important determinants of acid susceptibility. The low amount of silica (silicates) in the area (Table 2.6-1) supports this.

Detailed studies on the affects of acid precipitation on lakes in southeastern Ontario has not been undertaken. ~~Specifically,~~ studies pertaining to the secondary effects, such as; increased nutrient loading from soil leaching which is accelerated under acidification and, the effects the acid shock effect during the spring run off need to be addressed.

Water pH 8.3 (Table 2.6-1) and an alkalinity of 110 mg/l suggest White Lake is well buffered and not susceptible to acidification. Despite this, it is not yet certain whether or not this lake and area is sensitive to acidification.

White Lake is within the heaviest fallout zone for acid rain in eastern Canada and it is possible that leaching of soil minerals and cations may have a more significant impact on the water quality than was previously thought.

The latent and cumulative effects of acid precipitaion may be a significant contributing factor to the deterioration of the White Lake gamefishery. The 1980 Trap Net Report indicated a noticeable absence of pickerel in the age III class. This may be indicative of the trapping skills and methods employed at the time. However, future trap netting will indicate whether or not there are any fish in that particular age class, thereby indicating a correlation between acid stress/spring shock to the absence of a particular age class. The

impact of acid rain on fish population is widely publicized.

With reduction in a lake's buffering capacity and the summer pH drops below 5.5, fish populations decline rapidly. One of the best indicators of acidification stress on fish is a shift towards younger age classes in fish species. In acid stressed lakes, the acid shock loading in the spring may be responsible for an absence of a year class of fish, primarily due to a temporary drop in pH and increases in aluminum concentration (in solution). Aluminum is a major constituent of bedrock in the Precambrian Shield and is lethal to fish when found in toxic levels greater than 0.1 mg/l (Great Lakes Water Quality Board, 1976). Acid precipitation can also increase the leachate rate of metals from the watershed soils and bedrock.

It has been noted that the population of bullfrogs in the White Lake Planning area has been declining. Amphibians (bullfrogs) are highly susceptible to acidification. Where the cause of the population decline is not known, it is not likely attributed to overharvesting or water level drawdowns alone.

Algae is normally linked with nutrient enriched, high pH waterbodies. White Lake has had algae blooms in the past. In acid stressed lakes, algae undergoes a species change which is detrimental to the recreational lake use and poses a threat to aquatic habitats (Ont. Submission to USEPA, 1981). Lakes with a reduced pH support a proliferation of benthic filamentous algae (Appendix 1) which covers the gravel spawning beds, thereby impeding, if not totally restricting spawning successes. All of these results have been described for White Lake at one time or another.

2.6.6.3 The Effects of Lake Bottom Sediments on Water Quality

Profundal sediments in a lake are usually fine grained due to the nature of settling and their planktonic origin. Sediments can contain both organic and mineral matter, being allochthonous and autochthonous respectively (Appendix I).

Sedimentary deposits in oligotrophic lakes are scanty and mineralized, having a low organic content because of the abundance of dissolved oxygen overlying sediments thereby allowing for bacterial decay.

For eutrophic lakes, lacustrine sediments are called gyttja (Appendix I), consisting of a mixture of humus, fine plant fragments, algae remains, quartz and mica grains, diatom fistules, exoskeleton fragments and spore and pollen relics (Cole, 1975). In deeper waters gyttja becomes compact and gelatinous. Nitrogen and phosphorous nutrients are abundant in gyttja and phosphorous is commonly associated with the elements iron, aluminum and to a lesser extent calcium (abid).

White Lake has been subjected to low levels of dissolved oxygen in the deeper waters, referred to as an anoxic condition. In this state, different organic sediments form, giving off the familiar marsh gas methane. The latter phenomena has not been reported for White Lake.

The Sappropel organic matter associated with anoxic conditions is black in colour. This may overlies gyttja sediments, and thus reflect a long term change in the annual oxygen regime which is usually affected by organic pollution. This overlying layer of sappropel can be indicative

of organic pollution from shoreline developments or upstream sources. This has not been determined for White Lake at this time.

In studying the potential effects of acid precipitation on aquatic systems, the geological setting is generally described in terms of glacial sediments and bedrock of the area adjacent to the shoreline, or from bottom grab samples or cores from a few centimetres to a few metres in length (W.W. Shilts, GSC, 1982). However, very little concern has been expressed as to the nature of the unconsolidated sediments that lie beneath the floor of most lakes. Shilts (et al, 1982) has determined that the vertical and areal distribution of sediment facies in lakes must be considered in evaluating changes that are likely to occur in acidified ground or surface waters entering the lake. The amount and type of fill could be of critical importance in evaluating the effects of inflow of increasingly acid surface water and groundwater expected to be generated by acid rain (Shilts). In a lake with very little glacial or postglacial sedimentary deposits, the sensitivity to acidification is closely related to the capability of surrounding bedrock to react with and buffer acid ground and surface waters. However, a lake bottom that is overlain with thick late-glacial lacustrine silty clays may have significant capacity to buffer groundwater and may provide some buffering capacity at the sediment-water interface. Where the lake bottom is heavily mantled by postglacial gyttja (organic detritus), the buffering capability of the glacial sediments is substantially reduced at the sediment-water interface. Grab-bottom samples taken from White Lake indicate that 80% or more of the bottom is covered with postglacial organic material, 10% silt, and 10% exposed bedrock. Sediment cores taken in 1973 indicated significant Eogenic calcium carbonate precipitation, as observed by the thick marl deposits (gyttja). These deposits are indicative of periods of heavy photosynthetic activity.

MOE investigations revealed that in the Hardwood Island area there is 3 metres of suspended material (fine organics) and 3 metres of pure organic material on the bottom (Doyle, MOE, 1975).

With much of the lake bottom sediments covered in gyttja and/or spropel, the glacial sediment-water interface is reduced in area, and thus may not provide the amount of buffering that is expected with clastic carbonate sediments. Thus the true acid buffering capacity of the lake remains in question and thus questions the current belief that the lake is not sensitive to acid precipitation effects. White Lake, within the Precambrian Shield area, is surrounded by granitic bedrock and acid soils. It is likely that the lake bottom is underlain by CaCO_3 - glacial sediments, originating from the Paleozoic limestone formations to the east. However the extent and nature of laminated sediments is unknown. To understand more fully the effect of the bottom sediments on lake water quality, more detailed information on the type and origin of these sediments is required.

2.6.7 Water Quality Management Concerns

Contemporary concerns relate to how shoreline developments affect the degree and rate of natural eutrophication. White Lake is a headwater lake and as such is thought to be less susceptible to the effects of nutrient inputs than downstream lakes having development, since its nutrient inputs are largely local. While there is a low amount of nutrients from upstream sources, there is also a lower nutrient outflow

due to restricted water replenishment. A low flushing rate and a restricted outflow contributes significantly to White Lake being highly susceptible to nutrient inputs and thus eutrophication. Michalski reported that White Lake was in early stages of eutrophy (MOE,1972). Such a condition is not conducive to the ecological well being of the pickerel fishery, as they are best suited to mesotrophic conditions. Should regular water drawdowns be discontinued a recurrence of algae blooms and an overall deterioration in water quality and related concerns can be expected.

Sc

In addition to faecal coliforms that may be entering White Lake from faulty sewage disposal systems, an undetermined amount of nutrient enriched leachate is entering the lake and contributing to nutrient enrichment, increasing phytoplankton growth and subsequently, accelerated eutrophication. From other studies (MOE; Mississippi Lake 1976), it is unclear if the bacteriological water quality of small freshwater lakes is greatly affected by moderate shoreline development. The Mississippi Lake and other studies by MOE have shown that bacteriological indicators have increased in the vicinity of cottage development and various other types of human activities. Recreational activities are known to have isolated effects on lake water quality (Wagenet and Lawrence, 1979).

The most frequently impaired areas are mouths of inflowing streams, areas of low water flow, entrapped bays and in areas where a large number of septic tanks are found. Rainfall events result in an increase in faecal bacteria levels with the effect lasting up to 2.3 days after the event (Hendry & Toth; MOE, 1981).

Problems associated with sewage effluent discharge into a lake are:

1. Sewage temperatures influences the rate of biological activity and oxygen solubility. Turbidity from sewage hinders sunlight and reduces the growth of oxygen producing plants.
2. Sewage biodegradation uses up dissolved oxygen, reducing oxygen levels, especially at the bottom.

In the Precambrian Shield where the only activity in the watershed is recreational, the major contributor of nutrients is the cottager. The relative importance of nutrients from sewage systems as a contributor to water quality degradation varies with the location and type of activity in the watershed.

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2.7 Areas of Significant Interest

These are areas which have natural or cultural features that are an essential part of the ecological system and add to the character of the planning area. These areas are susceptible to damage if the use made of them is not controlled. This could mean prohibiting the type of development or use which could endanger the characteristics defining the area as sensitive or, encouraging a non-destructive use of the area. There are five categories defining areas of special significance;

- Vegetation
- Fish & Wildlife
- Geology & Landforms
- Historical & Cultural, and
- complexes of all four.

2.7.1 Vegetation

Opposite Hardwood Island, the north shore has good quality white pine stands. Much of this area is crown land and is therefore not subject to development pressures. Harvesting and other forestry practices on the shoreline should be in accordance with approved forestry management practices, recognizing in particular the management concepts of Modified Management Areas (MMA's). The wildrice beds on White Lake are significant natural features worth protecting from development and inappropriate harvesting (Appendix C).

2.7.2 Fish and Wildlife

There are numerous areas around the lake which are of special fish and wildlife significance (Appendix C). Spawning areas have been described in the fisheries section (2.5) and can be described as locally significant areas. These are:

1. The Darling Round Lake/Raycroft Creek Areas is valued for:

- waterfowl breeding and staging
- furbearer production - muskrat
- amphibian habitat - bullfrogs
- an important historical pickerel spawning area, especially Darling Round Lake
- pike and largemouth bass spawn in the marsh area.

The proposed Birchwood Falls development in this area could have a detrimental effect on the significant ecological nature of this area. It is recommended that this area be designated an Environmental Protection Zone or a Stream-Wetland Zone prohibiting any further development within the immediate area. Given the diverse nature and ecological importance of the area, a sanctuary designation may be more appropriate.

2. Fish Creek (North shore)

Traditionally one of the better spawning areas for pickerel on White Lake, however the creek area has been dammed by

52

beavers. Besides supporting beaver populations, the area is an important habitat for muskrat and waterfowl, as well as pike and largemouth bass.

3. Broad Brook Creek (Southwest Shore)

This pickerel spawning area has declined in importance recently due to a drop in water levels, resulting in the fish fry getting caught up the creek.

4. Waba Creek Dam Site This is a catchment area that attracts spawning pickerel in the spring.

5. Island Shoals

Pickerel spawn on the shoals around most islands.

6. North Basin

This area is a shallow weedy bay noted as a waterfowl breeding and staging area. The north-west shore of the bay is important for waterfowl, wildrice production as well as prime habitat for pike and bass and pickerel spawning.

7. Hayes Bay

This shallow bay area is a waterfowl breeding and nesting area as well as bass and pike habitat.

8. Bane Bay

This area is important for waterfowl breeding and staging, as well as being a good habitat for muskrats. Pike and bass are known to spawn in these shallow waters.

9. Eggshape Bay

This is a well known bass spawning area, as well as as a waterfowl habitat.

10. North Shore

The shore area opposite Berry Island- Fish creek is inundated with numerous creeks and backwaters, providing the ideal habitat for a large beaver population.

It is recommended that a rezoning of the above sensitive areas (ie. wetlands) to special environmental protection zones, restricting any forms of shoreline development, is highly desirable as a means of maintaining the diverse ecological nature of such areas.

2.8 Parks & Recreation Facilities

2.8.1 Introduction

Much of the district's recreation targets are expected to be met by four provincial parks, with White Lake not expected to contribute significantly to these targets. The remaining target potential will be provided by the private landowner.

The parks branch has a mandate to protect provincially significant elements of Ontario's natural and cultural landscape. However, these objectives are primarily oriented towards provincial parks. White Lake

is not known to have any provincially significant natural or cultural features. Locally significant interest areas were described in a previous section (2.7). White Lake does not contribute significantly to district targets for swimming, picnicking or camping.

A number of recreation activities takes place outside of the provincial parks where the Ministry does make a contribution. Since no targets are assigned, it is assumed that the current amount of public land is to be maintained.

2.8.2 Access Points

The extent of recreational use of Crown land in the White Lake area is not known. The Ministry of Natural Resources maintains three water access points all on Crown land, two of which are within the Carleton Place District and the other is the Pembroke District of the planning area (Appendix A).

The Lowney Lake access is a lightly used access that is not longer maintained by this Ministry. The west end access, (lot 27, Con V, Darling Township is an intensely used boat access, providing access for the Lanark-Calabogie end cottagers. The other crown access point is in the Pembroke district, at the White Lake Dam site.

Including the Lowney Lake access point there are a total of ten access points, providing public and private:

Public Launching Ramps	5
Marinas	4
Others	1

The White Lake village area has two access points, federal and municipally operated. Ministry access points are simple and do not provide camping or picnicking facilities. A new provincial policy calls for the removal of picnicking facilities from Crown access points. At this time, there are no plans or needs for additional crown access points on White Lake as the lake is already extensively used.

2.8.3 Camping & Other Recreational Use

Crown land is open for use by the public and provides opportunities for extensive recreational facilities including hiking, snow-shoeing, snowmobiling, skiing and camping. Camping has been popular on some Crown islands, notably Hardwood Island. Picnic sites on Crown islands were installed by this Ministry. Public camping space is available on the east shore of Three Mile Bay peninsula (Lot 24, Conc. 9, Darling).

Cross country and hiking trails totaling 19 km. were proposed in 1978 for Darling Township in conjunction with proposed forestry operations. This would link up with trails already existing in the area, extending from highway 511 east around the south end of Darling Round Lake to Three Mile Bay (Management Plan, 1978-1998). A local snowmobile club maintains a trail from White Lake to Calabogie lake.

White Lake serves as a major recreational area for the Ottawa area, with tourism constituting an important part of the local economy. The lake is subject to the following user days:

Summer angling days	17045
Winter angling days	2950
Boating days (non-angling)	11080
Snowmobiling days (non-angling)	100

	31175 user days

Angling continues to be the most popular form of recreational use made of the lake, representing a value of \$533,340 per year to the local economy (Fisheries Management Plan, 1982; Carleton Place District). The pickerel fishery accounts for 30% of the lake tourist and outfitters trade. Cottagers account for approximately 50% of the lake use. The four lodges on the lake attract large numbers of non-local users for angling. Specific lake recreational angling use is apportioned accordingly;

Tourist Camp Quests	45%
Campers	32%
Cottagers	14%
Day Trippers	10%

(Source: F & W File, Carleton Place District)

✓ 2.8.4 Recreational Use Concerns

55
no! see table 7-
contents

As with any large and diversified group of lake users, varied use of the lake brings about conflicting demands for limited lake resources. Pleasure boaters want the lake managed for their preferred recreation, requiring the maintenance of high water levels throughout the summer and early fall. Fishermen and tourist outfitters want an improvement in the pickerel fishery. The ministry is presently operating a pickerel habitat rehabilitation program, which requires an earlier scheduled lowering of the lake levels. Cottagers want high levels in the summer to permit easy access, whereas in the winter owners of docks and shoreline boathouses want lower levels to limit ice damage to docks and shoreline structures. Sawmills and a generating station downstream need a steady water flow for their operation. Duck hunters prefer high water levels until late fall. Trappers want the fall and winter levels stabilized by September 1 to provide for safe wintering conditions for furbearing mammals, as well as for amphibians. Based on this diversity of interest it is difficult and often not possible to manage the lake to the satisfaction of all resource users.

As with other crown islands in the district, these islands may be subject to intensive use. The ministry will continue to permit camping on crown land and islands of White Lake, but will monitor these for signs of overuse and adjust its policies accordingly.

Power boating is not a major problem on the lake at this time, as the shallow nature over much of the lakes is a natural deterrent to extensive power boating use. However, water quality problems and the lake physiography can lead to enhanced environmental problems when subjected to the rolling of bottom sediments by power boats.

not sp - !

The access point at the west end of the lake is intensively used. Soils in this area are thin and intensive recreational use could have a greater impact on the fishery here than elsewhere.

A planned extension of the Snye Road across Raycroft Creek would likely have a deleterious effect on the wetland area associated with this area. The potential increase and greater intensity of use from the proposed Birchwood Falls development could have a significant impact on the littoral zone in the area. Any docking facility for such a development should be centralized to limit the extent of littoral zone disturbance and keep the number of private docks at a manageable level.

2.9 Field Services

The Field Services Branch of MNR undertakes forest fire and engineering programs involving fire suppression and control, building of access roads to Crown timber resources, construction and maintenance of dams for water level control for flood control and fisheries requirements, and serves as the co-ordinating agency in flood emergency planning and response.

2.9.1 Programs

Field services' programs for the White Lake area are described below.

2.9.1.1 Water Level Control

The Ministry controls water level control on White Lake through operating of the dam at White Lake village. The purpose of the operation plan is to provide suitable water levels for recreational purposes during the tourist season and to provide adequate water levels for fish and wildlife concerns. The operational plan is described further in section 1.5.4.2.

2.9.1.2 Flood Control

White Lake is a headwater lake that is normally not prone to flooding being that there are no large upstream lakes or rivers. Because the lake is shallow and has a long shoreline, there are occurrences of local flooding (Appendix A). The initial responsibility for flood response rests with the municipality. In organized municipalities outside of conservation areas, such as the White Lake Planning Area, the Ministry:

- Maintains a provincial flood working area system to alert municipal representatives, local police, etc.,
- Stimulates contingency planning by the municipalities and,
- Responds to requests by the municipality for provincial assistance with respect to a flood emergency provided the municipality has undertaken all available means at its disposal.

(Planning for Flood Emergencies, MNR, 1980)

In ^{the} event of a flood emergency, the White Lake dam would be operated as a flood control structure, abandoning the operational target levels.

2.9.1.3 Fire Control

White Lake is within the provincial Fire Protection zone, including crown and patent land. Fire protection for the northern townships is detailed in the Carleton Place District Forest Fire Control Plan.

The responsibility for forest fires in Ontario rests with the Minister of Natural Resources. In organized municipalities this responsibility is subsequently assigned to the municipality. All municipalities surrounding White Lake have fire agreements with the Ministry regarding

fire control responsibilities and cost distribution. All municipalities have municipal fire departments except the Township of Darling. Consequently, the Ministry of Natural Resources becomes more involved with fire control in Darling Township than in the other municipalities.

In the White Lake Planning Area, Ministry responsibilities include;

- Detection (organized)
- Prevention (education, legislation and enforcement)
- Fire Suppression Training
- Fire Suppression backup assistance to support municipal responses to fire occurrences.

In the White Lake area, fire permits are required from April 1 to October 1 in the fire region. Two fire permit issuers are on the lake, Pickerel Bay Lodge and Cedar Cove Park on Three Mile Bay. A ministry appointed fire warden on the lake is responsible for issuing permits and taking action on fires.

Since 1973, aircraft have been used to meet all of the district organized detection needs (Carleton Place District, Forest Fire Control Plan, 1983). During the fire season, high and extreme hazard periods, the Ministry carries out special truck patrols in areas frequented by tourists.

The Ministry, specifically the Field Services Branch, reviews severances and plans of subdivision for forest fire concerns.

2.9.1.4 Access Roads

Field Services builds access roads for fuelwood, pulpwood and timber harvesting as well as for service programs such as providing access to remote areas and waterbodies for fish and wildlife. Timber licences also build forest access roads, but these are usually temporary.

The Crown forest access road located in the area is the Lavant Long Lake road. Planned Crown access roads for 1978-88 within the planning area are:

1. Northeast extension of the Lavant Long Lake road.
2. Lavant Long Lake to Folger road.
3. Billa Lake road, and
4. East Darling Long Lake road.

Temporary access roads will also be built and maintained for a period required to extract the timber and conduct the necessary silviculture treatment. Depending on the type of timber, the period of road operation may vary from one to three years (Forest Management Plan). The Ministry will also build class ER-C 'one-shot' roads to specified fuelwood areas, averaging about 2 kilometres annually.

2.9.2 Concerns

Approximately 78% of the total land area in Darling Township is in productive forest. The area south of Three Mile Bay area is primarily conifer fuel type, whereas the east of the lake area, agricultural use is dominant.

The fire occurrence in the past in the lake area has varied from extreme, (more than 1 fire/1000 acres/decade) to moderate to high, (1 fire/1000 acres/decade). The Hayes Bay area, Three Mile Bay and western arm are risk areas. White Lake has areas under intensive timber and wildlife management which now bear not only the cost of all standard habitat improvement work, but also the timber value itself. These areas have very shallow soil, with organic soil material to the bedrock in most cases. Fire would completely destroy all present growth in the area as well as preventing future growth for a lengthy period.

Forest Fire Management objectives are being reviewed but are unavailable at this time. In the interim, the Ministry's fire exclusion policy prevails. Every unit of area burned is equally undesirable. Due to the negative effect of fire on the area, fire will be excluded in all cases.

(? may Δ)

Fires caused by recreation are the most prevalent of all man caused fires (1960-69). Records indicate that the fire occurrence for this area is highest during the months (in order of rank), June, July, May and August for 1960-69. One of the worst fire seasons on record was 1977, with 19 fire occurrences with a large percentage caused by lightning.

The majority of fires occurred along travelled roads, as well as a number along lakeshores, indicating fire occurrences in areas that would be used for recreational purposes. For 1981-83, 83% of all fires occurred in April and May. Given the time and location of the majority of the main fire occurrences, it is apparent that with the influx of tourists and non-residents each year, the fire occurrence rises (Forest Fire Control Plan, Carleton Place District).

With increased shoreline development and associated recreational use of the lake and environs, the incident of forest fires~~x~~ occurrences will continue to rise. While shoreline development causes some concern for fire risks, development of backshore areas is cause for even greater concern. More available fuelwood, more intense burning, access problems, greater distance to water and a lower relative humidity all contribute to higher factors of risk.

Access roads may open up heavily forested high risk areas to estate lot development that are located away from water. The conifer area southwest of the lake is a concern area.

Temporary roads, which are initially intended to revert back to the natural form, are often extended, eventually becoming permanent roads. Temporary forest access roads often go through deer yards, exposing the area to increased hunting pressure. The main concern is whether an access road will increase the fire danger to the area. If the temporary roads are allowed to revert back to the natural state, forest fire suppression and control may be impeded by the lack of access.

2.10 Lakeshore Development Carrying Capacity

Carrying Capacity calculations are valuable for determining land and water capacities for development and recreational use. In determining a lake's total capacity for use, the most sensitive environmental component (lowest capacity for use) is used as the limiting factor from which to implement management programs and alternative strategies. Employing this method, the most vulnerable elements of the lake's ecosystem are considered for the focus of management proposals. At present, carrying capacities are controversial, being difficult to defend in response to development proposals. For White Lake, capacity calculations will be used as a means of comparing existing development to the ideal capacity. As one of several information sources, capacity calculations will be used in support of planning decisions concerning existing and proposed lakeshore developments and use of White Lake.

2.10.1 Angling Capacity

Angling capacity calculations were developed in response to management emphasis on angling and estimates of a lake's ability to sustain fishing pressure without degrading the degree of satisfaction reflected in the game fisheries management plan (Lakeshore Capacity Study, Interim Report, 1978). Given that fish are the most sensitive environmental indicator and the importance of the pickerel fishery to the White Lake tourist economy, lake plan recommendations will be based on lowest capacity estimates, which are angling capacity and water quality calculations.

Based on angling capacity calculations (Appendix II), White Lake is near the maximum number of development units. Given the current development proposals on the lake (Section 3.4), development will soon be in excess of that determined by angling capacity. Projected development levels from the current proposals would place lake development in terms of number of units over by 145 units (1,515-1,660=-145). Using the 0.85 and 0.65 factors of OSY levels for determining cottaging capacity, means that the projected cottaging capacity would be less than the original over capacity estimate. By allowing continued development at this historic rate, much more restrictive fishing measures are called for just to compensate for the increased development.

The current over development projection based on angling capacity is +145 units.

0.85 OSY .145	=123 over capacity
0.67 OSY .145	= 97 over capacity

2.10.2 Water Quality Index

A lake's water quality is defined in terms of its trophic status, which depends on the amount of naturally occurring nutrients available to stimulate biological activity. The more productive (eutrophic) a lake is, the more natural nutrients are available and the more human activity it can sustain without drastically lowering its trophic status. At the same time, a biologically productive lake is less attractive for contact recreational use. Existing water quality can

indicate the sensitivity of the lake to the addition of nutrients, either natural or man-induced. Water quality is classed and ranked according to an aggregate index of six parameters, indicating existing trophic status and thereby determining the degree of use the water can sustain while remaining at the same approximate trophic level.

Using water quality index calculations (Appendix II), the total maximum allowable total development units (DU) is 100, or 243 private cottages. Presently there are 1,190 DU's including 455 cottages on the lake. ~~Using~~ the water quality index, White Lake is over developed by 212 units.

2.10.3 Phosphorous Inputs as a Determination of the Lake's Capability for Development

The Dillon method of determining the lake's capability for development is based upon watershed characteristics, water quality characteristics, the natural supply and loading of phosphorous, an estimate present supply of phosphorous to the lake from developments and lake use, and the maximum mean summer chlorophyll a concentrations based on long range plans for the lake.

Application of MOE estimates of phosphorous supply from natural sources and shoreline development indicates White Lake is naturally mesotrophic with a predicted mean chlorophyll a concentration of 3.5 ug/l. This is in close agreement with the overall mean of 3.3 ug/l, over a four year period from 1972-75 (Section 2.6).

Since White Lake does not undergo any permanent thermal stratification, sufficient dissolved oxygen is maintained throughout most of the bottom waters to prevent any significant regeneration of phosphorous from lake sediments. In these shallow lakes body contact recreational use is important. Algae concentrations as reflected by chlorophyll a levels can be allowed to reach, but not exceed, a mean of 5 ug/l over a season. As a margin against overdevelopment, it is suggested that only 70% of the difference between that supply of phosphorous which would result in the 5 ug/l and the natural supply of phosphorous be allowed to originate from artificial sources. For White Lake this is estimated to be 1,085 kg./yr. which is predicted to result in a mean chlorophyll a concentration of 4.4. With an estimate phosphorous supply of 507 kg. from existing shoreline developments, it would appear that there is considerable capacity for future development (MOE, Galloway, 1975). The present artificial loading contributes only 47% of the allowable at 70% of the 5 ug l.

2.10.4 Conclusions

The use of different calculation methods for determining development capacities has produced a wide and varying spectrum from which it would initially appear that no decision could be based upon. Ranges are dependent upon the wide mix of variables required to do the calculations. However, these are not to be used to set exact limits; but, this series of calculations has identified the most sensitive indicators to use.

Angling capacity and water quality indexes (exclusive of the Dillon

Model calculations) exhibited the lowest and second lowest capacities respectively, indicating the lake is potentially over-developed. The lake may be able to withstand additional shoreline development without a significant lowering of water quality, since the lake is already biologically productive. It is unlikely the same could be said for the fishery. It is reasonable to expect that angling pressures and harvests with increasing development would increase disproportionately with shoreline alterations and habitat disturbances. A significant decrease in water quality is not expected, given that, ~~with the lake is~~ ^{is} undergoing a rehabilitation program and will be maintained as an important fishery. Angling capacity calculations will be used as the primary tool to direct Ministry guidelines for development capabilities and management programs for the lake.

2.11 Shoreline Description and Capability for Development and Recreational Use

The Ontario Land Inventory (OLI) system ranks land according to ability to attract and support specific uses; such as recreational use, as well as its capability to support agricultural wildlife and forestry uses.

Unlike the OLI, the Canada Land Inventory (CLI) does not classify land according to its ability to support specific uses but ranks land according to its ability to sustain varying intensities of general recreational use.

2.11.1 Ontario Land Inventory

The OLI classification can be used with a greater degree of confidence than the CLI. While the OLI classification is thought to be of limited use for this district's lake planning program, it is used to provide general background lake information.

The OLI land classification is a system describing the physical features of the land which exert the most significant influence upon the growth of the plant community. This information provides the basis for classifying the timber use capability and the wildlife use capability. Outdoor recreation capability is also based upon the physical features of the land but because recreation is not biologically oriented, a different set of physical criteria are used.

Land classification for the White Lake Shoreline area is broken down into four units based on patterns of physical features such as relief, soil materials, soil depth and moisture, which have been described previously.

Timber use capabilities are specifically related to the physical features which control the rate of tree growth. There are four regional capability ratings in the 3 to 4 range, being the areas north and south of the lake respectively. Limitations due to forestry are a restriction of the rooting zone by bedrock and low soil fertility (CLI).

2.11.2 Canada Land Inventory - not on Table of Contents ✓

The CLI is a generalized classification system that not only indicates land capability to support intensive use but, also denotes the uses

considered most appropriate for the particular land type.

The CLI has classified the lakeshore as having moderately high to moderately low capability for recreation. Access to water, suitability for family lodging, swimming and boating, superior viewing areas, and the viewing possibilities of wetland wildlife contribute to the overall capability for recreation. The capability classes for CLI range from 1 (very high capability) to 7 (very low capability) to attract and sustain intensive recreational use. Actual heavy development areas do not have a correspondingly high classification (2 and 1). However, higher classification areas do correspond to other similar intensive shoreline developments on private land.

Much of White Lake is classified as having severe limitations for the production of waterfowl due to adverse topography and water depth. Hayes Bay and Bane Bay are exceptions, having only moderate limitations. The capability for waterfowl is improving on White Lake especially the north basin, where wild rice production is increasing.

The shoreline of White Lake has moderate to moderately severe limitations for supporting ungulate populations. This is due to poor soil capability to provide adequate vegetation for food.

Most of the land surrounding White Lake has a low capability for agriculture (class F). East of Hayes Bay and north of White Lake village, moderate capabilities to support agriculture exist (class 2 and 4 respectively).

3.0 EXISTING LAND TENURE AND USE

Land tenure and use determine to a large extent the determination of the lake role, as well as determining its applicability. Land tenure and use will indicate the degree of present development, while determining the extent and potential of development sites.

3.1 Crown and Patent Land

The shoreline and backshore of White Lake is approximately 50% Crown and 50% Patent Land (Appendix A). The Ministry of Natural Resources has a custodial responsibility for Crown land, which is carried out by authorizing land use through licences, leases and permits, asserting the Crown's interest in matters of unauthorized occupations, maintaining records of land grants and clarifying land claims (Carleton Place, DLUG, 1983).

The Crown retains ownership of land under water ^{cept} except in a few cases where otherwise provided for in the original patent. The Crown has 66 foot shoreline reserves (crown land) on White Lake. The Ministry administers the disposition of these lands, under certain circumstances, for public or private use.

Crown lands may be used for general recreation including, camping, hunting, fishing and hiking. Extended use of Crown land, such as the establishment of recreation or hunt camps requires some form of disposition from the Ministry.

3.1.2 Islands

In the Carleton Place District of White Lake there are 37 islands ranging in size from 0.01 to 33.7 ha. (Appendix A). Outside of this district there are 11 islands in McNab and Bagot Townships (Pembroke District), for a total of 51 islands (Table 6). With a long history of fluctuating water levels, ownership status of some islands has been questionable.

Crown islands include those listed as; 2, 4, 6, 7, 8, 12, 13, 18, 23, 25, 26, 27, 28, 29, 30, 32, 34, 35, and 36. Whereas islands 5 and 31 are partially patented (Appendix A).

At one time, properties B, C, and D (Appendix A) may have been part of the mainland lots adjacent to ~~to~~ these islands. The adjacent lots are Crown so dispute of their tenure is unlikely.

Property A (Burnt Point area) appears to have been patented with the adjacent mainland lot, joined by a marsh (Table 6). This is a probable area of dispute over the exact extent of Crown land on the northern point.

Another disputable area is island # 26. This island is not patented but is occupied with a building and dock (Lands Files, 1974).

TABLE 6 - ISLANDS OF WHITE LAKE

Darling Township

<u>NO.</u>	<u>NAME</u>	<u>AREA (ha)</u>	<u>STATUS</u>	<u>IMPROVEMENTS</u>
'A'	Unnamed	5.5	Patented with mainland--Lot 26 Lot 27--Crown	None - bush covered
2.	Unnamed	1.13	Crown	None
3.	Unnamed	0.97	Patent	Cottage, boathouses
4.	Unnamed	3.72	Crown	None - bush covered
5.	Hardwood Is.	38.7	2 part lot remainder crown	2 cottages on eastern shore
6.	Unnamed	27.9 m	Crown	None - cedar covered
7.	Unnamed	0.08	Crown	None - cedar covered →
8.	Unnamed	0.10	Crown	None - cedar covered →
9.	Avalon Is.	0.15	Patent	Cottage, boathouse bridge to mainland →
10.	Ross Is.	0.21	Patent	Cottage
11.	Bogs Is.	0.97	Patent	Cottage
12.	Unnamed	0.01	Crown	None - rock
13.	Unnamed	0.01	Crown	None - rock
'B'	Unnamed	1.94	Crown	None
15.	Birch Is.	3.89	Patent	1 Cottage
'C'	Unnamed	0.04	Crown	None
17.	Curley's Is.	1.40	Patent	1 log cabin
18.	Unnamed	0.02	Crown	None
19.	Unnamed	0.49	Patent	2 cottages, boathouse →
20.	Unnamed	0.49	Patent	1 cottage, boathouse →
21.	Unnamed	0.04	Crown	None - bare rock

Table 6 - Islands of White Lake (continued)

'D'	Unnamed	0.04	Crown	None
23.	Unnamed	0.04	Crown	None - bare rock
24.	Stanley Is.	3.09	Patent	1 Cottage
25.	Unnamed	0.04	Crown	None
26.	Unnamed	0.04	Crown	1 frame shed, UO
27.	Waba Is.	1.13	Patent	5 cabins, boathouse →
28.	Unnamed	0.02	Crown	None
29.	Unnamed	0.04	Crown	None
30.	Unnamed	0.16	Crown	None
31.	Barber Is.	7.69	Crown part lot 25, Concession I Patent	None
32.	Unnamed	1.66	Crown	None
33.	Unnamed	0.16	Crown	None
34.	Unnamed	0.04	Crown	None
35.	Unnamed	0.65	Crown	None
36.	Unnamed	0.04	Crown	None
37.	Unnamed	0.04	Crown	None

(verified, March 8, 1977)

Bagot Township Islands

<u>NO.</u>	<u>NAME</u>	<u>AREA (ha)</u>	<u>STATUS</u>	<u>LOT</u>	<u>CON.</u>	<u>IMPROVEMENTS</u>
38.	Unnamed	(S. Shore)	Patent	1	I	None
39.	Deadmands Island		Patent	2	I	Cottage
40.	Unnamed	(N. Shore)	Patent	2	I	None
41.	Unnamed	(N. Shore)	Patent	2	I	None
42.	Unnamed	(N. Shore)	Patent	1	II	None

McNabb Township

Table 6 - Islands of White Lake (continued)

43.	Unnamed (South Canal Bay)	Patent	1	I	None
44.	Fishers Point Island	Patent	2	I	None
45.	Unnamed (South Canal Bay)	Patent	2	I & II	2 cottages
46.	Andrews Island	Patent	3/4	I	1 cottage
47.	Jacob Island	Patent	3	I	1 cottage
48.	Myrtle Island	Patent	3	I	1 cottage
49.	Unnamed (N. Shore)	Patent	4	I	None
50.	Kitty Island (Narrows)	Patent	6	II	1 cottage
51.	Unnamed (North Basin)	Patent	6/7	II	None

3.1.3 Crown Land Disposition

As recently as 1975, the province was disposing of crown cottage lots on lakes in this district, with many of these sold as seasonal cottage lots. Cottage lots are no longer made available in southern Ontario.

The province began disposing of Crown Land in the White Lake area as individual (cottage) lots and island lots as early as 1912. On the east shore opposite Birch Island, some 66 lots were severed as summer resort parcels dating back as far as 1938. The majority of summer resort land parcels were sold in the 1950's. The sale of resort lots on crown islands dates back to the early 1900's. Crown lots were disposed of as recently as 1955 & 1957 on Hardwood Island. Disposition dates for other islands are listed below.

Curley's Island	1912
Stanley Island	1912
Birch Island	1912
Ross Island	1912
Bogs Island	1913
Waba Island	1924
Avalon Island	1927

A large number of cottage lots were made available on Crown lands by registered plan of subdivision (Table 7). Six plans of subdivision were drawn up for White Lake, resulting in the release of an additional 93 cottage lots between 1950 and 1961 (Appendix A). All plans of subdivision (except plan no. 1715, 1950), included a Crown shoreline reservation of 66 feet (20.1 m). Detailed information on the Crown subdivisions is provided in Appendix II.

The Crown retained shoreline reserves on the waterfront lots because, historically waterways were the primary transportation routes. Shoreline reserves were essential to ensure that the travelling public could gain access to and from waterways without trespassing on private property, (Lands Files, April, 1980). This reserve was thought able to ensure adequate protection of the shoreline environment and thus implementation of Ministry programs.

Table 7

CROWN LAND DISPOSITION

WHITE LAKE--DARLING AND BAGOT TOWNSHIPS

<u>Individual Severances</u>	<u>Date</u>	<u>No. Lots</u>
Shoreline Lots	1938-1970	64
Island Lots	1912-1957	12
<u>Registered Plans of Subdivisions</u>		
<u>Darling Townships</u>		
1. Plan No. 1715	24/03/50	11
2. Plan No. 2057	27/06/60	25
3. Plan No. 2058	27/06/60	30
4. Plan No. 12649	21/07/61	12
5. Plan No. 13182	18/12/61	3
Others (Previous lots within subdivisions)		2
<u>Bagot Township</u>		
6. Plan No. 359	21/07/66	12
Total Crown Shoreline Seasonal Residential Lot Dispositions		171

As of April 8, 1980; the Crown began disposing of Crown owned road allowances and shoreline reserves and will not object to municipal closure and disposition of municipal owned shoreline road allowances, or road allowances leading to water (Land Files, L.M. 8.02.11). This policy change resulted because owners of land adjacent to waterways, with tacit approval, have been constructing on the reserve in front of their properties. In addition, without approval, residents have placed docks, boat houses, protection walls, and other structures on the underwater of Crown land. To date, 15 shoreline resources have been patented, (total area 2.0 ha.), with another 20 in various stages of progress (Appendix II).

3.1.4 Darling Township Cottage Lot Program

The township subdivided twenty-six lots in 1968 by registered plan of subdivision (Plan No. RD3) on lot 26, Concession VIII, Darling Township (Appendix A). Twenty-five, one acre (0.41 ha.) lots were sold

Figure 9

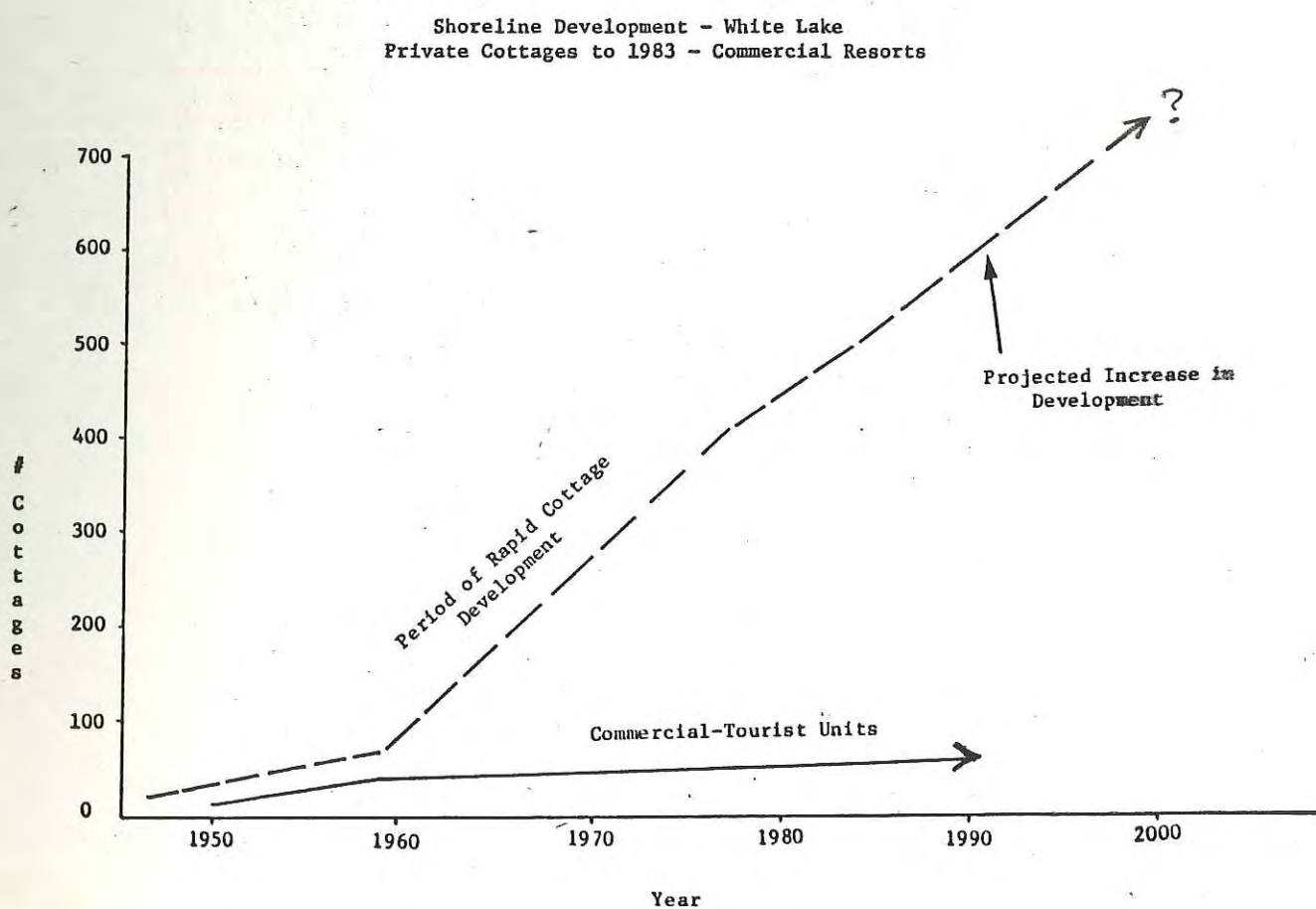


TABLE 8

CHRONOLOGY OF WHITE LAKE DEVELOPMENT

1914	130 permanent families in lake area
1920	Initial seasonal residential development,
1930	(Numbers unknown)
1950	Crown Subdivision Plan No. 1715 + 11 lots
1959	65 Cottages (private) Tourist commercial resorts (10?)
1960	Crown Cottage Lot Program 2057 + 25 2058 + 30
1961	Crown Cottage Lot Program 12649 + 12 13182 + 3 359 + 12
1967	315 Cottages 5 resorts (99 units)
1973	412 Cottages 300 Trailer Sites 6 CT operations
1974	449 Cottages (65 permanent of 375 cottages) (17.3% permanenet)
1975	2 shoreline subdivisions, 34 Lots (483 cottage lots)
1976	462 Cottages 372 Cottages 8 Commercial Tourist
1977	Monette Subdivision, 7 Lots
1978	699 Cottages Units (include tent & trailer sites)
1979	233 Mobile Homes
1978 to 1981	Additional 55 consents
1982 Aug.	490 Cottages (estimation) 700 Campsites (tent & trailer, etc.)
1983 Jan.	455 Private cottages (Shoreline only) 10 CT developments (55 units)
1983 June	488 Private Cottages (permanent and seasonal)

A 1978-79 MNR shoreline cottage survey indicated that approximately 60% of the total development on White Lake was located in Darling Township. A 1983 assessment indicated that 70% of all shoreline development existed in Darling Township. McNab has 16% of the total development, with Pakenham and Bagot Townships having 9% and 4.2% respectively (Table 9). Assessments in February and June '83 included a detailed count of all private shoreline and island cottages visible from the water as well as those in the backshore. Cottage counts have varied considerably in the past due to inconsistencies in data collection and, aerial counts that included non-dwelling buildings other than cottages (ie. accessory buildings).

Table 9

WHITE LAKE DEVELOPMENT-1983 ASSESSMENT

<u>Private Cottages</u>	<u>Greater than 100' Setback</u>	<u>Less than 100' Setback</u>	<u>Total</u> →
Seasonal	138	326	464
Permanent (approximate)	15	9	24
Island cottages		11	(included in above)
Accessory Buildings	227	159	386
Sleeping Cabins	5	36	41
Boat Houses - simple			
- second story			
Conversion			7
Mobile Homes			35
<u>Commercial Tourist Establishments</u>			
Tent & Trailer Parks	8		
Campsites	6		
Total Number of Sites			500
Rental Cottages			5
Establishments			
No. of Development			25
Units			
<u>Others</u>			
McNab Park and Museum		(Buildings)	3
Sawmill			1
MNR Dam			1
Hunt Camps			4
Access Points			7

The heaviest shoreline cottage/tourist development areas are Three Mile Bay and The Canal (Appendix A). The village of White Lake (north basin) is the largest permanent residential area on the lake. The 1983 assessment did not include the residences set back from the lake in White Lake Village. The location of the village is believed to have a significant impact on the lake resources, considering that a significant portion of the winter angling pressure originates from the village.

3.2.1 Seasonal and Permanent Residential

As with most recreational lakes in southern Ontario, White Lake is experiencing a trend towards a greater number of permanent residential compared to seasonal residential shoreline cottages. This conversion to permanent homes is a recent phenomenon as the initial lake settlers nearing retirement age begin to use their summer cottage on an increasingly extended basis. White Lake is not expected to have a drastically different seasonal to permanent ratio than other recreational lakes in the district.

It is expected that the environmental effects associated with development on White Lake will increase as the number of permanent homes increase. A 1974 assessment indicated that approximately 17% (375) of all cottagers assessed were permanent residents. With a slowing pace of new cottage development, it is expected that the ratio of permanent to seasonal cottages may increase as more cottages undergo conversion to permanent status.

3.2.1.1 Results of Lakeshore Development

The impacts of over-development ^{can be} are summarized accordingly;

indent → -Destruction of natural shoreline habitat occurs as cottagers tend to urbanize their cottage lot by planting grass, removing natural vegetation and infilling marshy areas for beach areas, and constructing piers and retaining walls.

→ -Alteration of the natural shoreline occurs through the removal of detritus, rocks, litter, deadfalls and infilling of the shoreline and littoral.

→ -Service and maintenance costs may increase in rural municipalities unprepared for large scale cottage development.

→ -Development and associated recreational activities can affect the fisheries in numerous ways, but are grouped here into three general categories;

i) Increase in angling pressure and harvest

ii) Change or accelerate the lake's trophic status from oligotrophic mesotrophic eutrophic state.

iii) Disturbances to the littoral zone; spawning beds, nursery and feeding grounds by large motorboat activity, construction, infilling, etc.

→ -Water quality is deteriorated by substandard or inefficient sewage disposal systems; increased sedimentation as a result of accelerated erosion from shoreline development activities and the removal of natural shoreline vegetation.

→ -Increased recreational use of the lake resources occurs, resulting in increased angling pressures, creating latent pressures on the fishery.

3.2.2 Cottaging Trends

Two shoreline subdivisions, with a total of 34 lots, have been approved on White Lake since 1975 in lieu of the recommendations outlined in an MNR report (Development Recommendations for Lakes in Lanark County, 1975). Between 1978-81 there were 55 severances approved for individual lots, but many of these approved lots remain undeveloped today. In Darling Township alone, there are 71 vacant cottage lots (1983) (Appendix A). A MOE lake survey in 1976 indicated 119 vacant lots fronting onto the lake. The cottaging boom of the 1960's and early 70's has subsided to where now, the demand for new cottage lots is not near former levels. ~~This may be reflective of higher energy costs and current economic uncertainties.~~ While the demand for shoreline cottages on White Lake may not reach previous levels, it is expected ~~to continue~~ to be steady. With the extensive shoreline development that exists on White Lake, it is expected that there will be a growing pressure on the presently unused backshore areas as the remaining shoreline lots become scarce or economically unfeasible for development.

Of approximately 4,500 private cottages in the district, White Lake has 11% (488) of this total. This amount of cottages is, in part, a result of the Provincial Crown cottage lot program that resulted in the placing of 151 additional cottage lots on the lake. Traditionally, the Ministry has maintained a program to provide cottage lots contributing about 10% of the total supply. On White Lake the Ministry has supplied approximately 31% of the cottage lots. The Ministry's Cottage Lot Program terminated in 1970. Any additional cottage development will be developed and supplied by the private land owners.

3.3 Commercial Tourist Resorts

As of 1977, the Ministry of Industry and Tourism (now Tourism and Recreation) licenced eight recreation establishments on White Lake. There are now 11 tourist operations on White Lake with 55 cabins/cottages units, as well as numerous support structures.

Recent growth of the commercial tourist sector has seen the expansion of tent and trailer park facilities, which require only municipal approval. There are now more than 250 new and additional trailer sites proposed for White Lake (Table 9).

Approximately 30% (\$533,340/1977) of the total tourist-outfitters (\$1.78 million/1977) trade is based on the pickerel fishery.

3.3.1 Trends in Commercial Tourist Establishment

Demand for outdoor recreation is affected by four factors:

- Population growth
- Transportation availability
- Income levels
- Available leisure time.

Growth rate projections for Lanark County are expected to be lower than for Ontario as a whole (1971-2001), (25% and 45% ~~re~~spectively), with

the Ottawa-Carleton area expected to reach a population level of 1.5 million by 2001 (Ministry of Industry and Tourism, 1977). This population growth close to the White Lake Planning Area is expected to have a significant impact on the lake and adjacent recreation areas in meeting this increased demand for recreation and resource products (Ministry of Industry & Tourism, 1977). Private lands are expected to meet the bulk of this demand for recreation opportunities. In the long run, prospects for commercial operations on White Lake look favorable and it is expected that there will be additional requests for expansion of tourist facilities to meet the demand.

In the short term, rising costs of living and unstable economic situations may result in recreation expenditures being lower than the past (ibid). This may mean a static growth situation for the tourist industry at this time, but should not be used to predict the longer term trends of the tourist industry for White Lake. A low to moderate demand increase is predicted for commercial-tourist accommodation and commercial recreation opportunities from users originating more than one days trip away from the district. The use of tourist accommodation by non-residents will originate from visitors from nearby Ottawa-Carleton, drawn by the many hunting, fishing and small boating opportunities that are unavailable close to Ottawa. The use placed on facilities and recreation lands by local residents is expected to grow at a high rate as local residents avoid spending on extended trips out of the area and restrict their activities locally (Ministry of Industry & Tourism, 1977).

3.4 Development Proposals

White Lake is experiencing modest development pressures despite a relatively slow economy. This is attributed to the proximity to a growing metropolitan area (Ottawa), increased mobility and leisure time, the natural amenities White Lake has to offer and the expected increase in demand for lake oriented recreational resources in the near future.

There are approximately 250 proposed tent and trailer site proposals and an additional 200 lots (not including those previously approved), either as plans of subdivision or individual lots.* This level represents 8 development proposals and does not include individual severances and building permits. It is highly unlikely all of these proposals would be simultaneously approved. If approved, it would result in a 30% increase in total development units on the lake as well as an escalation of recreational use. The township of Darling has imposed a by-law severely limiting the expansion of tent & trailer parks (March, 1983).

Proposed developments are:

1. Birchwood Falls(southshore - Raycroft) (affiliated Cedar Cove with Park) 500 acre subdivision - 72 cottages in first.

Original Submission included 21 shoreline lots
31 individual estate lots
13 backshore lots
2 cluster cottages(4 ea.)

March 1983 - Revised Proposal

18 Shoreline Lots
10 Backshore Lots

TOTAL

28 Lots

* Darling Council has initiated a development policy preventing the expansion of any tent & trailer park facilities or construction of new ones (Aug.1983).

end page

****2. Cedar Cove Tent & Trailer Park(Three Mile Bay)**

- 95 Tent & Trailer Sites(3 years)
- 2 Additional Cottage Lots

3. Glenlea Trailer Park(north basin - McNab Township)

- 50 (maximum) tent & trailer sites
- mobile home park
- (11 built in past year) 56 proposed

****4. D. Bancroft-Tent and Trailer Site**

- 50 proposed tent & trailer sites

5. Duncan Stewart - Windy Point

- 400 acre subdivision
- 6 severances (1983)

****6. Pickereel Bay Cottages(Pickereel Bay)**

- tent & trailer sites(planned)

****7. Snye Road Subdivision Proposed(Penninsula - 3 Mile Bay)**

- 500 acres (84 lots)

3.4.1 Remaining Cottage Capacity

The remaining White Lake cottage potential is difficult to assess because development is not restricted solely to shoreline areas. Since lands within Darling Township account for the majority of land abutting onto White Lake, this township contains the most development potential. At present, there are approximately 103 vacant lots in Darling Township that are in the immediate lake area (Darling Twp., Policy Statement,

1983). A great number of these lots can be further subdivided into smaller cottage lot size parcels. Cottage potential on White Lake is further restricted by the large percentage of Crown Land (approx. 50%) on the lake. SP.

Darling Council's new development policies will restrict new developments to 12 units/year on White Lake, being shoreline cottages. Linear shoreline development is expected to continue as the dominant form of development for a number of years. The area with more development potential exists as backshore estate and/or cottage clusters away from the lake. Backshore development is restricted at present by Darling's proposal development control policies, road access and the provision of services by the Township. SP.

** These areas are currently under consideration for development proposals but as of yet no formal submissions have been received.

end page

The Snye Road area between Three Mile Bay and Pickerel Bay is believed to have the best potential for backshore development. Projected residential development up to the year 2000 (figure 9), is based on a minimum of 15 new units per year. This includes 12 set out in the new Darling By-law (April 22, 1983), plus a minimum of 3 additional new developments for the other townships. This could give a minimum potential of 255 new developments on White Lake by the year 2000, for a total of 743 individual cottage units, representing a 50% increase. This projected development is a conservative one as it does not account for existing building permits. Estimates of commercial tourist development growth potential is not available, particularly for the Tent & Trailer Parks which are the fastest growing sector on the lake. At present the Ministry is not involved in the review of Tent & Trailer Park proposals as the municipalities have sole jurisdiction in this matter.

3.5 Official Plan and Zoning Bylaws North Lanark Planning Area

Under the New Planning Act (Aug., 1983), some planning areas will be disbanded, with much of the responsibility for planning to be taken over by individual municipalities. Until municipalities adopt new official plans and zoning by-laws, it is expected that the policies of the former Planning Areas will continue.

Darling and Pakenham Townships were within the North Lanark Planning Area (Planning Act 1983) and governed by policies and guidelines contained in the official plan approved July 27, 1978. Under General Development Policies concerning types of development:

The plan calls for a "limited amount of development provided for in the rural parts of the planning area; uses which relate to the development of the natural resources of the area will be preferred, but a certain amount of other development will also be allowed as long as it is comparable with the rural environment."

Municipalities will encourage new development by registered plan of subdivision, where more than two lots are to be created, or where a new road or road extension is necessary. Country lot development created by severances along existing public roads is thought to be more feasible than by plan of subdivision in areas serviced by individual well and private sewage systems.

Seasonal residential development need not have access to a year-round maintained public road. Land use zoning is exhibited in Appendix E.

3.5.1 Rural Policy Area

In the rural policy area, it is desirable to preserve prime agricultural land as well as to protect the rural, open space environment as much as possible. The intent is not to totally restrict development within the rural area, but to carefully control the location and amount of development that will be permitted in the rural area. The impact of development on the environment is expected to be minimal without a financial burden on the municipality. In the rural policy area, it is policy to retain other important natural resources, wherever possible. In this area the municipalities rely on information and advice from MNR. The rural policy states that rural non-farm residential uses should be strictly controlled. A limited amount of this type of development, with adequate controls is thought to be beneficial to the planning area. This type of development will be encouraged to take place by plan of subdivision, and will basically be large lot (average 0.8 ha., minimum 0.4 ha.) developments on non-agricultural lands having some natural amenities.

3.5.1.1 Seasonal Residential

Seasonal Residential development in the rural area shall be permitted provided that council and the planning board are satisfied that the development relates to an outdoor recreation resource and will be used only seasonally in the foreseeable future. This will include private vacation homes used for recreation and relaxation which are not the

principal residence of owner or tenant. This type of development will be encouraged to take place by registered plan of subdivision with preference given to backshore cluster development. Infill development is to be permitted on previously registered lots. Conversion from seasonal to permanent use (formerly) required an amendment to the zoning by-law, with council considering guidelines governing conversions such as lot size, building size, access to public roads, and board of education approval. Local council and the Planning Boards are to be guided by the MNR report; development recommendations for recreational lakes, North Lanark planning area May 1975. This report recommended that:

Further shoreline development would aggravate the existing water quality problems and cause a decline in the sport fishery, especially the pickerel. Total nutrient containment is essential if the recreational value of White Lake is to be maintained. We recommend substantial setbacks from the highwater mark for any future proposals. Backshore clusters should be encouraged.

Where seasonal residential development relates to water and is a backshore cluster, conditions concerning water frontage and conditions of important concern in the official plan shall be applied accordingly. Setbacks adjacent to water state:

"Where any development takes place adjacent to water, all buildings or structures except a boathouse, dock or marina shall be set back a minimum of 20 m. from the high water mark and all septic systems shall be set back a minimum of 30 m. from the high water mark. These requirements may be increased depending on site conditions, the particular use proposed and the advice of the Ministries of Natural Resources or Environment."

Tourist commercial uses ranging from lodging facilities, motels and resorts to campgrounds and trailer parks are permitted in the rural zone with applicable provisions governing their use.

In reviewing applications for CT development, regard is to be given to the capacity of the area for recreation use, and to provide for the protection of natural environment, the open space character and scenic qualities of the area. Provision for industrial, wayside pits, institutional and public, park and open space pits and quarries, wrecking yards, and disposal sites.

Tent & Trailer parks are permitted in the rural policy area in accordance with policies set out in the official plan. These are seasonally operated parks for tents and recreation vehicles.

3.5.2 Hazard Lands Policy Area

This designation applies to lands which, because of their physical characteristics in combination with their location, sustain a risk to occupants for loss of life, property damage or social disruption if developed. If there is no risk to life or property, development is to be permitted in accordance with policies for the rural policy area. In the White Lake area the only areas that could be considered hazardous, are a few abandoned mining pits. In the Official Plan, hazard lands designations are considered as interim only.

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3.5.3 Special Uses

The Official Plan permits mobile home parks in both the urban and rural policy areas provided that:

It is not located on prime agricultural lands;

It is suitable for development;

It is located within a reasonable distance of existing settlement; and

It is compatible with surrounding uses.

Approval for mobile parks rests solely with the municipalities. Municipal policies applicable to permanent residential development may also apply to mobile homes in addition to other specific policies.

3.5.4 Building By-law and Minimum Standards

The municipality has the capability to ensure adequate construction standards in new developments and can encourage the rehabilitation (upgrading) of existing buildings and property. Minimum Standards By-Laws are an underutilized land use control technique (in the townships of Darling and Pakenham). These can set out general conditions pertaining to physical condition and adequacy of light, plumbing, water, etc., and can require substandard properties to be repaired and maintained to comply with standards and can prohibit the use of substandard property sites. These could control and enforce upgrading of substandard waste disposal systems.

3.5.5 Development Control

The extent and rate of development on White Lake has long been of concern to both lake residents and users. The Official Plan (1977) indicated that large developments that adversely affected the municipal debt would not be permitted. In addition there was a quota set on development of 100 lots over five years beginning in July, 1978 with only 30% permitted in a given year with a reasonable distribution among developers required (Municipal Affairs & Housing - memo to Darling Township, July 19/82). There was a limit placed on the number of severances of three per lot (or 100 acres).

Non-farm residential policies restrict development to 20 lots, beyond this an official plan amendment is required. The policies also encourage large lot developments. Council is required to ensure that development of rural residential areas is based upon the following principles:

- Protection of head water streams and physiographic formations discharging ground water to these streams.
- Protection of stream, pond, marshland woodland habitat... wherever possible.
- Maintenance of the natural character of watercourses, and,

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- General maintenance of land forms in their natural state to ensure as far as possible that the natural, rather than the man-made character of the site predominates.

Reports must also be provided by the developer indicating the suitability of the area for wells and waste disposal systems.

Seasonal residential policies do not specifically restrict the number of lots to be included in a development, but do require a minimum lot size and a 30 m. frontage. In determining the amount of development that is appropriate for each instance, the following policies which provide the municipality with guidance are:

- The Ministry of Natural Resource's report, Development Recommendations for Recreational Lakes, May 1975. The report recommends substantial setbacks for development (this is over and above the 30 m. setback the reports recommended for other lakes).
- Council may ask for information on soil type; permeability, existing and proposed grades, and where waste disposal systems are to be located (7.3.2 (b) (ii) Vi).
- With backshore development, a minimum of 6.1 metres of water frontage shall be provided for each lot and this frontage shall be appropriate for recreation use (section 7.3.2 (b) (ii) 3 (vi)).
- Development may not take place on lands having environmental hazards or in areas possessing a unique natural characteristic (section 7.3.2 (a) iii).

With application of these policies, it was thought that the municipality should be able to develop an appropriate rationale to restrict or prohibit specific development proposals (MMAH memo, 1982).

3.5.5.1 Official Plan Amendment No. 7

Planning board attempts to control development by establishing quotas on lots to be created was unsuccessful. Approval of a consent or subdivision makes development possible but does not necessarily result in development taking place, as evidenced by the number of lots created versus the number of building permits issued. Official Plan Amendment No. 7 removed the formal quota on number of lots created.

The Official Plan allows each municipality to control the rate of development within its own boundaries having regard for local financial and servicing constraints (4.3.2). The municipality may require the staging of any form of development 'to provide for orderly growth and in order not to exceed the capacities of the necessary services of the ability of the Township or other public agencies or finance any necessary services.' However, MMAH (CPAB -Ottawa) has advised Darling council that it could not use this section (4.3.2) to justify restricting the amount of development in only one portion of the municipality without placing some controls on the rest of the municipality (Sept. 3, 1982). Once 200 lots have been created within the planning area a new policy regarding the amount of future severances is to be reviewed.

3.5.5.2 Development Setbacks

Development setbacks for the four municipalities are not consistent. This reflects the rate of development on their respective areas of the lake and the largely, rural nature of the townships. The following table depicts the differences in policies concerning development setbacks.

TABLE 10

SETBACK DISTANCES FOR
TOWNSHIPS BORDERING WHITE LAKE

	Darling Twp.	Pakenham Twp.	McNab Twp.	Bazot Twp.
Floodplain; Buildings, Structures		15 m	15 m	15 m
Buildings in EP Zones	N/A	N/A	10 m	15 m
Buildings, Structures from highwater mark	20 m	20.1 m	10 m	15 m
Solid Waste Disposal Wrecking yards Pits & Quarries	300 m	NIL	N/A	N/A
Septic Tanks Tile Fields	30 m (highwater mark)	100 m	30 m	N/A

* N/A -- Information concerning setback is not available, or has not been provided for in zoning by-law.

3.6 Zoning By-laws

3.6.1 Darling Township

On White Lake Darling Township is subjected to the most intense development, lake use and subsequent environmental problems. It is also the most active in developing a policy to control the extent and rate of development on White Lake.

Despite an MNR report on "Development Recommendations for Recreational Lakes," (1975) which recommended 30 metre setbacks, the NLPA - Official Plan and Darling's comprehensive zoning by-law (80-9) approved a 20 metre setback for buildings and structures from the highwater mark, and a 30 m. setback from the highwater mark for septic tank/tile bed fields. Few recommendations presented in the 1975 MNR report as well as those given in OPA # 7 proved to be adequate for restricting development around White Lake. Subsequently, Darling council passed a policy statement to control the number of new residences to be built within the township, implemented through Official Plan Amendment #8.

3.6.1.1 Development Control - Official Plan Amendment #8

The basis for policy statement (OPA #8) focuses on the large residential and commercial development in recent years and Renfrew counties. Residents and tourist operators pressuring Darling council to halt all but the most dental developments immediately, and ^{whether the} to ~~to~~ ^{development} determine ^{if} the lake is overdeveloped. Council wants to know how much ^{development} the lake can sustain without harming the water quality, wildlife, and the wetland areas; and is concerned that ^{no} further deterioration in the quality of the lake resources. In preparing OPA #8, council obtained background lake information from the Ministry of Natural Resources and Environment on the status of the lake resources. If the proposed amendment is approved, none of the following land uses will be approved within 500 metres of the high water mark for a minimum of 5 years.

1. Plan of Subdivision - affects Birchwood, Snye road; Windy Point
2. Tourist Commercial - allow for expansion
3. Highway Commercial
4. Industrial
5. Mobile Home Park

This applies to new development proposals and the enlargement of existing facilities but is not intended to restrict the enlargement of existing facilities which would conform to existing zoning.

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The Township of Darling has also adopted a policy statement on the 'Rate of Development' to implement section 4.3.2 of the North Lanark Official Plan. Relevant statements are:

The township will be divided into two areas. The maximum number of new residential lots (seasonal and permanent) created per year by severance and plan of subdivision is to be:

Area I (White Lake) 12 lots

Area II (remainder of township) - 12 lots

Quotas from one year cannot be carried over to the next year except in special circumstances for plans of subdivisions.

In one year, any one developer can create a maximum of 4 lots by plan of subdivision or two lots by severance, but not both (~~not~~ not more than 8 lots can be created by plan of subdivision in one year).

Council will review any reserved quotas for subdivision with the developers to ascertain the appropriateness of a yearly and projected schedule and make any required adjustments.

Council recognizes that the creation of new lots does not entirely reflect rate of growth. Building permits for new residential construction is a more accurate indication of growth. Council intends to monitor building permit activity. If there is a significant increase in the number of residential building permits issued, council will review the policy statement and may adjust it accordingly.

The Council does not intend for this policy to supercede the North Lanark Official Plan and will therefore consult with other municipalities in the planning area to determine when the limit of severances established by the Official Plan is reached.

(Township of Darling
Policy Statement on
Rate of Development,
1983)

The Ministry of Natural Resources has expressed the desire that the four municipalities agree in principle on the lake's role prior to considering development on the lake. Darling Township is hoping that the other townships bordering White Lake will follow their lead in adopting a similar policy of development restrictions.

3.6.1.2 Zoning Designation

Historically, zoning in Darling Township developed as spot-zoning, with the current seasonal residential zone an extension of earlier seasonal dwelling lines. Darling Council at this time feels that no future tent and trailer sites should be allowed on White Lake, but will permit the upgrading of existing sites.

3.6.2 Pakenham Township

Lands abutting White Lake in Pakenham Township are experiencing less development pressures than Darling and McNab Townships. The small amount of development in Pakenham (57 cottages, 1 resort, 17 cottages, 68 tent and trailer sites) is results from the lack of developable site such as marshy areas, shallow water and generally less amenable conditions. This has resulted in comparatively simple zoning around the lake compared to other townships (Appendix E). The Hayes Bay and area is identified as an area of special significance with the marsh conditions providing excellent waterfowl habitat.

Development control is provided within OPA #7 of the North Lanark Official Plan, but does not provide a quota on development for the township. Rural zoning with a hazard lands designation (schedule D) is not believed to be adequate enough to recognize the special nature of the Hayes Bay and Lowney Lake. An environmental protection zone around the area would be a more appropriate designation, which would more effectively controlling development.

3.6.3 McNab Township

McNab Township is located at the north end of White Lake, including the Village of White Lake (Appendix A). This township is the only township on the lake that has a distinct zoning for mobile home parks (RMHP), Residential Hamlets (RH), Open Space (OS) and Environmental Protection (EP) zones (Appendix E).

Land development within McNab Township is guided by the Official Plan of the Lower Madawaska Planning Area. It provides guidance to both the public and private sectors with respect to future development by, establishing land use pattern and development policies and principles to be followed. A comprehensive Zoning by-law (No. 81-15) was passed on June 23, 1981.

3.6.3.1 Development Control - Rural Development Zone

The Rural Development (RD) Designation indicates areas of low agricultural resource potential (Classes 5,6 and 7). Mixed development, such as low density permanent residential, commercial, industrial, agricultural, forestry, conservation and recreation uses are permitted in this area. Such developments shall not interfere or conflict with proper management of timber, mineral aggregate or fish and wildlife resources.

Residential development in the rural development designation allows for estate development. Conditions as to size of lot (1 unit/ha), proximity to incompatible land uses, phasing of development times and others are described in the Official Plan. Specific to White Lake, permanent residential development within 300 metres of the lake is subject to the following policies:

(i) Density - can be increased to 1 unit/2,000 (.5 acre) allowing for cluster developments while retaining this density.

(ii) New Development shall take place by registered plan of subdivision, and wherever possible occur as cluster type development.

With cluster development the water front is to be reserved for common use by nearby seasonal dwelling owners, or for public use as water access.

(iii) Septic tank installations, including weeping fields, shall be set back at least 30 metres from the high water mark.

(iv) Residential development should only be located in the better area around water bodies, and not in the poorer areas.

- a) Swampy or marshy water/land interface.
- b) Lands subject to flooding, erosion, hazards
- c) Areas of inadequate tree cover.
- d) Fish spawning, feeding or nursery areas.
- e) And where development would result in a deterioration of water quality that would negatively affect the present fisheries habitat.

3.6.3.2 Rate of Residential Development

No specific development controls pertaining to White Lake proper exists in the Official Plan or Zoning By-law for McNab township. However, growth is to be regulated by limits on the rate of development, hinging on the development criteria provided in the plan such as:

- availability of services
- financial ability of municipality to finance services
- planning and land use restrictions
- continual approval of an adequate number of lots
- ensuring that public sector development constraints are not too restrictive.

For the planning area the rate of development (1978 - 1983) allowed for a maximum of 700 new lots (for lots serviced by wells and septic tanks). During and after this period, development will be phased evenly over time, but this is to be reviewed every five years as circumstances warrant.

3.6.3.3 Designated Zones

Forestry

This zone allows for forestry and reforestation and forestry activities, farms, conservation of soil and wildlife, outdoor recreational uses and single family dwellings in accordance with other policies in the plan.

Private land that is designated 'Forestry' does not mean that the land will remain designated as such indefinitely nor that these lands are

fr and open to the public. Development proposals for these lands will be considered as an application for redesignation upon consultation between the municipality and with this ministry. Council intends to encourage landowners to enter into WIA agreements with the Ministry of Natural Resources (Forestry is included in the EP designation - Appendix E).

Environmental Protection Zone

The Environmental Protection Zone (EP) are lands which because of their physical characteristics in combination with their location will, if developed, sustain a risk for the occupant and property damage. This includes flood plains, organic deposits, drainage ditches, unstable clay slopes, karst features and landslide areas. This zoning is identified in Appendix E, Land Use Zoning.

McNab Township has passed a motion of intent (January, 1983) to add this EP zone to the Comprehensive Zoning By-Law. Permitted uses in this zone are:

- agricultural (excluding buildings)
- conservation (excluding buildings)
- forestry (excluding buildings)
- golf course (excluding buildings)
- open space (excluding buildings)
- park (excluding buildings)
- parking areas (excluding buildings)
- and a recreation facility (excluding buildings)

Definitions of the permitted uses are provided in the comprehensive zoning by-law for McNab Township. Generally, consents (severances) will not be granted for a parcel of land in the EP area.

Open Space

The Open Space designation (OS) does not permit buildings or structures unless erected for purposes incidental and accessory to recreation purposes as those erected for a primary public use.

Agricultural Designation

The agricultural designation (RU) is intended to designate areas of good agricultural potential, classes 1, 2, 3 and 4 under the Canada Land Inventory. Agricultural areas are located north and east of the Village of White Lake.

Mineral Aggregate Extraction

Mineral aggregate extraction areas are identified in Appendix A. The Township of McNab is not designated under the Aggregates Act (New Pits and Quarries Act) and therefore the aggregate operations of this

to ship are not regulated by the Ministry of Natural Resources.

As such, the municipality, in order to ensure the proper management and operation of pits, quarries, wayside pits and wayside quarries has assumed a regulatory role. Because of the limited nature of aggregate resources, the municipality intends to protect these resources, wherever possible, from any form of permanent development which would render further utilization impossible.

3.6.4 Bagot Township

Land use policies for Bagot Township are governed under the Bagot and Blythfield Official Plan. Compared to the other townships on the lake, only a small portion of the township abuts onto White Lake (Appendix A).

Bagot Township is the least developed of all the townships in the area, and this is reflected in the Official Plan and Comprehensive Zoning By-law. Zoning that is applicable to the White Lake area, is the Rural Marginal Zone and the Stream and Wetland Zone (Appendix E).

3.6.4.1 Permitted Uses

In the Rural Marginal zone, permitted land uses include; forestry, mineral exploration, low density rural residences, seasonal residences, agriculture, institutional, parks, outdoor recreation use and facilities, rural-related commercial, highway commercial, including uses catering to tourist and industrial uses permitted. Land developed for a variety of residential uses shall be subject to the policies of Subdivision Development Criteria. Specific to White Lake and immediate area for the RM zone;

- All applications are to be accompanied by a site plan indentifying waterbodies, drainage courses, wetlands or marshes, launching and docking areas and locations of campsites, beaches.
- Development will not affect fish or wildlife habitat through dredging or filling, the removal of vegetation, or the construction and use of beaches, docks or boathouses.
- Development will also not affect the fisheries habitat through changes in water quality.

3.6.4.2 Stream and Wetland Zone

The Stream and Wetland Zoning is a unique landuse designation amongst the four townships bordering White Lake. The intent of this zoning is to protect the natural water systems and the hazard lands in the municipality. This includes rivers, creeks and their tributaries, flood plains, river valleys, marshes and wetlands, lakeshores and banks. The hazard lands refer to lands having poor drainage, swamps, organic soils, flood and erosion susceptibility, steep slopes, and instability or other physical condition that could cause property damage, loss of life or damage to the environment, if developed upon.

Permitted uses in the Stream and Wetland Zone are limited to:

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- conservation of soil and wildlife
 - outdoor recreation
 - dams and other water-control devices
 - non-intensive agricultural uses, nurseries
 - forestry, reforestation
 - boat anchorages and moorings.

Land uses involving disturbances of soil, vegetation, or stream banks, which pose a threat of chemical or biological pollution, or which require the construction of buildings greater than 9.3 m are not permitted.

Agriculture and forestry operations on such areas should maintain the unique natural characteristics of such lands and must not contribute to problems of erosion, flooding, pollution or the deterioration of the environment. Council also intends that any dredging, filling or alteration of the shoreline, water course or water body shall not be permitted without council's approval in consultation with this ministry. Where development is proposed adjacent to a watercourse, the municipality intends to protect the fisheries environments by restricting the removal of the bank vegetation.

3.6.4.3 Rate of Development

Once the municipality's population reaches 1,200, council shall establish a quota to control the future number of new lots. ~~This is expected to have any affect on development around White Lake.~~ ?

3.6.4.4 Development Criteria

Any area of national, provincial or local historical significance will be protected from any possible negative impacts resulting from subdivision development. To determine areas acceptable for development reports on soils, geology, hydrology, vegetation and ecology. In addition any proposed development must have direct access to an open public road allowance. This effectively restricts any further development on the north shore of White Lake as there is no road access.

3.6.4.5 Comprehensive Zoning By-law (8-81)

Under general provision (section 4), the minimum setback from the water (highwater mark) shall be 15 metres where there is no marine road allowance of at least 20 metres.

Wayside pits are a permitted use, except in a residential, stream and wetland or a hazard zone.

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3.7 Recommendations

Official Plans and Zoning By-laws of the four White Lake Townships represent a mixture of land use policies. Darling and McNab Townships are the most heavily populated, representing the largest share of the lake area and degree of development. The Official Plans for these two townships and to a lesser degree Pakenham, are directed more towards development control. All of the above three townships had their Official Plan and Zoning By-laws compiled by planning consultants.

Bagot Township is less populated than the other three, and represents only a small portion on White Lake. The Official Plan and Zoning By-law for Bagot and Blythfield was compiled by the Renfrew County Planning Office in conjunction with the Ministry of Natural Resources, Pembroke District. This resulted in unique zoning designations recognizing fish and wildlife concerns and wetlands. While the same zoning criteria is not likely acceptable nor applicable over the lake area as a whole, it can serve as a benchmark for areas on the lake which are thought to be deficient in their planning and zoning with respect to significant resource interest areas. Specifically, Stream and Wetland Zoning is designated in lieu of the standard, less specific Hazard Land Zoning, and is seen as a progressive step in the zoning of the lake environment. McNab Township has designated an Environmental Protection Zone (EP) to protect similar features, while allowing permitted uses. This in turn gives recognition to the special significance of such areas in the overall ecology of a waterbody.

The Zoning By-law for Bagot Township has stated that development will not affect fish or wildlife habitat. It is believed that similar recognition by the other townships, recognizing the importance of the lake fishery to the lake and resource uses would provide for a better consensus amongst the four municipalities, lessening conflicting or dissimilar zoning and development policies.

The zoning by-laws differences amongst the townships reflects the degree and extent of current and proposed use of White Lake in each township. While it would be desirable to have a consensus amongst the townships as to the future use of White Lake, it is thought to be impractical to have identical zoning by-laws.

Darling, McNab and Pakenham Townships have the heaviest residential and commercial tourist developments and are expected to receive the greatest pressures for additional development and general recreation use of the lake and environs.

In an attempt to establish greater control on development Darling Township has passed a development policy statement that will not allow more than twelve (12) units to be built per year. This constraint will serve as an interim control measure until there is sufficient information concerning the impact that future development will have on the lake. It also recognizes that the impact of such development may not be measured in terms of the amount of fishing pressure (MMAH memo to Darling Township, September 1982).

Darling Council's attempt to have the other municipalities to adopt a similar policy approach to development was unsuccessful. Pakenham and Bagot do not have a large amount of lake development. Despite this

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initial setback, a consensus on development policy is still a desirable and reasonable objective for the lake.

Further participation by the ministries of Municipal Affairs and Housing and Natural Resources is encouraged in order to achieve a common use policy. In the interim period, however, it is expected that the major development policies and majority of use will be implemented and directed towards the Township of Darling. It is essential that the Darling position on development and future use be representative as possible for the lake as a whole, in order to facilitate the adoption of similar policies by other municipalities.

Included in the new Darling Policy Statement is a provision that states backshore developments should be discouraged. This is in contradiction to the North Lanark Official Plan which states that backshore clusters should be encouraged (3.5.1.2). This position on backshore cluster development should be reconsidered. Backshore development is a viable alternative to continued linear shoreline development in that it relieves pressures on the remaining vacant shore lots and more importantly, the lake resources.

4.0 CONCLUSIONS

White Lake is a large waterbody that is well suited to various forms of recreation, including cottaging and angling. The lake is intensely developed, with most of the private cottage development occurring in the 1960's and early 1970's. The commercial-tourist sector, fishing lodges and rental cottages, pre-dates the large influx of private cottages.

White Lake has been subjected to significant fluctuations in water levels for much of its settlement history, mainly due to the operation of a dam at the Waba Creek outlet. The drawdown, often in excess of 1.2 metres, created a suitable habitat for gamefish species. Pickerel were first introduced to the lake in the 1920's and the population thrived until the late 1950's - early '60's, when stresses to the population were documented. Successive studies have showed that intense angling pressures associated with increasing shoreline development, as well as greater access to the lake and a general increase in public mobility, has led to a drastic decline in the game fishery. Associated with extensive shoreline developments are; habitat destruction in the form of siltation of spawning beds, shoreline alterations, removal of shoreline vegetation, infilling along shorelands, construction of retaining walls, and demand by cottagers and lake users for stable water levels for the summer cottaging-boating period; all contributed to the crash of the pickerel population by the early 1970's. ^

As a result of poor angling success and concerns expressed by lake residents and users, the ministry of natural resources instituted a Water Level Management Plan (1977) to restore water levels so that they closely reflect the historic fluctuations. A gradual drawdown over the summer months was designed to improve the spawning habitat for pickerel as well as improve the overall water quality. The 1985 fishery

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assessment of White Lake indicates a significant improvement in fish populations which can only be attributable to the improved water regime.

A Self-Help Water Quality Monitoring Program sponsored by the ministry of the environment and conducted by citizens on the lake has operated on White Lake since 1972. Secchi disc depths and chlorophyll a concentrations are determined on a regular basis over the summer months. These parameters are used to indicate the trophic status of the lake. The lake can be said to be in a late mesotrophic/early eutrophic state. The trophic status of the lake has not deteriorated appreciably over the past 10 years. It is suggested that the degree of shoreline development and lake use has contributed significantly to an accelerated eutrophication of the lake. Artificial water levels accompanied by rapid, uncontrolled development has created water quality problems in the past. In a discussion on water quality, there are two main areas of concern; health standards and nutrient-biological standards. The Ministry of the Environment and the local health departments have determined, using health related standards of faecal coliform counts, that the water is safe for recreational purposes but is not reliable as a source of drinking water (non-potable). A lake water quality survey conducted in 1973 determined a large majority of cottages had water unsuitable for drinking (based on outfall from sewage systems directly in front of cottages), using faecal coliform as the determinant bacteria. The percentage of cottages that had unsuitable waters increased throughout the summer, implying that heavier, intensified use resulted in increased coliform counts. The safe levels for recreational use are 10 faecal coli/deci-litre (ml). Levels encountered exceeded 10 faecal coli-deci-litre, which exceeds the maximum acceptable levels in waters used for domestic consumption (Water Quality Sourcebook, Inland Waters Director, Environment Canada, 1979).

It is well known that cottages ~~can~~ pollute a lake to a measurable extent. Many disposal facilities need to be upgraded. If a similar survey were conducted at this time, it is expected to yield similar results as in 1973. Faecal coliforms are short lived in water and are indicative of a faulty septic tank-tile bed or other types of sewage disposal systems. These very same systems can also release nutrient laden sewage effluents along with the bacteria, which persist in the lake for long periods of time, contributing to the eutrophication process. Combined with White Lake's low flushing rate, the result is accelerated eutrophication. In the past, the existence of cottages with faulty disposal systems on White Lake has contributed to the deteriorated state of the water quality. Given the premise that cottage development and recreational use will continue to increase, it is to be expected that the incidence of faulty septic tank/sewage systems - bacterial outflow problems will similarly increase as cottaging increases in density around the lake. In order to maintain the current acceptable level of water quality, the flushing rate of the lake may have to be increased as one possible solution. *sp*

It is expected that White Lake will continue to be a major recreational use area, for angling and general recreational use. Lake use and resultant effects are expected to increase as the local population, and that of the Ottawa-Carleton area continues to increase. Inherently the lake's resource management plans will become of increasing importance and under increasing public scrutiny. *consequently*

White Lake in itself is not a unique resource, but collectively all lakes are unique and valuable resources that should not be permitted to degrade through inaction or inappropriate action. Water resource degradation is a sign of management strategies and use gone wrong. While at this time development regulations are not totally restrictive; mis-applied and misdirected management, now and in the future, may necessitate more drastic and totally restrictive measures which are in no user groups best interests.

Part I, **Background Information**, provides the necessary information for the interpretation of Part II, **A Management Plan for White Lake**. Both are designed to be used together in order to understand the development of the ministry management approaches as well as that for the municipalities and the individual lake user.

The White Lake Integrated Resource Management Plan is one of many integrated resource management plans that will be prepared by the Ministry, as stated in the District Land Use Guidelines (DLUG, 1983).

Neither the creation of awareness on the resource status of White Lake nor adoption of all alternatives and resultant policies are guaranteed to maintain a rehabilitated lake environment. However, adoption of the principles of the White Lake Integrated Resource Management Plan (Part I and II), is a positive step towards that goal. At some time in the future, the status and management programs for White Lake will be redefined, making the lake plan a practical, working document that incorporates updates in data, greater public input and new management directions.

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WHITE LAKE
INTEGRATED RESOURCES MANAGEMENT PLAN
LANARK - RENFREW COUNTIES
CARLETON PLACE DISTRICT
MINISTRY OF NATURAL RESOURCES
PART II
A MANAGEMENT PLAN FOR WHITE LAKE

APPROVAL PAGE

A Management Plan for White Lake represents Part II of the White Lake Integrated Resources Management Plan that has been prepared by the Ministry of Natural Resources, Carleton Place District.

Expected changes in resource demands and changes in our knowledge of the lake resources and resources management will require amendments to this lake management plan. Such revisions may occur periodically as is necessary, but will normally occur every five years when the plan is reviewed.

District Manager
Carleton Place District

December, 1985

PREFACE

The Ministry of Natural Resources has the responsibility of providing for outdoor recreation and resource development for the continuous and economic benefit of the people of Ontario and for administering, protecting and conserving public lands and waters. Lake Integrated Resources Management Planning is one method of attaining this goal.

The White Lake Management Plan has as a primary objective, to provide current, relevant policies and guidelines that will enable the Ministry to assess the suitability and compatibility of existing and new land use proposals in the lake planning area, which is the immediate shoreline and backshore areas within the watershed boundary.

Part II, **[A Management Plan for White Lake]** states the purpose and rationale for the White Lake Plan and provides detailed management direction primarily to Ministry staff and secondarily to municipalities and lake users. Once the Management Plan for White Lake is approved at the district and regional levels as well as having been reviewed by the municipalities, a draft municipal summary document will be prepared, derived from the Management Plan document. The Municipal Summary will inform the municipalities within the White Lake Planning area of the Ministry's programs intentions regarding lake management and provide recommendations as to how municipalities can derive benefit from a formal recognition of natural resources use in their Official Plans and Zoning by-laws. The White Lake Integrated Resources Management Plan - Municipal Summary will emphasize a municipal context within which this Ministry can act supportively.

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The lake roles have been described in the Carleton Place District Land Use Guidelines (DLUG, 1983), in its policy on Integrated Resources Management. The Carleton Place District will have particular emphasis on public lands for all Ministry programs. Where individual programs require the use of private land, the Ministry's resources management will be coordinated with other land uses such as agriculture and residential development so that conflicts and inefficiencies are avoided or minimized. It is anticipated that greater cross-program inefficiencies may be achieved through integration of activities now managed by the Ministry.

The Ministry will provide or encourage areas of modified management along all shorelines and in other areas as necessary in order to protect important fisheries, wildlife, recreation and tourism resources (DLUG, 1983).

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1.0 INTRODUCTION

In recent years, pressure on the recreational lake environment has dramatically increased due to population growth, greater disposable income and leisure time, new technologies, increased accessibility to recreational areas that were once left relatively in their natural state, an aggressive governmental encouragement of tourism and the active promotion of its use through lifestyle advertising that exploits back to nature values (adapted from, Lang and Armour, 1980).

Recent development proposals and the concerns expressed by municipal councils, local cottage owners, and cottage associations has precipitated the need for lake management plans. The Ministry has perceived this demand for lake plans as part of our plan input and review functions, to review our own programs and to guide our comments of other agencies or municipalities.

Since the late 1960's lake planning has been an evolving process in this province. The Lake Alert Manual ^{was} the ^{land} landmark document for lake planning, developed for use by the Ministry of Natural Resources. Lake Planning guidelines have since followed, but were primarily intended for cottage developments in Northern Ontario.

In the Carleton Place district 90% of all land is privately owned (DLUG, 1983). Where Lakes are surrounded by private land; as for White Lake ~~land~~ this constitutes 50% of the shoreline area; a different approach from the Northern Ontario methods are required. Lake planning in this district must recognize the needs and important roles of the private land cottage owner in lake management.

The primary goal of 'The Management Plan for White Lake' is to provide shoreland land-use policies that the Ministry may follow in its program planning and management to protect and enhance the ecological and recreational value of the lake planning area (Part I, Background Information; White Lake Integrated Resources Management Plan, 1984).

The Management Plan for White Lake will also provide the document for the preparation of a Municipal Summary, which will inform the White Lake municipalities of the Ministry's program intentions regarding lake management and provide guidelines as to how the municipalities can derive benefit from a formal recognition natural resources use in their Official Plans and Zoning by-laws.

1.1 STUDY AREA

White Lake is located in the townships of Bagot, McNab, Darling and Pakenham, in the counties of Renfrew and Lanark. The White Lake Planning Area is located in the northern portion of the Carleton Place District (Figure 1). The planning area has been delineated on a watershed unit basis (Figure 2). The planning area is described in detail in Part I - Background Information.

1.2 MANAGEMENT OBJECTIVES FOR WHITE LAKE

The management objectives for the White Lake ^{ake} Planning Area are

described in Part I (section 1.2) of the Background Information Report. In Part II of this report, the objectives will be briefly outlined.

Existing uses and desired management direction as perceived by the public, municipalities and the ministry have formed the basis for determining this plan's objectives for ministry and municipal management of the lake's resources. Municipal objectives and implementation strategy are not detailed in this report, but will be included in the Municipal Summary, the next sequence in the White Lake Integrated Resource Management Planning.

It is a premise of this lake plan that Ministry objectives and management programs be integrated with those of the four municipality's as much as possible.

Some of the Ministry's general objectives are to:

- Implement the land and water use policies of the District land Use Guidelines (1983) and other Ministry management plans.
- Provide guidelines and recommendations for Ministry input into Official Plans and Zoning by-laws.
- Provide guidelines and policies that will enable The Ministry to carry out its plan input and review function in a manner that is consistent with the resources management objectives for the planning area.
- Provide the ~~form~~ municipalities and other agencies with information that clearly outlines the Ministry's management policies for White Lake.
- Inform the public, cottagers and other lake users, of the issues and concerns regarding resource use, lakeshore development and the ~~alternative~~ management possibilities for an improvement of the lake resource.

Specific objectives, reflective of each service's management concerns have been assigned for White Lake from current and future services management program and plans. The primary objective reflects the state of the fishery, particularly pickerel and water quality.

Wildlife and Timber resources are the notable resource concerns that are reflected in objectives for White Lake. All of these and others, are interrelated resources whose use and management has a direct impact on the lake environment, its use, development and other resources management, objectives outside of the Ministry's mandate.

The Ministry of Natural Resources has classified White Lake according to its fisheries potential and its sensitivity to development. White lake is a Class 2 - Principal Warmwater Fishery that is to be managed for a good angling experience with other recreational values secondary. A catch quality target of 1.5 fish per day for all sports fish is desirable. Development ceilings may have to be imposed in order to maintain this quality (DLUG, 1983). Day trip angling ~~and limited~~ and limited shoreline development is preferred and water level manipulation should be tailored for maximum fish and wildlife benefits. The Ministry is opposed to any development within 30 metres of the

hi water mark of White Lake.

The ministry's overall objectives for White Lake is one of improved resource management integration between individual ministry service's program; the ministry and the municipalities, lake area residents and lake users of the planning area.

2.0 ALTERNATE MANAGEMENT STRATEGIES

2.1 INTRODUCTION

Management alternatives; being ¹Controlled Linear and backshore development are presented for White Lake which are thought to best ^{achieve} the ^{←?} Ministry ²Municipalities' objectives. The alternatives include guidelines designed to alleviate the pressures and negative results of shoreline development and lake recreational use. Direct ministry control guidelines are necessary to rehabilitate the pickerel fishery designation, while simultaneously improving and stabilizing the water quality. The acceptability of the alternative management strategies depends on the lake objectives, does not result in conflicts amongst the land users and the resources base, and is judged to be socially acceptable (MNR - Carleton Place District; Lake Plans, Terms of Reference, Feb. 1982).

Cottage development in southern Ontario has traditionally followed a sequential and concentric pattern of development in three phases being; Phase 1 - Single tier linear development along the shoreline (Ribbon Development), Phase ² - Second tier development (in depth); and Phase 3 - Backshore (Jackson, 1974).

The White Lake Mining Area is unique to the district in that there are areas which exhibit all three forms of development in various stages. Lake development does not necessarily follow in sequential steps, or to the maximization of one phase over the next. The mix of development on White Lake is a result of a number of specific factors, among them being, the amount and distribution of Crown Land. This has directed development to be concentrated on patent lands, tiered cottage development and a growing number of mobile homes in the north basin area of the lake and, the sporadic development of backshore areas on the peninsula between Three Mile Bay and Pickerel Bay. This shoreline of development is expected to continue for an indefinite period of time.

Inherently, alternative approaches to the existing development status of the shoreline recognizes that the status quo is not necessarily the most desirable form of development at this time, given the present extent of development on the lake, the nature and status of the lake resources and the latent effect such development inflicts on these resources. Alternatives can provide for a better mix and balanced use of the lake's resources, without a further deterioration in lake quality. This White Lake Plan does not assume or recognize that a deterioration in lake quality and subsequently other lake resources is inevitable. Such a policy stand, merely serves to emphasize that, the appropriate mix of management alternatives has not yet been sought or implemented.

Instead of White Lake being allowed to continue in a downward environmental spiral, every management effort should be pressured and action taken by MNR, MOE, the municipalities, lake residents and users and other agencies.

It is essential that the White Lake Management Plan be subjected to periodic reviews in order to incorporate new ideas, concepts and management strategies that will best accommodate changes in background information and lake conditions and expected improvements in lake

pl ing methodology.

2.2 APPROACH

Alternative strategies are oriented towards both shoreland development and lake resource recognizing the rights of cottagers and property owners to develop their property (under specific development controls), while maximizing and protecting the quality of the lake resources. The management alternatives stress a proactive approach to management of the lake environment with the introduction of new and innovative lake management programs. Adoption of one alternative does not necessarily exclude others since many alternatives may be compatible and do embody the principle of integrated resources management.

2.3 DEVELOPMENT ALTERNATIVES

Existing development and associated recreational lake use is directly and indirectly responsible for the quality of White Lake and its resources. Some forms of shoreline development are more environmentally and socially acceptable than others. While it is desirable to control linear shoreline development, to a large extent, much of the private shoreline is already developed. The least desirable form of development is second-tier development. Specific areas on the lake already exhibit this form of development. At White Lake Village, second-tier development is evident. All development guidelines are directed towards avoiding this increasing, all too common second phase in lakeshore development. This lake plan is not intended to reverse or prohibit the existing or continued hamlet growth within the village proper. It is desirable to prevent the establishment and growth of another hamlet on the lake, which may innocently begin as second-tier development in areas of congested seasonal cottages. All alternatives represent some form of development control, in varying degrees, dependent upon current use.

2.3.1. LINEAR SHORELINE DEVELOPMENT

It appears that neither Darling Township or the other wish to prevent the individual landowner from building on their lots (see section 3.5-6). The Ministry complies with this approach. Individual shoreline lot development should be allowed to proceed on privately owned lands. It has been stated previously that there presently exists ~~a~~ 130 lots in Darling Township that have been severed but remain vacant. Therefore a policy of restricting the number of lots (ie: a Quota System) would not be an effective development control. Thus it is necessary to allow development to proceed at a determined rate, while further studies can better determine the affects of increased development and lake use. Should it prove that additional individual cottage developments are having a significant impact on the lake, a more restrictive quota may be placed on the number of development units.

What this alternative provides is a 'sliding scale' approach to ceiling levels that are usually determined by capacity calculations. This alternative assumes that individual cottage lot development is the least detrimental of all forms of shoreline development. In this controlled development strategy no large subdivisions would be permitted, as would expansion of tent and trailer parks and mobile home sites. In certain instances, such as sensitive areas, hazard areas

individual lot development should be curtailed:

Other Features are:

- increase lot sizes for individual severances to a minimum of 1 acre (.4 hectares)
- all sewage disposal systems must be set back a minimum of 30 metres. Where slope of lot is greater than 10% or where soil conditions are inadequate, setbacks must be greater.
- establish restricted areas by-laws and other development controls to control shoreline alterations, vegetation removal, etc.
- restrict new development to seasonal dwellings only, as permanent has greater impact on the environment than seasonal units.

The Three Mile Bay area, both north and south, is extensively developed and heavily forested. This and other existing residential and seasonal residential areas will be eventually fuel typed mapped to determined areas subject to high forest fire hazard and risk by the Ministry.

New cottage developments with development and site control may be less environmentally damaging to lake and other resources than older existing cottages built prior to development control. Specifically, septic tank systems tend to become less efficient with age, as they are not properly maintained, and tend to be overused than for what they were initially designed for.

Additionally, shoreline development is known to cause a latent and cumulative impact on the environment, especially the fishery.

A summary of the positive and negative aspects of continued shoreline development follows.

POSITIVE ASPECTS

- inherent in land ownership
- means of controlling high land prices (avoids speculation)
- satisfies demand for lots
- allows for interim management
- relieves immediate pressure for tier development
- acceptable to municipality and landowner
- recognizes problems of nutrient enrichment from ~~domestically~~ septic systems ← ?

controls/limits development to one manageable type

- individual development, with proper control may not reduce water quality
- new development may be more ecologically sensitive, with greater plan control

NEGATIVE ASPECTS

- allows for increases in angling pressure
- potential for further resource degradation
- shoreline monopoly
- increases year round use
- greater number of shoreline structures and alterations
- higher development costs
- sewage system design limited due to lot size, topography
- further sterilizes the amount of land behind cottages for other use
- frustrates fishery/wildlife management plans
- may not be restrictive enough for condition of lake resources
- linear development is the largest single source for addition of nutrients to water
- does not allow for complete maximization of use along shoreline

2.3.2 DEVELOPMENT OF BACKSHORE AREAS

While Management Alternatives are directed at controlling shoreline development they must also provide a direction that is less user control oriented, in contrast to a greater use. Backshore development, will require a much more active orientation. Public participation and lake use awareness is required in order to 'sell' the merits of cottage development back from the lakeshore in lieu of linear development to developers, buyers and the municipalities themselves. Realistically, backshore development (various designs) will not occur until much of the existing vacant shoreline lots are developed and/or these shoreline lots become prohibitively expensive.

Recommending backshore development as an alternative to shoreline

development recognizes that the demand for cottaging and lake use will continue to be a dominant factor in lake environments. It provides one of the few development alternatives that is feasible for a lake which is approaching or is already extensively overdeveloped. Extensive linear development does not necessarily have to be a pre-requisite to backshore development.

The Backshore Alternative is based on the assumption that the current pattern of linear development is unacceptable since the shoreline area is the most susceptible to environmental deterioration and therefore, requires greater development control. The environmental impact is expected to be much less for backshore areas than for the shoreline development. Generally, planning mistakes are less severe and easier to rectify in the backshore. ~~With the~~ With the pressure for development removed from the immediate lakeshore environment, management of the lake according to the management objectives is expected to be more feasible.

Future backshore development proposals may cause some conflicts for the municipalities. Conifer forest is the prevalent forest cover around White Lake. The presence of residential development, whether as backshore clusters or individual estate lots, are cause for concern for the protection of human life and private property values. The existing conifer now creates the hazard to support even crown fires. The presence of residential development and people will produce the risk necessary to create dangerous fire conditions. Backshore residential development should ensure the conversion to hardwood corridors around residential areas to reduce the risk of crown and slash fires.

General features of backshore development include;

- Development can occur in a variety of forms; clusters, nuclei or individual cottages, depending on topography and demand.
- Public access to lake should be provided where necessary.
- No development should occur in a linear fashion directly behind existing shoreline development.
- Infill developments between clusters should be avoided through appropriate land-use zoning.
- When cluster development is to be built where there is no shoreline development, foreshore area should be retained for use by backshore cluster residents and the general public.
- The number of development sites should be consistent with land and water capability calculations ~~are~~ not to be used to arrive at definitive ceilings at this point in time.

The general merits of backshore development are listed as follows;

~~POSITIVE ASPECTS~~ *most primary from here - see dist. 10/7/15*

- ~~Provides more effective use of backshore for recreational~~

POSITIVE ASPECTS

- Provides more effective use of backshore for recreational use, presently left vacant by shoreline development.
- Allows for greater recognition of the long term lake management objectives, and easier implementation of the lake management plan with better control.
- Provides a greater capacity for cottage development than shoreline areas.
- Provides the opportunity for greater variety in subdivision design and lot size, taking advantage of natural features and recognizing more environmentally sensitive areas.
- Lower development costs can be expected away from the lakeshore areas.
- Provides alternate recreational uses other than traditional lake oriented use.
- Allows for improved treatment of sewage wastes and alternate leaching areas other than into lakes, as is the case with shoreline cottages.
- Environmental impact on the lake and resources is expected to be less.
- Will reduce the amount of shoreland vegetation that is normally lost to lakeshore development, thereby, maintaining the natural character of the lake.
- Shoreline clutter and littoral zone disturbances reduced with controlled docking facilities.
- Can coincide with continued shoreline development alternatives to deter multi-tiered cottage development.
- Competition between cottage residents and non-residents for lake watershed resources may be lessened.
- Lower maintenance costs to municipality in providing year round service.
- Allows for a greater degree of privacy.
- Backshore development is in agreement with the statement endorsed in the North Lanark Official Plan.
- Less social resistance is expected than for uncontrolled shoreline development.

NEGATIVE FEATURES OF BACKSHORE DEVELOPMENT

- Lake residents who view the lake as already overdeveloped may resist backshore lake developments.

- Administrative conflicts may be encountered when non-recreational lands (i.e. farmland, forestry) are included in the design and location of lakeshore lots.
- Where there are no current docking facilities, beaches, etc., backshore developments will require the acquisition of shoreline for public access.
- The public and municipalities may not be convinced of the need for this type of development while developable shoreline areas remain undeveloped.
- Backshore use may conflict with other resource areas such as deer yards and forestry operations.

2.4 Management Alternatives for Ministry Programs

The Ministry management alternatives will be directed at those programs identified as those requiring new approaches over which the Ministry has direct control. All Ministry programs and alternative plans will have regard for the integrated nature of the lake environment and management plans of other Ministries and agencies. Consequently, the Ministry's alternative may have to be interim in nature recognizing that management concessions will occur, program priorities will be periodically reassessed and our operational strategy will change until all programs become fully integrated into the lake planning approach.

Fisheries management options (alternatives) presented in Section 2.5 (Part I - Background Information), indicates that management techniques, harvest seasons and creel limits may be required to vary from lake class to lake class, as well as within individual lake classes, sometimes within narrow geographical areas to achieve the district's fisheries objectives. Given that the status of the fishery is similar to other district lakes, management techniques are uniform and White Lake is recognized as an important district fishery; a selective fishery management program with lake specific regulations should be applied to White Lake at this time. The yet untried fisheries quota system received tentative backing from Fish and Wildlife Services and is recommended on an interim trial basis for White Lake.

The lake planning area management goals and alternatives should take precedence over secondary goals or management plans of other services. The lake resources management plan should be the guiding or encompassing document regarding the preparation and implementation of other service's specific management plans.

At the present White Lake is managed by two Ministry administrative districts, Carleton Place and Pembroke. Currently, Carleton Place is responsible for fisheries and water level management only. Other regulations such as the Beds of Navigable Waters Act and the Lakes and Rivers Improvement Act are administered by the respective districts. Often, it has been difficult to control detrimental actions like shoreline infilling and alterations because the lake is split between the two districts.

It is strongly recommended that the Ministry of Natural Resources

rectify such problems not only on White Lake, but others in similar predicaments. The Carleton Place District office should approach the Pembroke District concerning this district taking over all Ministry functions related to White Lake. Such functions could include Plan Input and Review of Official Plans, Zoning By-laws, Severances and Subdivision proposals, monitoring Crown land occupations, etc.

2.4.1 Management Strategies - Geographic Areas

White Lake, owing to its unique shape, may be more easily managed by specific geographic areas (Section 1.1.1). These are based on topography and shape of water bodies such as bays, narrows and canals. The White Lake Water Quality Committee presently has the lake divided into 12 water sampling monitoring areas, represented on the committee by a lake resident. Development by geographic areas recognizes that not all of the lake is uniformly developed nor should they be subject to identical development controls or management programs. Different areas of the lake having their own special physical characteristics are subjected to differential levels of environmental stress. Within each area, the municipality may, under advice from M.N.R. and other agencies wish to adjust zoning by-laws and amendments to the official plan depending on the extent of development and sensitivity of an area.

Naturally geographically oriented areas, such as Three Mile Bay have been used in the past (MOE, Cottage Pollution Survey, 1975) for studies and management purposes. In the future with Three Mile Bay already extensively developed, Darling Council may wish to restrict development here more so than elsewhere.

Density of development in an area may be a determining parameter, or an important geographic pickerel spawning site management action for specific area development control through geographic areas may provide the means for some form of water-use zoning, reflecting existing compatible land use zoning. While no provision is provided in the Planning Act for Water Use Zoning, it is thought that by controlling or directing development away from or restricted to certain water areas through zoning, the same objectives can be met.

2.4.2 Preferred Management Alternatives

The Ministry's preferred management alternatives supports continued cottage development, that will least conflict with traditional Ministry program areas as well as new perceived areas. This will require much greater plan input and site development controls than presently exists in official plans and zoning by-laws.

The Ministry supports some form of restricted shoreline development, as has been recently introduced in Darling Township's policy on development. New developments should emphasize selected backshore development in various forms, estate lots, individual (remote) lots, and cluster cottages/homes, depending on terrain conditions. Any backshore development should have considerable setbacks from the shoreline so as to prevent the development of tiered cottage rows, and provide for public access to water. Backshore development should not be landlocked. Where backshore development is proposed and there are no existing shoreline cottages, lesser setbacks may be utilized while still maintaining the natural vegetation state over much of the

non-developed shoreline.

All types of lake development should be directed away from wetlands, waterfowl nesting areas, critical spawning sites and other environmentally important areas identified by this Ministry and others. Areas not suitable for development will be identified and should be addressed in the respective municipal zoning by-laws.

The management alternatives and strategies discussed in this section provide the basis (background, setting) for specific plan recommendations discussed in Section 3.2. Program recommendations are designed to form the basis for discussion development and implementation of new land and water use policies that directly address White Lake and area concerns.

3.0 Plan Recommendations

The following recommendations were developed according to the stated management objectives and current resource status of the lake to provide the Ministry and the respective municipalities with compatible management guidelines. Such recommendations allow for recreational and residential lake area development and use while concurrently providing the framework for protecting and restoring the natural lake environment. Detailed municipal guidelines and implementation strategies are included in the municipal summary of the White Lake Management Plan.

3.1 General Recommendations

Lake planning for White Lake embodies the principle of integrated resource management. Because of the diverse nature of a lake's resources and the inter-agency responsibility for management, an increase in inter-departmental/agency co-operation and management planning is required. Integrated inter-agency management is regarded cautiously and is difficult to effectively implement. A concerted effort is needed to increase the understanding of integrated resource management as well as to facilitate inter-agency co-operation towards the adoption of the lake objectives and management alternatives. Increased contacts, joint field programs and information/study sessions will provide a means of understanding concerns and achieving appropriate program strategies. Where a lake resource concern is identified but is not within this Ministry's mandate, an immediate dialogue must be established between all parties in order to resolve the problems according to the established and accepted lake objectives.

3.1.2 A Lake Association for the Protection of the Lake Environment

Cottagers, landowners and lake users form a vital part of the lake planning and management programs of any waterbody. Being the ones to use the lake most extensively and who will benefit most from an improved lake resource, this group serves an important function other than that mentioned above. This group can serve to act as an important catalyst to initiating, and implementing surveys and restorative programs. While serving as an effective lobbying force, they can also serve as a unified group to which Ministries, agencies and groups can

address their concerns and programs too. At present White Lake lacks a unified lake association. A cohesive view of lake concerns and how the lake should be managed and/or rehabilitated is not known.

It is strongly recommended that the cottagers and landowners of White Lake establish a lake association. This should be a separate entity from a cottage association. This lake association should be formed solely for the protection of the environment of White Lake, thus addressing only the environmental concerns. Thus residents of White Lake will be able to represent common concerns to various governmental agencies and elected officials. This will also better facilitate joint Ministry and lake association rehabilitative management programs. The Ministry of Natural Resources should endeavour to assist the citizens of White Lake in forming a lake association.

Following the success of the Christie Lake Pilot Project '84, the newly formed White Lake Association should become involved in this district's Lakes Program, Shoreland Restoration Program, etc. This is to be a co-operative rehabilitative management program amongst the lake association and the Ministry.

3.1.3 A Lake Program for White Lake

Encompassed in M.N.R.'s Lakes Program is the Lake Use Awareness Program. This program is proposed for all of the district's major waterbodies to be implemented over the next few years. Christie Lake is scheduled to participate in the Lakes Program in 1984. Contingent on the success of the Christie Lake Program, White Lake should be included in those lakes participating in the program in 1985/86.

The awareness program is directed towards users of the lake resources, cottage owners, landowners, resort operators, camp operators, day users and other interest groups in an attempt to foster increased understanding of lake environments and the processes involved while ultimately bringing about a change in attitude towards the use and management of Christie Lake. In its initial stages, it is hoped that the lake awareness program will address and promote an awareness of:

- Lake ecology and the current status of the lake environment.

- The interdependence of the lake, surrounding forest and the wildlife it supports (Programme des lacs, Quebec, Ministry of the Environment).

- The importance of natural shoreline vegetation in preserving the lake's biological and aesthetic qualities.

- The importance of minimizing disturbances in the shallow littoral zone.

- Use and management of the lake from a natural environment perspective.

- Minimizing shoreland disturbances so as to prevent erosion and accelerated sedimentation nutrification of the receiving waters.

- The necessity for undertaking a shoreland restoration and

protection program.

The shoreland restoration program is seen to be central focus of the Lake Use Awareness Program in that its main aim is to restore natural shoreland vegetation as part of the re-establishing of the lake's ecological balance. Restoration efforts are directed at a 10 metre band of shoreland, measured from the high water mark.

The Ministry's role in a shoreland restoration program will be one of:

Providing the initial impetus for the start up of a program.

Co-ordination of the program.

To act as a consulting service to lake associations wishing to participate in a lake restoration program.

Provide much of the background information for the lake(s).

Help in the establishing of a nursery for the production of natural vegetation species.

To gain support for the continuation and expansion of a shoreland restoration program for other district lake associations.

The lakes program and its Lake Use Awareness Program is pivotal to the long term success of the Fish and Wildlife - White Lake fisheries and water quality improvement program. An active lake use awareness program is expected to serve as a catalyst for motivating citizen participation in other programs as well as serving to create a new ethic and attitude by all residents and users towards the lake environment.

In addition the Ministry encourages the continued participation of the White Lake Water Quality Committee in the Ministry of the Environment's Self Help Program of water quality assessments.

The approved White Lake Integrated Resource Management Plan will provide the guiding framework for all of this Ministry's programs and future resource planning as they relate to the lake planning area.

3.2 Recommendations for Ministry Programs

3.2.1 Forestry

Forestry activities in the White Lake area contribute significantly to M.N.R.'s forestry management programs and the local economy.

All forestry management programs operating within the lake planning area especially near the lake or streams should operate under environmentally acceptable conditions with greater environmental monitoring than for forestry management activities outside the planning area. Timber harvesting near the lakeshore area should be conducted in accordance with the Environmental Assessment Act (Class Environmental Assessment Act for Forestry Management). Shelterwood or other environmentally acceptable cutting techniques that will have a minimum effect on the watershed, primarily water quality effects and shoreline

vegetation, is preferred.

The importance of natural vegetation in maintaining the lake environment in terms of erosion and sediment control, nutrient retention and other ecologically and aesthetically beneficial ways must not be underestimated. A quick regeneration of natural vegetation species in all cutting areas near the lake should be given a high priority in all forestry management plans. Because of its critical importance to lake ecology shoreland vegetation deserves special consideration. A tree cutting by-law has been the traditional means of attempting to protect shoreline vegetation.

Currently most forestry spraying programs are done aerially and are subject to the Environmental Assessment Act. Spraying near waterbodies is done manually, and must be monitored so as to prevent overspray from entering the water. At present, there are no specific guidelines for the application of herbicides and pesticides near waterbodies. Site preparation spraying methods should be reviewed to determine if there is the potential for the spray to enter the lake system.

The Raycroft Creek area, noted for its pickerel spawning, has plans for a spray program after the current cutting is completed. This presents the Forestry Branch with the opportunity to reassess their application guidelines for spraying near waterbodies. It is recommended that close communication be maintained with Fish and Wildlife on this matter.

Modified Management Areas (MMA) were initially developed for forestry activities near lake shorelines. However, it is felt that the principles of MMA's apply to shoreline developments, recreational activities and any programs or activities that utilize the shoreline areas.

Forestry Management, shoreline development, and other Ministry management programs should operate under the guidelines for 'Modified Management Areas' (MMA).

MMA's will be designed to maintain or improve resource values such as:

- fish habitat
- special features such as cultural, historic, biological or earth science sites
- wildlife habitat
- fragile forest sites
- scenic areas, recreation or tourism establishments within a multiple use context. Land use activities within these areas will be designed so as to maintain and/or improve identified resource values.

Modified management areas are especially necessary on all shorelands and will be established on other areas as necessary. In the case of forestry, modified management, should apply to all operating activities such as road building, stream crossings, cutting, skidding and scarifying. Depending on local conditions, the prescription for forest management could provide for a broad range of utilization levels. Cutting may be permitted in some areas and not others, with a variety

of cutting methods employed depending on the site location and sensitivity.

Because there is a keen competition for shorelands for such uses as forestry, fish and wildlife habitat and recreation, a 120 metre MMA is recognized in all shorelands. The dimensions of this area may be altered as necessary to suit particular circumstances. For White Lake the 120 metre MMA should be employed.

The MMA on shorelands should be managed using a two zone concept, where:

- the inner zone, next to the water, is a zone of minimal disturbance,
- the outer zone should be an area of more general use.

Certain aspects of management will have to be carefully controlled. The extent of each zone will vary with local conditions such as topography and soil material. Suggested width of the minimal disturbance zone is as follows:

Shore Slope %	Width of Minimal Disturbance Zone
0	15 metres
10	30 metres
20	40 metres
30	50 metres
40	60 metres

The minimal disturbance zone could, in some cases, be an area where forest cutting is not permitted, but in other cases modified forest cutting could occur.

Access roads which are considered to be a major disturbance, should not be built in the minimal disturbance zone. Because roads can cause major losses of fish habitat, a set of guidelines for road construction will be attached to all work permits related to the shoreland area. Special references should be made to stream crossings, not only the Raycroft Creek area.

In areas determined to be locally significant to Ministry program concerns; notably, fish spawning and rearing grounds, wetland areas, inflow stream areas, slopes having greater than 10% slope, etc., the MMA area may be insufficient and would require a greater setback. These will have to be assessed on a site by site basis.

Sensitive features such as walleye spawning areas should receive special protection. To protect walleye habitat, it may be necessary to modify management practices beyond the immediate shoreland area. Some management practices may have to be modified in the watershed area around White Lake.

(Source: MNR, Temagami District Land
Use Guidelines, 1983)

3.2.2 Wildlife

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The White Lake watershed area represents an area of considerable importance to MNR's Fish and Wildlife Programs. It is desirable to minimize the loss of wildlife habitat through environmentally compatible land development, selective forestry harvesting techniques, natural regeneration programs, rehabilitation of habitats, sanctuary designations and access control.

Fur trapping targets in the White Lake planning area can be sustained through continued and improved habitat maintenance, harvest controls and regulatory enforcement.

Modified management areas (MMA) for wildlife should be identified and managed accordingly. MMA's for wildlife includes habitat of endangered species and may include deer habitat or other special wildlife habitat such as heron rookeries and wetlands.

Increased co-operation between the Wildlife and Forestry programs would benefit the overall lake plan objectives. Both resource areas have an important input into lake planning area concerns. Timber cutting operations could involve more co-operative planning with Fish and Wildlife to improve deer yard habitats. Fish and Wildlife are encouraged to actively promote this joint planning of cutting operations if possible.

Any backshore development should be directed away from the deer yards located in the lake area. Forest access roads through deer yards should be temporary, limited to the period of forestry operations. The wild rice areas on White Lake are a valuable resource for waterfowl production. A maximum sustainable crop is encouraged, and should be compatible with other justified uses of the lake and surrounding area. Crown areas with public access are to maintain current levels of production. It is recommended that the Ministry encourage wild rice production in areas with restricted access. In addition, wild rice harvesting techniques must not threaten the capabilities for natural regeneration. These areas must be protected from indiscriminate weed control measures and shoreline development, through appropriate regulations and/or zoning designations.

3.2.3 Fisheries

Fisheries assessments often have indicated single cause events being responsible for a fisheries decline. Overdevelopment is frequently named as being responsible for overharvesting. Undoubtedly overharvesting due to the extensive shoreline development is a significant factor on White Lake, but there are other contributing factors which should be addressed.

A natural rebalancing of the gamefish/coarsefish ratio is needed, with pickerel and pike regaining the niche currently occupied by the panfish and coarsefish species. Coarse fish harvesting has been tried in the past as a means of rebalancing the White Lake fishery, but this has not proved to be successful or practical. However, similar programs under the Ministry's CFIP (Community Fisheries Improvement Program) have been attempted on other lakes in the district. While it has yet to be proven whether it is a worthwhile effort, it does encourage lake groups/association participation in lake management and identifies the user groups closer to the resources. This is known to have spinoff benefits to other lake management and restorative programs.

The desired angling quality and the angling pressure upper limit necessary to rehabilitate and maintain a viable game fishery has been determined for White Lake. The appropriate fisheries management programs should be implemented to coincide with other Ministry rehabilitation programs, like the proposed lakes program in 1985. This should emphasize harvest controls to ensure the long term viability of the pickerel fishery, as has been designated by the district's fisheries management plan.

A reduction of allowable harvest levels to 0.67 of the OSY level for game fish is proposed. This will facilitate a speedier recovery of the fishery. This will also provide a greater safety margin than the current 0.85 level; while also permitting greater flexibility in fishery management. The proposed 0.67 level is compatible with harvest levels proposed in the Background Report of the Draft Official Plan for the Lavant, Dalhousie, North Sherbrooke Planning Area.

Harvest controls can be varied, rising catch limits, size limits, shortened seasons, or quota systems. While a fisheries quota system is yet untried it is thought to be the option that will result in the most benefit to the fishery. Given the poor record of other regulatory methods in the past, or the failure to implement such, the Fish and Wildlife branch is encouraged to pursue and implement a quota system on an experimental basis.

Alternatively, a significant reduction in angling pressure and harvest levels can be attained through a curtailment of a winter fishing season and a reduction in the line limit.

Stocking of White Lake is not recommended as it tends to create a dependance on the maintenance of an artificial fishery. White Lake now has the minimum required spawning stock.

The White Lake Water Level Management Plan (1977 - 86) has resulted in an increased flushing rate, bringing about a marked improvement in the fishery and water quality. This water level plan should be extended

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beyond the ten year experimental period as benefits to the overall lake environment are now being realized. Periodic reviews will be done to assess the impacts on the fishery and water quality, while also ensuring that water levels are adequate for cottagers and boaters. Because of the obvious benefits of this program, it is essential that the interests of the former user groups must not take precedence over the fisheries and water quality objectives.

Occupation or degradation of the shoreland and littoral zone through the removal of aquatic and shoreland vegetation, construction of permanent concrete docks and retaining walls, infilling, dredging and construction activity leading to erosion and accelerated sedimentation should be prohibited. Any of the above or related activities associated with the lake shoreland is to be circulated to and approved/disapproved by M.N.R.

Where required by the fishery, unused or unuseable spawning areas should be rehabilitated to provide viable spawning grounds. Raycroft Creek should be considered as a site for an artificial spawn area. Fish Creek, historically a good spawning area, is unuseable due to debris and beaver dams. All areas having spawning potential should be inventoried for both M.N.R. districts.

This district is encouraged to continue their fisheries assessment programs on White Lake. However, new survey programs are needed; updates of oxygen levels, nutrient inputs, water chemistry, winter creel census, and most importantly a determination of the impact of acid precipitation on the fishery. Specifically acid shock associated with spring meltwater runoff or heavy rainfall events should be closely monitored as to its effect on pickerel spawn. The impact of acid precipitation may be more significant than previously recognized, as this area is within one of the highest fallout areas and lowest pH precipitation in North America (Ontario Submission to the United States Environmental Protection Agency, 1982). The acid impact on fisheries is well documented and should therefore be easily identifiable as to its significance in this area.

New fisheries management policies must be accompanied by a public relations program directed at residents and fishermen. Being compatible with the Lake Use Awareness Program, this will foster a spirit of co-operative management and community involvement.

3.2.4 Mineral Resources

Activities that are associated with mineral and aggregate extraction can often be incompatible with development and other resource management programs. It is desirable to avoid conflicts between these other management goals for White Lake and those for aggregate reserves in the planning area.

It is recommended that the removal of aggregate resources not be permitted in the modified management area, which includes a 120 metre deep zone around the lake. The aesthetic and physical impact of sand and gravel pits can be substantially reduced if the 120 metre setback in the MMA is adopted as the minimum distance prior to approval.

The removal of aggregates should not be permitted in the MMA and areas

of significant interest such as wetlands, stream and creeks and where the removal of material will alter the topographical characteristics of the shoreland areas. Any major mineral or aggregate extractions should be carefully monitored for any effects on the lake environment such as increased sedimentation or alterations in water flow and quality.

All lake area development proposals must be reviewed with regards to the potential impact on mineral resources. This is a current practice with the Ministry and should ensure that development does not sterilize reserves from future use.

Pit rehabilitation near the lakes should be given a higher priority than for pits located away from the lake area. The abandoned pit on the south shore of Three Mile Bay (Appendix A) should be rehabilitated in order to lessen the degree of erosion and sediment runoff into White Lake and to reduce the safety hazard an open pit presents to area residents.

3.2.5 Significant Interest Areas

Section 2.7 described local areas of significant interest. It is recommended that such areas be recognized by the Ministry in their management and operational plans. These interest, or environmentally sensitive areas are areas of land or water of unique significance to this area, which provide certain positive values to the public or environment. The areas around White Lake may be susceptible to irreparable damage as a result of human land and water use or a significant change in use of these areas. The significant interest areas in the White Lake planning area serve a variety of functions; preservation, conservation and education. These areas should be preserved for such non-destructive uses.

It is recommended that each municipality recognize these areas in their Official Plans, designating such in their zoning by-law as environmental protection areas (where not already designating) restricting further development in these areas.

3.2.5.1 Wetlands

The Carleton Place District should adopt the following interim wetlands policy for all peatlands, fens, bogs, ponds, marshes and swamps in the White Lake Planning Area.

Prohibit drainage of wetlands for development (residential, road building, aggregate extraction).

Recognize the planning area wetlands as vital habitat and essential to the lake's (and planning area) ecological balance.

Prohibit all dredging and filling of wetlands especially in front of shoreline cottages.

Increase public awareness regarding the importance of wetlands to the lake area. This increased awareness will create a more responsible public behaviour. The Wetlands Public Awareness Program can be part of the Lake Use Awareness Program.

Enforce the regulations of the Lakes and Rivers Improvement Act, Fisheries Act to prevent the filling of shoreline wetlands, protect fish habitat and prevent interference with the shoreland and backshore marshes.

Inventory all local wetlands.

Re-establish wetlands, especially along shorelines where it once existed, with natural aquatic vegetation.

Encourage shoreline property owners to maintain or re-establish natural aquatic vegetation in front of and on their shoreline property.

Conduct environmental appraisals on all programs affecting wetlands.

Prepare a set of planning guidelines to preserve wetlands to be considered by the municipalities.

Encourage municipalities to designate wetlands in their official plans as areas to be kept in their natural state.

3.2.6 Parks and Recreational Use of Crown Land

Additional access points are not recommended at this time, as there are a sufficient number of private and public access points onto White Lake. New access points would be detrimental to a fisheries rehabilitation program as well as other management goals for the lake at this time.

Modified Management Areas (MMA) for recreation or tourism resources should be identified and managed accordingly. Where it is in the public interest to do so, an MMA may be identified and managed to protect particular recreation or tourism resources and establishments.

Other than the McNab Museum Park near White Lake, there are no known special features such as cultural and historic sites. MMA's should identify and be managed to protect this and other features as they become apparent.

Public camping on Crown islands and shorelines should be kept as an alternative recreational use where such use does not conflict with use of adjacent patented lands. This will provide for a balanced recreational use amongst all user groups. Heavily used Crown areas should be monitored regularly for signs of overuse. Posting of heavily used Crown lands is one method of reminding users of their land use responsibilities.

The recreational land and water resources should be managed so as to minimize the conflicts between users and residents. The interests of lakeshore cottage owners should not take precedence over nearby lake area residents, day users and campers. A single use activity should not be allowed to degrade the quality of the lake to the extent where it impedes the recreational use by others.

- regular chemistry survey to determine the cumulative effects of development and use on water quality
- the effects of sub-bottom sediments on water quality.

The increased flushing rate as a result of the Water Level Management Program has resulted in improved water quality. However, this static improvement should not be used as a means of allowing a greater degree of development since deteriorating water quality is associated with future development. Should the water level management program be discontinued, a significant improvement in sewage disposal systems, development design and lake use would be required in order to maintain the present quality.

3.3.2 Soils

Shoreland development and the construction of sewage disposal systems must be conditional on the use of soils having high phosphorous retention capabilities. This will increase the retention of effluent borne nutrients and decrease the rate of eutrophication.

Surficial material types, slopes and thicknesses must be taken into account in the planning, review and implementation of shoreland development. As part of the Lakes Program, the Ministry should acquire or inventory the lake, identifying those areas especially unsuited for development with remedial work being undertaken.

3.4 Other Recommendations - By-law Protecting Shorelands, Wetlands of Lakes and Rivers

This plan will be followed by a municipal summary, providing municipalities with guidelines for shorelands of lakes. This represents a part of this Ministry's commitment to protect the lake resources by managing the land and water resources in such a manner so as to minimize any adverse environmental affects associated with use and development.

This lake plan recognizes that much of the control over shoreland use and degradation rests with the landowners and municipalities. To achieve this lake plan's objectives, the respective municipalities must recognize and adopt land use policies that will protect the shorelands of White Lake. A draft by-law protecting the shorelands and wetlands of lakes and streams is provided in Appendix II. A final draft by-law would have to involve a collaboration between this Ministry, Environment and Municipal Affairs and Housing.

4.0 Implementation of Lake Plan Objectives and Recommendations

The management plan for White Lake will be revised as new information becomes available, Ministry management policies change, the status of the resources change, and as policies become inappropriate in relation to changing land and water use conditions.

Minor revisions may be undertaken at any time, but major revisions will be undertaken only when it is apparent that significant changes to land

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use policies and programs are required. In either case the White Lake Management Plan will be formally reviewed every five years as will be the District Land Use Guidelines (1983).

The lake plan can also be called a 'Plan of Action' of White Lake. As an Integrated Resource Management Plan, this plan is to serve as a guiding document for all Ministry programs operating in the White Lake planning area. The Ministry program and municipal planning guidelines (to be detailed in a subsequent report called 'Municipal Summary', provide a means for direct and pro-active involvement and community participation in restorative management programs for White Lake.

Joint management goals for White Lake are:

- To maintain and improve the quality of the natural lake environment.
- To maintain the existing recreational lake role.
- Improve the quality of recreation experience for all lake users.
- Maintain or improve the water quality of Christie Lake.
- A commitment to improving the quality of the Christie Lake pickerel and game fishery.
- Initiate a lake environment restoration maintenance program.
- To make the best use of lake, shoreland and backshore resources in compliance with the principles of integrated resource management.
- To encourage co-operative participation amongst all user groups, municipalities, and public agencies, with a common goal of maintaining the natural lake environment.

While the White Lake Management Plan is a form of environmental planning, planning alone will not provide for the optimum improvement of lake quality. The lake resources require that an environmental concern and ethic exist towards the lake for all Ministry and municipal management processes but also for and by the lake users. A change in landowners and public use attitudes is expected with a noticeable improvement to the lake environment through the participation by all parties in a lakes program.

Responsibility for land and water management is divided amongst several provincial Ministries; Agriculture and Food, Environment, Municipal Affairs and Housing and Natural Resources. An inescapable feature of much public and environmental planning (i.e. Lake Planning) is that issues and actions to cope with them tend to transcend the boundaries of individual agencies. Environmental problems such as those associated with lake development which do not fit neatly into organizational mandates, generate demands for responses often unfamiliar to existing organizations (Lang and Armour, 1980). However, various options are possible to change the organizational structure and ways of operation in order to better realize environmental objective, overcome conflicts and jurisdictional difference amongst organizations (Lang and Armour, 1980). In order to fulfill the basic requirement of lake planning; viewing land and water as integral components of an ecological system, a co-ordinated effort is called for. The Ministry

of Natural Resources is seen to have the best ability for the principle role as co-ordinator for all activities requiring the use of public lands and waters.

Ministry of Natural Resources Management Guidelines for White Lake can be accomplished by the following means:

- Our role in plan input and review of municipal official plans, zoning by-laws.
- review of development proposals that relate specifically to lake shorelands.
- Use of site specific conditions in permits, licences, leases and easements issued under one or more of the following:
 - Public Lands Act
 - Crown Timber Act
 - Lakes and Rivers Improvement Act
 - The Beach Protection Act
 - Beds of Navigable Waters Act
 - Environmental Protection Act
- Preparation and approval of Integrated Resource Management plans and annual work plans.
- Close liaison with other government Ministries particularly the Ministry of the Environment and local health units.
- Education and extension programs for private landowners, cottage associations, tourist operators, lake users and municipalities.

As in the case of many southeastern Ontario lakes shoreline areas of White Lake are already extensively developed and subject to varying degrees of shoreland and littoral zone degradation. In these areas, the Ministry management emphasis switches to use, to the organization, directing and controlling of human activities and to management of the environment. Incentives, dis-incentives and control measures can be used; to minimize environmental losses, to ensure that pro-environmental objectives are achieved, and to compensate for the limited predictive capability of a lake management plan (Lang and Armour, 1980).

Incentives rather than control measures will encourage a more acceptable change in use attitudes and bring about a new perspective towards the lake environment. This is especially important for the shoreland and littoral zones, which are the most affected by shoreline development and intense recreational use.

Subsequent to the concerns identified in this lake plan, a lakes program is proposed for White Lake. This lake is expected to participate in such a program in May, 1985, following a review of the 1984 Christie Lake Pilot Project. The Lakes Program for White Lake will tentatively consist of a Lake Use Awareness Program and a Program for the Protection of Nature.

4.1 Lake Use Awareness Program

Like other management plans, the environmental status of the lake is not necessarily understood or known by those who contribute to the lake's degraded environment. Lake users such as developers, cottages and landowners who infill and drain wetlands, cut down natural shoreland vegetation and continue to overharvest the fishery are usually unaware of the environmental consequences. To ensure a successful adoption of the Ministry recommendations and restorative management programs, the Ministry (and other agencies and municipalities) need an informed public knowledgeable in the principles and/or workings of integrated resource management, its problems and alternatives. A means of creating an increased understanding of lakes and their environmental concerns, is the implementation of the proposed Lake Use Awareness Program.

The Lake Use Awareness Program will have as a focus:

- i) to inform the lake residents and users of the status of the lake resources through the use of public information centres - bulletin boards strategically located on the lake and increased contact with Ministry staff.
- ii) The preparation of an audio-visual slide program centred on lake use, shoreland vegetation, shoreland developments and how this relates to the lake's ecology. Both programs are expected to result in a change of attitude towards lake use and the lake environment by landowners, residents, and users of White Lake. This awareness program is based on the premise that some knowledge of the lake and its natural ecology are necessary in order to protect it. Two main client groups are identified; adult cottagers, lake residents and the children of cottage owners, nearby communities and camps.

This program should be initiated in the summer of 1984 so as to complement and prepare for the Shoreland Restoration Program expected to start in the spring of 1985.

The first step in the Nature Protection Program will require a determination of the extent of shoreline artificialization. Prior to the shoreland restoration program, the first 60 metres of the forestial border back from the waterline should be surveyed. The existing natural vegetation cover is to be measured against what is known of the original cover. The forestial border will be classified according to how much natural vegetation is present.

The shoreland survey involves land to a depth of 10 metres from the shoreline. The extent of artificialization can be measured by classifying the vegetation cover according to the type of land management to which it has been subjected. An example is provided below.

<u>Form of Management</u>	<u>Description</u>
Natural	Vegetation still in natural

Natural		state.
	Natural but thinned out	Natural vegetation has been thinned out.
	Regenerating	Herbaceous ground cover.
Artificial	Ornamental	Lawns
	Hard Cover	Natural vegetation has been replaced with inert material such as gravel, asphalt, etc.

The survey of the extent of artificialization of the shoreland will be carried out by M.N.R. staff using large scale aerial photocopy and ground survey techniques and mapped using easily identifiable symbols. Upon completion, the survey results are to be placed on the information centre board for White Lake. While it is desirable to survey the total shoreline prior to starting a shoreland restoration program it is not entirely necessary as it is likely that only a portion of the shoreline residents will participate in the first year in a shoreland restoration program.

4.2 Shoreland Restoration Program

The Shoreland Restoration Program under M.N.R.'s guidance is to start in the spring of 1985. Restoration efforts will be directed at a 10 metre band of shoreland identified in an earlier shoreland survey. Restoration of natural shoreland vegetation involves planting of herbaceous plants, shrubs and trees.

Where the shoreland has been cleared of all natural vegetation it is important that erosion be halted as quickly as possible. In this case herbaceous plants are necessary to first put down a protective ground cover. Along with the planting of herbaceous plants, indigenous shrubs are also planted within the 10 metre shoreland border. Eventually indigenous trees are also planted in this area.

M.N.R.'s role in a Shoreland Restoration Program for White Lake will be to:

- 1) Co-ordinate the services of other Ministries and agencies in establishing such a program.
- 2) Establish contact with lake association(s) regarding initiating program.
- 3) Conduct a survey to determine the extent of artificialization of the shoreline.
- 4) Provide background information on Christie Lake and serve as consultant and intermediary between Christie Lake Association and Quebec, Ministry of the Environment and FAPEL.

- 5) Establish and operate an ongoing Lake Use Awareness Program. This may be a co-ordinated effort with M.O.E.
- 6) Encourage the participation of the formulation of other lake associations and their participation in a shoreland restoration program based on expected successes.

Ultimately the success of a lake restoration program for White Lake rests predominantly with the users of the resource. These can be identified as cottage owners, landowners, tourist operators and other users who want the natural environment of White Lake protected and restored where necessary.

To date there is no organized lake association on White Lake. The Ministry of Natural Resources (Lands Section) will contact members of the above concerning the start up of a project for restoration, sometime in late '84 or early '85. A lake group or association will be requested to organize a meeting in early spring '85 in order that the results of the Christie Lake Program can be presented and to solicit their reaction, support and participation in an upcoming program. This same group will be expected to organize a spring planting day as well as a fall cutting day. Plants will be supplied to shoreland participants by M.N.R. through the support and co-operation of Quebec's FAPEL and Ministry of the Environment.

4.3 Other Ministry Programs

Private lands in the White Lake planning area will play an important role in the integration of Ministry programs. Some Ministry programs are required to function on private lands where land use is controlled by official plans and zoning by-laws. The Ministry will continue to solicit the assistance of the municipalities in protecting natural resource concerns and meeting resource objectives through appropriate land use policies.

The Ministry of Natural Resources has two means of controlling land use on private lands. The Ministry comments on development proposals concerning impacts on water quality and the fishery. As previously discussed water quality has an overlapping responsibility between the Ministries of Environment and Natural Resources. Using angling capacity calculations as a means of commenting on private development proposals has its limitations at this time:

- the Ministry comments accordingly with respect to fisheries.
- to the extent that the maintenance of a healthy reproducing community of a desired species is threatened, or
- where a present major economic resource base is threatened and the economic viability is threatened because of poor fishing success.

The Ministry's plan review of development proposals will not be used in an attempt to secure a given quality of angling. Other means of securing the quality of angling for White Lake have been discussed previously. A preferred fisheries management option that would reduce the harvest levels while allowing for an increased natural recruitment

should be implemented to coincide with the broader lakes program that strives to improve and prevent further degradation of the shoreland and littoral zone environments, which ultimately affects the viability of the fishery.

Modified Management Areas (MMA) were discussed as a new management approach towards shorelands. Whereas the concept was developed for forestry practices on Crown land, it is felt that the principles are applicable to all shorelands regardless of tenure. MMA's are believed to be highly compatible with the Lakes Program concept, since both are designed to protect the shoreland environment.

4.4 Course of Action

The White Lake management alternatives, being recommendations for management programs, requires a recognition of two things. Firstly, the recognition of the necessity for an improvement in, or maintaining the quality of, the lake resources. The basis for this has been presented in Part I - Background Report, where the resource base was identified and analysed. Secondly alternatives to present management programs requires a plan of action while it is still feasible to undertake lake rehabilitation programs and achieve the lake objectives. This plan of action is in itself a commitment by the Ministry and other agencies, recognizing the problems of lake use while attempting to safeguard and improve the quality of the lake environment. A proposed management schedule for White Lake is included in Appendix I.

The timing of the implementation for each resource concern and alternative is or will be based on the public's perception of the resource quality and the demand for corrective action, as well as the present state of the resource and how they fit into current Ministry programs.

Specific resources such as the fishery, have been declining in quality and quantity for a number of years. If the Ministry of Natural Resources wishes to prevent a further decline of the game fishery, a new management response over and above our present fisheries programs is required at this time. The appropriate management response should not be delayed or implemented for lack of appropriate choice of management alternatives. These have been identified in the Carleton Place District's Fisheries Management Plan as well as in this plan.

It is desired that the fisheries management alternative be adopted for implementation in 1984/85. Such a program should run coincidental with a White Lake Program, involving a Lake Use Awareness Program and Shoreland Restoration Program. As is necessary for any radical change in management policies a new fisheries management program must be preceded by a public information program for fishermen, cottagers and resort operators. This will explain the need and purpose of the new program. Public objection and adverse reaction to a more restricted fishery is to be expected. However, a Fisheries Awareness Program is expected to ease the transition to a more restricted fishery making it more amenable to the public. It is important that a public information program stress that a policy for a more restricted fishery is not necessarily long term. Fisheries controls are short term in nature and have evolved according to the fishery's status in response to management policies of the time.

Given that the fishery is in a comparatively worse state than the water quality, water quality improvement recommendations and programs can be implemented over a longer time schedule. Also, water quality improvement programs involve inter-ministerial concerns and would be more difficult to implement. As such, water quality recommendations can be phased in over a number of years. Short term water quality goals can be achieved through a survey of cottage sewage disposal systems, upgrading substandard disposal systems and the prevention of the progressive deterioration of the shoreland. As the White Lake and district lakes program gains momentum and support it is hoped that water quality problems that are commonly associated with sewage disposal systems will be addressed as part of the overall lakes program by the lake association.

Shoreline assessments should be part of a regular ongoing annual summer program that will include an inventory of unauthorized occupations of Crown land (i.e. bed of lake), shoreline, infilling and dredging, removal of natural shoreline vegetation (part of shoreland artificialization survey) shoreland excavation, erosional problems and other environmental problems.

The New Planning Act (August, 1983) presents the Ministry of Natural Resources, Carleton Place District with the opportune time to introduce its concerns and management goals into the formulation of any new official plan and zoning by-laws. This approach is likely more acceptable to the municipalities as it does not require an amendment as has been the case in the past.

Once this lake plan is approved by Regional Lands, the Carleton Place District will prepare a 'Municipal Summary' with recommendations specific to municipal implementation in their official plans and zoning by-laws. Since White Lake is contained in four municipalities it is desirable that zoning by-laws, minimum standards, setback distances, development control and environmental policies be compatible in order to have greater uniformity in the management policies.

Essential to the White Lake Plan, its goals, recommendations and the success of its proposed alternative management strategies, is the need for a means to integrate all of these components into a common strategy for the lake. The White Lake Program is that means, since it embodies the principles of integrated resource management involving all Ministry services in a co-ordinated lakes program.

More importantly, for the success of Ministry programs, is the acceptance, support and participation of most lake residents, cottagers and lake users in a lakes program for White Lake. The Ministry's first role is to provide technical data required by cottagers and other users and to provide a co-ordinating function for the program implementation and adoption by other lake associations in the district, eventually including participation by other districts.

A common problem with many co-operative management programs is the maintaining of public support and momentum on a long term continual basis. There is a tendency for participants to drop out of the program once underway and their own shoreline has been restored. If the commitment is not maintained and participation wanes, as a result, the program for the protection of nature is in trouble and will be

difficult if not impossible to resurrect. This brings us back to the earlier comment on the Ministry's commitment. If the Ministry maintains an ongoing commitment it will be much easier to implement and sustain a co-operation program for the lake's rehabilitation and eventual improvement in environmental quality. Thus it is essential not only for the lakes program but the success of our own programs that the Ministry's presence, input and public involvement be maintained on a continuing, regular basis. It is readily apparent that if this program is viewed as being temporary or momentarily expedient, it is unlikely it will receive the full support and involvement of the lake residents. The Lakes Program must become a regular part of the Ministry's lands and waters programs and policies involving other M.N.R. services as well. Public program involvement and Ministry commitment are integral and indivisible components to the program's success. These can be maintained partly by:

- regular newsletters to cottage/lake associations along with other regular contact
- involvement with other agencies such as conservation authorities, Environment, etc. in the lakes program
- establish and maintain a higher Ministry profile in the lake area. The Lake Use Awareness Program is one means of increasing our profile on the lake.
- co-ordinate and host a yearly convention of lake associations to discuss involvement in the lakes program, its success and problems, and to encourage further participation by other lakes. This will serve to identify M.N.R. as an active and committed participant in the program while also serving to reinforce M.N.R.'s commitment to the quality of the lake resources.

The White Lake Management Plan must be a useful, informative, but most importantly, a workable document that will co-ordinate Ministry, agencies and municipal policies and programs. Out of necessity, the plan will undergo a review process every five years of the resource base and use, management goals and alternative strategies. The review may be sooner, as the use, demand or the resource base, changes significantly.

5.0 Conclusions

A management plan for White Lake (Part II) is the second part of the White Lake Integrated Resource Management Plan. Official Plan, zoning by-law development control and alternative development recommendations were presented in conjunction with the Ministry plans and programs. Parts I and II provide for an improved approach to environmental lake planning and management over earlier Ministry plans.

Known and existing management techniques for White Lake and others were presented, while concurrently presenting some new alternative techniques and solutions. Where new solutions are thought to be required for White Lake, these have been identified. A Lakes Program for White Lake, comprised initially of a Lake Use Awareness Program and a Shoreland Restoration Program, paralleling the Christie Lake Program, is scheduled to be implemented in the spring of 1985.

This management plan for White Lake represents a significant new approach to resource management planning in Ontario. It advocates a large amount of public and/or resource user involvement, not only in the latter approval stages, but importantly in the planning, implementation and eventual adoption and management of the lakes programs on their own. Greater user and citizen participation and management of resources reflects the current provincial policy of transferring more responsibility to the local municipalities and landowners in regards to land use matters. This is evidenced in the New Planning Act, August, 1983.

White Lake is one of the first few lakes in the Carleton Place District to be scheduled for participation in the previously discussed Lakes Program. It is hoped that White Lake will act as a yardstick for the successful adoption of the program by other lake associations in this district and elsewhere.

Successful implementation of the White Lake Plan objectives and management recommendations is dependent upon a co-operative working relationship amongst the resource managers (MNR and Environment), municipalities, and most importantly the resource users, cottage owners, landowners, fishermen, resort owners and other lake and area residents and users.

The present and future environmental quality of any lake must ultimately rest with the citizens who live on or near and use the resources of the planning area. If this key group is not convinced of the necessity of maintaining a high quality lake environment, no amount of Ministry planning and corrective programs will reverse the negative effects of a lethargic and indifferent group of lake users. In the early stages of these programs the onus of responsibility to ensure the successful adoption by the lake residents rests with the government agencies. Once adopted and working smoothly, the Ministry can take a more passive role.

APPENDIX I

WHITE LAKE INTEGRATED RESOURCE MANAGEMENT PLAN

IMPLEMENTATION SCHEDULE FOR LAKES PROGRAM

<u>Date</u>	<u>Management Action</u>
June, 1984	Start-up of Christie Lake Program - shoreland restoration program (joint MNR/Lake Association)
Summer, 1984	Presentation of White Lake Plan to MNR Lands - Pembroke District
Summer, 1984	Lake Use Awareness Program - survey and land subdivisions - survey of extent of artificialization - develop MMA's for White Lake - MNR decision on fisheries management option
Fall, 1984	Contact cottagers, landowners and user groups re participation in project.
Spring, 1985	Meet with 'White Lake Association' to introduce program and obtain supprt and participation in spring planting days.
May, 1985	Extensive shoreland survey for those cottagers participating in program
Mid June, 1985	Start of White Lake Shoreland Restoration Program, involving participation by FAPEL, MNR, and Christie Lake representatives
Summer, 1985	Continuance of Lake Use Awareness Program
Fall, 1985	Shoreland Restoration Program - fall cutting day, to be organized by association - assessment of 1985 programs for White Lake
Winter, 1985/86	Follow-up of summer and fall programs. - meet with lake association to discuss problems, successes and strategy for 1986 programs.

Spring, 1986

MNR sponsored meeting of lake associations that participated in 1985 programs - meeting should include other lake associations who have not yet participated in program.

Spring/Summer, 1986

Continuation of Lake Use Awareness program and Shoreland Restoration program.

APPENDIX II

DRAFT MUNICIPAL BY-LAWS RESPECTING
THE SHORELAND, WETLANDS AND SHALLOWS
OF LAKES AND STREAMS

Adapted from:

Direction de l'aménagement des
lacs et cours d'eau;
Programme de Protection des
rives et du littoral;
Quebec, Ministère de
l'Environnement 1983

Preface to Draft By-laws

One of the most distinguishing features of the Ontario landscape is its incredibly complex network of lakes, wetlands, brooks, creeks and rivers (collectively referred to here as streams).

These water courses affect the amount of water available for human use, determine the quality of water, serve as conduits for nutrients and sediments, provide habitat, and have considerable recreational potential.

Wetlands too are included here. Wetlands are critical to the environment in that they are important for water storage, groundwater replenishment and flow regulation; filtration of pollutants; sediment control; wildlife habitat, recreation, microclimate modification, commercial value and perhaps most importantly, educational value.

Lakes perform many valuable functions. They provide water for drinking, industrial use and irrigation. As a recreational resource they accommodate a variety of uses such as cottages, boating, swimming and fishing. They also provide a stable environment for a wide range of species and they offer a staple food supply (Lang and Armour, 1980).

Lakes and streams are collectively one of Ontario's greatest resources. A large part of our tourism industry is based on the quality of these bodies of water. It is thus essential that efforts are made to protect them (Quebec).

Although we rely on lakes for many purposes, we know far too little about either the complex processes shaping the lake environment or the measures necessary to manage lake resources effectively. In the past the commitment to gain the necessary knowledge and take the required management actions is generally inadequate.

Previous components of the Christie Lake Management Plan (Part I) attempted to treat the lake as a natural system with interacting and interrelated elements. Discussed as an ecosystem concept, it has helped in understanding and analyzing the natural environment in relation to human activity.

Pollution of lakes and streams has tended to be a dominant concern in the past when discussing lake environments. However degradation of the shoreland and shallows is now recognized as a significant contributor to the deteriorated state of lakes and streams. Landfill and dredging or destruction of shoreland vegetation not only upsets the ecological balance, but also affects the water quality.

Most cases of degradation are localized to small sectors of shoreland or shallows, but the effects add up quickly and affect the entire body of water. The best means of gaining effective control of these common and consistent acts is through a concerted effort on the part of the Ministry of Natural Resources, the municipalities and the citizens concerned.

In order the help municipalities shoulder their responsibilities with respect to protecting the shorelands and shallows of lakes and streams, we have drafted a municipal by-law in the hope that, if adopted by municipalities, it will arrest the degradation of Ontario's natural heritage.

Section I

Definitions

1- In the by-laws, the following words, terms and expressions mean:

a) Public access:

Any form of access to lakes or streams, on private or public land, open to the population or part of the population, with or without admission charges, and planned in such a way as to enable a lake or stream to be used for recreation and relaxation purposes.

b) Green window:

Opening created through a screen of greenery by pruning or cutting back trees and shrubs.

c) Natural high-water line:

The shrubbery line or the line where a predominance of aquatic vegetation gives way to a predominance of land vegetation.

d) Bed:

That part of a lake or stream usually covered by water.

e) Shallows:

That part of the bed of a lake or stream which extends from the natural high-water line out

towards the centre of the body of water to a depth corresponding to where aquatic vegetation disappears.

f) Flood plain:

The bed of a lake or stream, at the time of a ¹⁰⁰~~25~~ years flood i.e. the strong current zone where the flood has a probability of 1/100 to appear in a given year, under present climatic, cleared land, agricultural organization and water use conditions, or the part of the territory located below the elevations indicated in the by-law.

g) Shoreland:

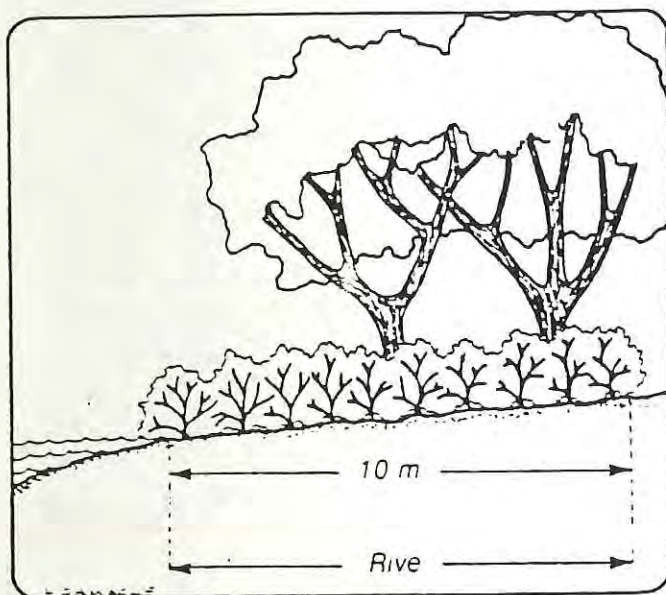
The shoreland is a terrestrial band bordering lakes and streams extending inland from the natural high-water line.

The shoreland is a 10-meter deep band:

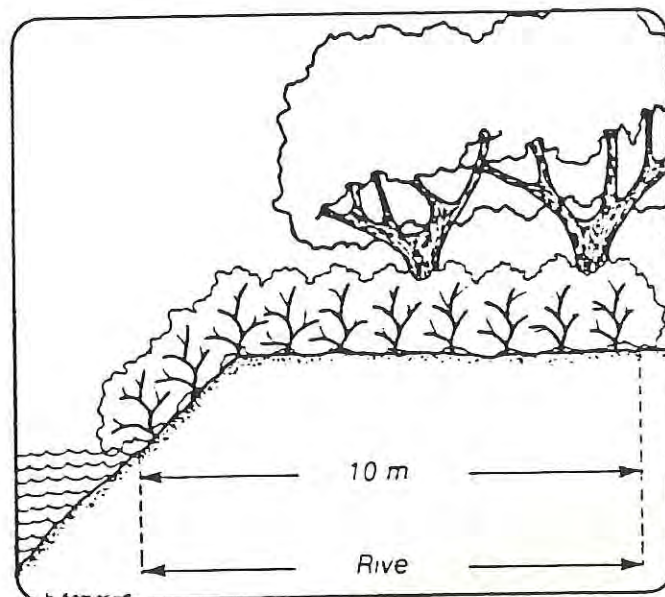
- a) where the grade is less than 30% or;
- b) when the grade is greater than 30% and features and embankment less than 5 meters high.

The shoreland is a 15-meter deep band:

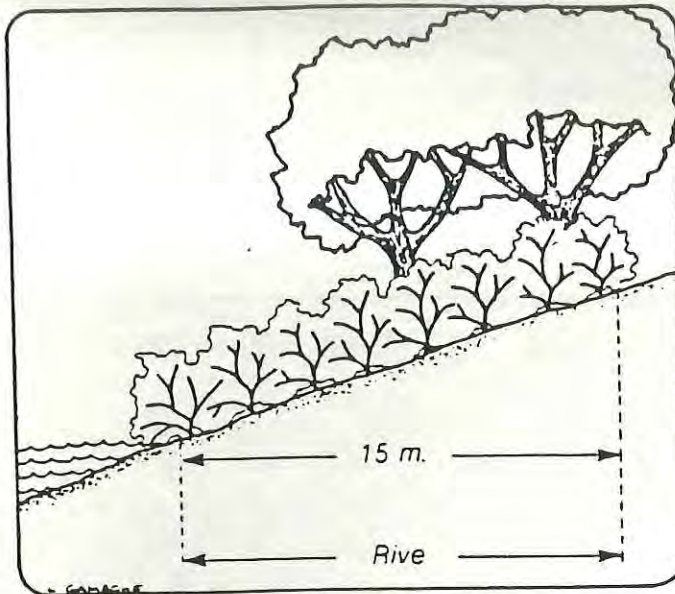
- a) where the grade is less than 30% or;
- b) when the grade is greater than 30% and features and embankment less than 5 meters high.



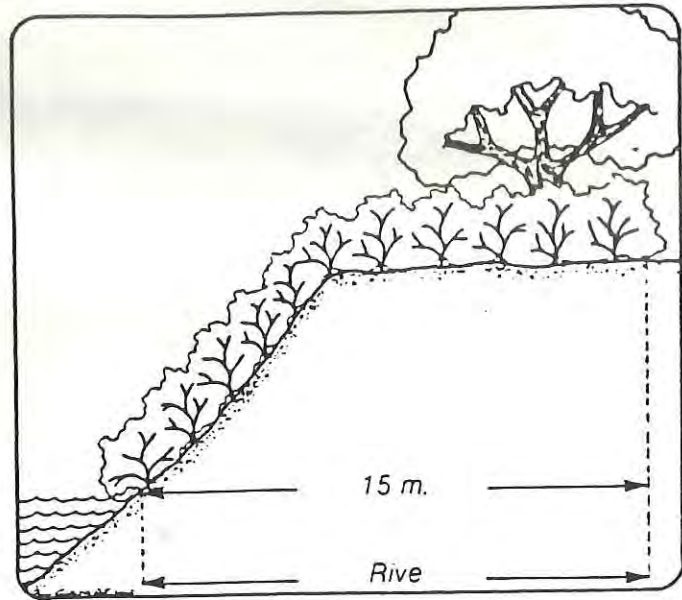
Shoreland with a grade less than 30 percent.



Shoreland with a grade more than 30 percent with an embankment less than 5 meters high.



Shoreland with a grade more than 30 percent.



Shoreland with a grade more than 30 percent with an embankment more than 5 meters high.

Section II

Application

- 2- This by-law applies to any works leading to the destruction or modification of the natural shoreland vegetation of lakes and streams and to any project of modification of shoreland and shallow.

It also applies to the modification and the repair of existing structures of the shoreland and shallows. It applies to any use or occupation of the shoreland

and shallows of lakes and streams which could modify or alter their natural state and appearance.

Notwithstanding, the first two paragraphs, this by-law does not apply to structures for municipal industrial or public access purposes which must be approved by the ~~Deputy Minister of the Environment~~ *Ministry of Natural Resources* *or* *Municipal Affairs and Housing*.

Section III

General provisions

- 3- Any person wishing to modify or repair any structure on the shoreland and shallows of lakes and streams or wishing to use or occupy the shoreland and shallows in such a way as would result in changing or altering their natural state and appearance, must pursuant to this by-law, apply for a permit for this purpose from the municipal inspector, *which will be circulated to the Ministry of Natural Resources for comments and approval.*

- 4- Any structures or modifications on the shoreland or shallows must be designed and made in such a way as to respect the natural state and appearance

of the site and not impede the natural flow of water or create a source of erosion.

Such structures, and modifications must be made without recourse to excavation, dredging, levelling, backfilling or other work of similar nature whose effect would be to change or alter the natural state and appearance of the site.

- 5- Obtaining a permit under article 3 does not relieve the holder of his obligation to obtain any other permit that could be required under any other ~~Quebec Laws and Regulations such as the Water Resources Act (R.S.Q. 1980, Chapter 40).~~ *Quebec Laws and Regulations such as the Water Resources Act (R.S.Q. 1980, Chapter 40).*

Section IV

Protection of vegetation cover

6- Natural shoreland vegetation must be preserved in order to slow down surface water runoff, allow nutrients to be absorbed and protect the beauty of the landscape.

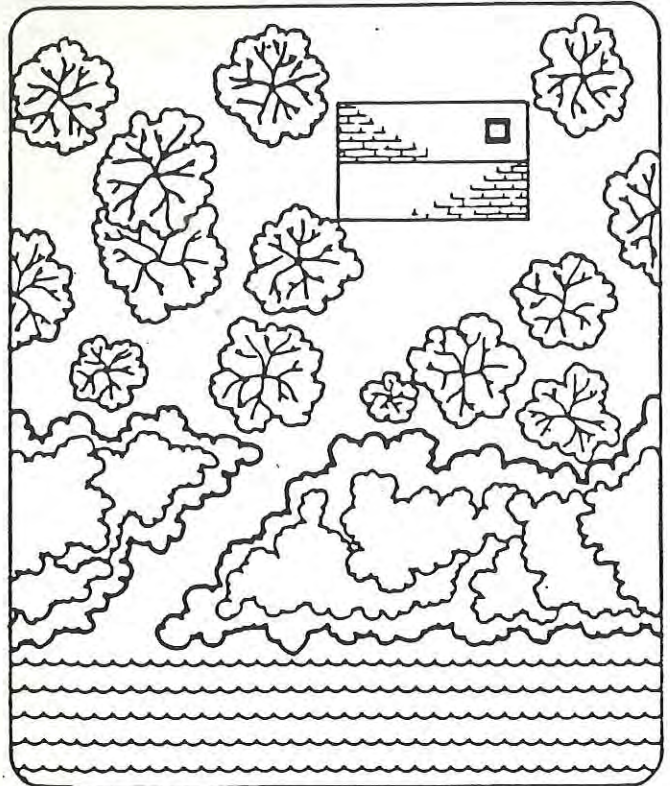
7- If the grade is less than 30%, a single opening with a maximum width of 5 meters may be made through the entire depth of the shoreland to give access to the lake or stream. ✓

The path of the opening must form a maximum 60° horizontal angle with the shoreline and the soil must be stabilized with herbaceous plants immediately after trees or shrubs are cut.

8- If the grade is greater than 30%, a single green window with a maximum width of 5 meters may be cleared by pruning trees and shrubs in order to give a view on the lake or stream.

A path may also be made or a stairway built to give physical access to the lake or stream, but in such a way as to not create erosion problems.

9- Any path along the shoreland of a lake or stream must be made in such a way as to not destroy natural vegetation and to prevent erosion.



Opening made through the entire depth of the shoreland to allow access to the lake or stream.

Section V

10- Notwithstanding article 4 and when the grade, the nature of soil and the conditions allow it, the bare or degraded shoreland must be stabilized using exclusively pioneer plants and plants typical of the shoreland of lakes and streams in order to stop erosion and restore the natural aspect.

Notwithstanding article 4 and when the grade, the nature of soil and the conditions do not permit stabilization with pioneer plants and plants typical of the shoreland of lakes and streams, the bare or degraded shoreland may be stabilized partly or totally with riprap gabions or retaining walls but the priority must be given to the method most liable to restore the natural aspect of the shoreland.

Section VI

Occupation of the shallows

11- In order not to charge or occupy shallows of lakes and streams in a way which would change their natural state and appearance, only docks built on piles, posts, cribs, or made of floating platforms

shall be permitted. Boat-houses and other structures used to protect boats must be of the open type, with or without a roof, and built on piles, posts or by means of floating platforms.

Section VII

Flood plain

12- Notwithstanding the provisions of the preceding Articles, it is prohibited, in the flood plain of a lake or stream, to build or establish a permanent or secondary residence, building, industry, business or any other structure, or perform landfilling, excavation or

any other work that could harm the free circulation of water during floods, endanger lives, create nuisances or cause damage to properties, fauna and flora.

Section VIII

Snow dumping

13- The shoreland and shallows of lakes and streams may not be used as sites for dumping snow

Enabling Provisions

The powers of municipalities with respect to the shoreland and shallows of lakes and streams are those determined in the Act respecting land use planning and development (S.O. 79-2-51). They are to be found specifically in Sections 81, 113 (13), 115 (4) and 118.

New Planning Act

Chapter III Division I Powers of the municipality

8. A municipality may adopt a planning programme. A municipal council which undertakes to prepare a planning programme must pass a resolution to that effect. The resolution must indicate the time within which the council intends to adopt its programme.

On the passing of the resolution, a copy of it shall be sent to the council of the regional county municipality and, for registration, to the Commission, together with a notice of the date of its passing.

In the case provided for in section III, a copy of the resolution, together with a notice of the date of its passing, shall also be sent to the Ministère de l'Énergie et des Ressources for the purposes of the cadastre and published in a newspaper circulated in the territory of the municipality.

Notice of the passing of the resolution shall be published in the **Gazette officielle du Québec**.

Enabling Provisions

The powers of municipalities with respect to shoreland and shallows of lakes and streams are those determined in the New Planning Act, the Municipal Act and the Public Lands Act. They are to be found specifically in Sections 208 (31, 33, 37, 38) of the Municipal Act; Section 42 of the Public Lands Act; the Beach Protection Act, Section 3(2), 7(1) and the Planning Act.

Chapter 1, Section 2, The Planning Act Powers of the Municipality

Part I - Official Plans

- 2(1) The Treasurer, upon the application of council of a municipality or the councils of two or more municipalities, or upon his own initiative where in his opinion it is the interest of any area, may define and name a planning area.
- 13(1) The council of the designated municipality shall appoint the planning board of an area.
- 12(1) Every planning board shall investigate and survey the physical, social and economic conditions in relation to the development of the planning area and may perform such other duties of a planning nature as may be referred to it by any municipality or within any defined area or areas or abutting any defined highways or part of a highway.
- 34(1)2 Zoning by-laws may be passed restricting the locating of buildings or structures, in addition to the erecting or use.
- 34(1)3 For prohibiting the erection of any class or classes of buildings or structure on land that is subject to flooding or on land, where, by reason of its rocky, low lying marshy or unstable character, the cost of construction of satisfactory waterworks, sewage or drainage facilities is prohibitive.
- 34(1)3 Zoning by-laws may now prohibit the erection of buildings or structures on steep slopes.

The zoning by-law may include provisions to regulate or prohibit, by zone, the construction of certain works, taking into account the topography of the landsite, the proximity of a stream or lake, or the danger of flood, rock fall, landslide or other disaster.

Section 29 Subdivisions

- 49(3)c Land acquired for flood control, erosion control, bank stabilization, shoreline management or preservation of environmentally sensitive lands under projects approved by the council having jurisdiction in the planning area, (and without limiting the generality of the foregoing it shall . . .)

- 45
- 21(2) For the purpose of developing any feature of the Official Plan, the designated municipality in the case of a joint planning area, with the approval of the Minister, may exercise any of the powers mentioned in Subsection 1 in respect of land within the planning area.

Part III Zoning By-laws and Building By-laws

35(1) By-laws may be passed by the councils of municipalities:

1. For prohibiting the use of land, for or except for such purposes as may be set out in the by-law within the Ministry of Natural Resources and declared accordingly by a Conservation Authority, is now exempt from subdivision control, . . .

Chapter IV, Division I

Zoning by-laws

113. The council of a municipality may adopt a zoning by-law for its whole territory or any part thereof.

A zoning by-law may include provisions regarding one or more of the following projects (16) to regulate or prohibit, by zone, the construction of certain works, taking into account the topography of the landsite, the proximity of a stream or lake, or the danger of flood, rock fall, landslide or other disaster; any prohibition under this subparagraph may be absolute or may contemplate only certain classes of immoveables, as it may determine;

Chapter IV, Division II

Subdivision by-laws

115. The council of a municipality may adopt a subdivision by-law for its whole territory or any part thereof.

The subdivision by-law may include provisions on one or more of the following objects:

(4) to govern or prohibit, by zone, a cadastral operation, taking into account the topography of the landsite, the

proximity of a stream or lake, or the danger of flood, rock fall, landslide or other disaster; any prohibition under this paragraph may be absolute or contemplate only certain classes of immoveables determined by the by-law;

Chapter IV, Division III

Building by-laws

118. The council of a municipality may adopt a building by-law for its whole territory or any part thereof.

The building by-law may include provisions on one or more of the following objects:

(1) to regulate the materials to be used in building and the manner of assembling them;

(2) to establish standards of strength, salubrity and safety or insulation for any structure;

(3) to order the reconstruction or repair of any building destroyed or become dangerous, or diminished in its value entered on the valuation roll by at least one-half, as the result of fire or any other cause, in accordance with the by-laws in force at the time of such reconstruction or repair.

OK ✓

Adoption procedure

The municipality has no development by-laws but is in the process of adopting some

This is the ideal situation for a municipality, since it is in the process of choosing its directions for the utilization of its territory. Since the shallows and shoreland of lakes and streams in the municipality are important parts of its territory and since bodies of water are not a negligible resource, it has the opportunity to discuss and select principles and land use planning rules for these areas in consultation with its population. The development by-laws subsequently become the means of enforcing the decisions made in the development plan and controlling activities within the territory.

In this case, the municipality includes in the planning programme its decisions as to how to utilize the shallows and shores of the lakes and streams in the municipality. Thereafter, it proceeds to include the rules for utilizing these areas in its zoning by-laws.

The municipality has no development by-laws and does not expect to adopt any in the near future

In such a case, these would be the municipality's first development by-laws. The municipality could take advantage of this opportunity to assess the situation prevailing in its territory, with respect to land use. However, it could quite well limit itself to adopting the measures proposed by the Ministry of Environment, Natural Resources.

The procedure for adopting these rules involves a discussion with the population by means of a public consultation meeting. Thereafter, the municipality could adopt and implement its by-laws.

The municipality has already adopted development by-laws

If the municipality already has zoning or construction by-laws and intends to adopt rules concerning the utilization of the shallows and shoreland of lakes and streams in the municipality, it must amend the by-laws currently in force.

It will have to check whether it is necessary to amend the administrative procedure for issuing construction permits and certificated of authorization. The former are issued when construction work is to be done and the latter relates to other uses and work whose purpose is to modify the ground or vegetation.

~~For further details, please refer to the document entitled "Procédure d'adoption et de modification d'un plan ou de règlements d'urbanisme" or contact the Direction générale de l'urbanisme et de l'aménagement du territoire, Ministère des Affaires Municipales, 20, avenue Chauveau, Québec G1R 4J2.~~