NATURAL ENVIRONMENT SURVEY

A

DESCRIPTION OF THE INTRINSIC VALUES IN THE NATURAL ENVIRONMENT AROUND GREATER HALIFAX-DARTMOUTH

April, 1971

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Fishery Section by

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Resource Development Branch
Dept. of Fisheries & Forestry

CANADA

OUR FILE NO.
NOTRE DOSSIER N°

YOUR FILE NO.
VOTRE DOSSIER N°

DEPARTMENT OF FISHERIES AND FORESTRY
MINISTÈRE DES PÊCHES ET DES FORÊTS
OTTAWA

May 11, 1971.

Mr. M.E. Lloyd,
Executive Secretary,
Metropolitan Area Planning Committee,
Box 505,
Halifax, Nova Scotia.

Dear Mr. Lloyd:

I am pleased to submit the Natural Environment Survey for the Metropolitan Area of Halifax - Dartmouth. I have tried to identify and interpret the habitats in the region that are important to our fish and wildlife resources as well as landscapes that have important ecological, aesthetic and recreational potential. I have further attempted to describe how these natural existing values can be fully utilized for man's enjoyment without impairment of their intrinsic beauty or use by wildlife.

It has been a pleasure and a most interesting experience to have had the opportunity to work on this project.

Yours sincerely,

Paul Dean,
Wildlife Biologist,
Canadian Wildlife Service.

From P. Dean 1971, April, Natural Environment Survey

A Description of the Intrinsic Values in the Natural Environment Around Greater Halifax - Dartmouth

L E G E N D

CATEGORY 1 — NATURAL ASSETS THAT ARE UNIQUE IN THE HALIFAX - DARTMOUTH AREA OR IMPORTANT ON A REGIONAL OR PROVINCIAL SCALE.

CATEGORY 2 — OF LIMITED ABUNDANCE IN THE HALIFAX - DARTMOUTH AREA.

CATEGORY 3 — LANDSCAPE UNITS OF RECREATIONAL AND ENVIRONMENTAL VALUE.

CATEGORY 4 — LANDSCAPE UNITS THAT ARE QUITE COMMON IN THE AREA BUT BECAUSE THEY BORDER ON A LAKE OR RIVER, THEY HAVE HIGH POTENTIAL RECREATIONAL OR ENVIRONMENTAL VALUE.

WOODED AREAS

SAND BEACHES

MARSH

DATA COMPILED AND INTERPRETED BY THE

CANADIAN WILDLIFE SERVICE

DEPT. OF INDIAN AFFAIRS & NORTHERN DEVELOPMENT

B.P. DEAN WILDLIFE BIOLOGIST

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DES AND
ERIM MAP

DEPT. OF REGIONAL ECONOMIC EXPANSION
ENGINEERING SERVICES - HALIFAX

SCALE 1 INCH
PROJECT
DRWN R.C.T.
OCT./70
CHK
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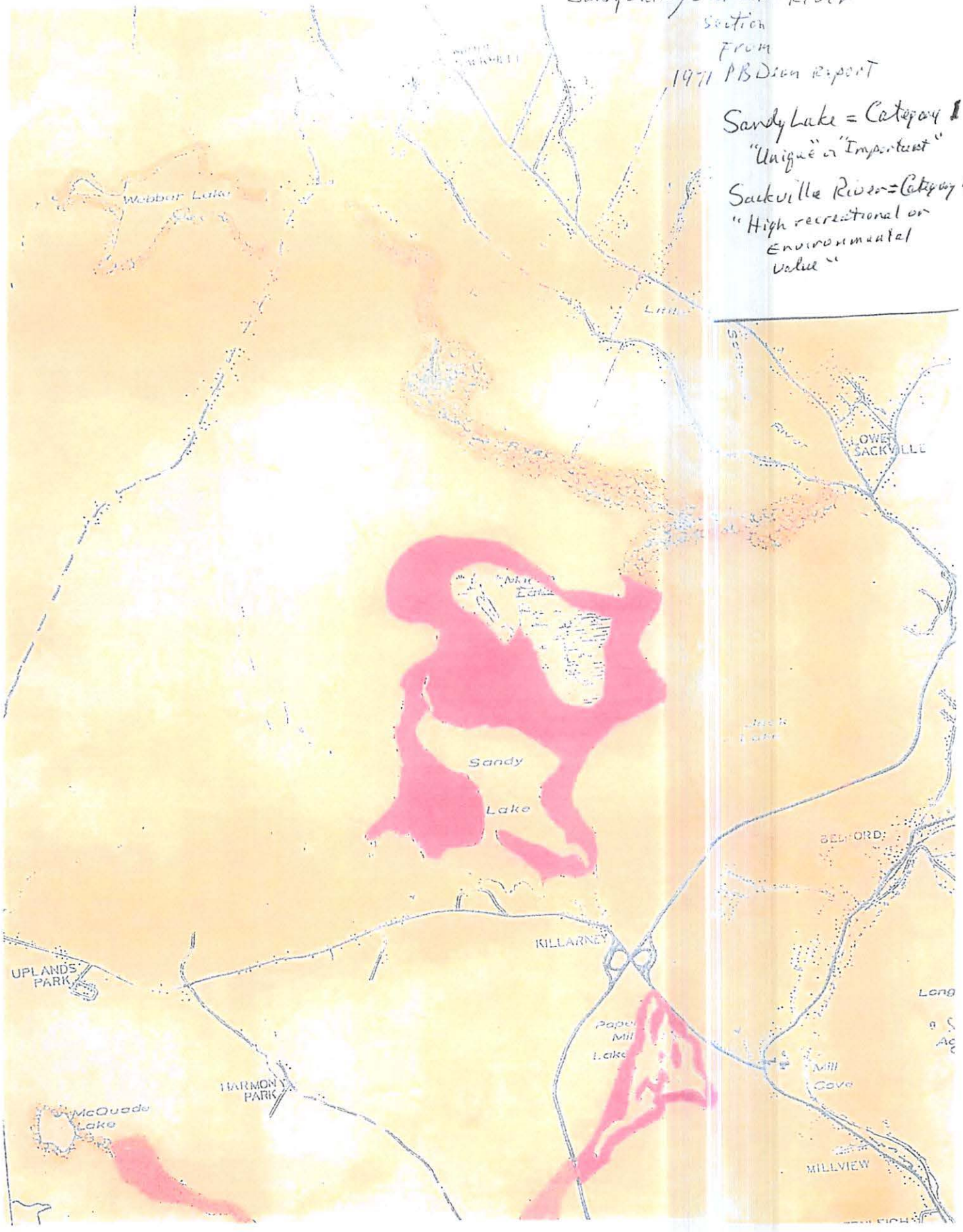
Sandy Lake / Sackville River
section
From
1971 PB Dion Report

Sandy Lake = Category 1
"Unique" or "Important"

Sackville River = Category 4
"High recreational or
Environmental
value"



Sandy Lake / Sackville River
section
from
1971 PB Dean report

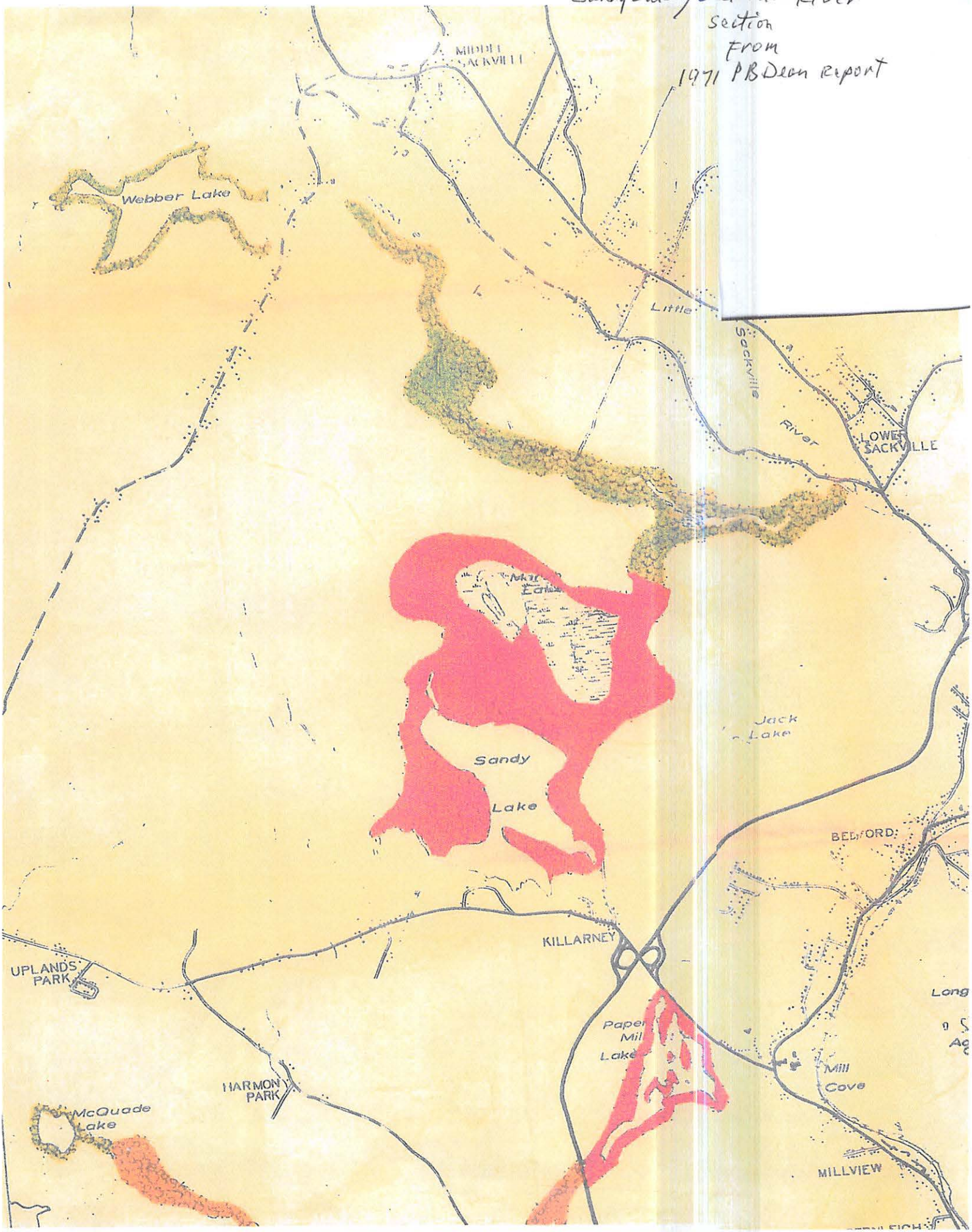


Table of Contents

PART II

Summary

Man and technology are having a profound effect on the natural environment and the ecology of this planet. Supersonic aircraft, super tankers and expanding urban areas threaten our whole ecosystem. The nations and people of the world are beginning to realize these imminent dangers and are beginning to react against the wholesale spoilation of our resources and natural environment.

This report identifies the intrinsic values in the natural environment around the city of Halifax-Dartmouth and suggests methods for their protection and assimilation during the growth of the metropolitan region. It is proposed, as feasible, that natural assets such as a virgin hemlock forest, a waterfowl breeding marsh, a tidal lagoon-sand dune complex, a heron colony and numerous fresh water lakes can be protected, intelligently developed so as to remain attractive to their wildlife inhabitants, and successfully integrated into an urban environment for man's maximum enjoyment and use.

The three general landscape types in the Halifax-Dartmouth area consist of: a series of broad, low ridges marked by numerous boulders with frequent outcrops of bedrock and very shallow stony soil; areas of gently undulating to rolling hills with deeper, moderately textured soils; and finally the coastal areas affected by the Atlantic Ocean.

The kinds of natural values in each general landscape type are determined by their differing ecological conditions.

The successful integration of natural environment lands into the urban context will require careful management and maintenance. For maxium protection from surrounding development, a green belt of not less than 150 feet, but ranging upward, depending on topography, should be maintained around all lakes, river shores and other natural assets. Public control is recommended for the lands identified in the survey which total approximately 6500 acres.

The three levels of government already control a portion of the land involved and it is estimated that approximately $7,500,000.00 would be required to purchase the remaining acreage. The estimate is based on acquisition in fee simple only. It is further recommended that a Regional Environmental Council be established to acquire the lands. The Council would be able to negotiate a variety of options with land owners and it is anticipated that the actual total cost of the programme thereby could be reduced. Other environmental responsibilities are suggested for the Council.

The natural environment lands could form the basis for a regional green-space and park system with careful attention given to the preservation of their intrinsic values. Proposed and discussed in the report are such items as undeveloped buffer zones around important wildlife habitats, proper location of recreational

facilities so that fish spawning areas are not destroyed, long range planning so that roads around a lake or along a river valley are of "local street" standards rather than highway standards. As well as ensuring the continued use of the areas by wildlife, the natural environment lands will provide local citizens and visitors with a maximum of enjoyment and recreational opportunities. Water based recreational activities, cultural centres and tent and trailer parks are among the possibilities discussed and suggested for various areas.

The large number of small, freshwater lakes distributed throughout the metropolitan area constitute an extremely valuable fishery resource. Based on the limited information now at hand, 40 lakes were identified as suitable for production of speckled trout and smallmouth bass. A management stocking programme could add to, and compliment, the existing natural values.

Part II of the report identifies the natural assets of twelve of the more important areas in the metro region and suggests how they might be managed to allow maximum use by man without destruction of their intrinsic values.

Recommendations

1. The lands identified in this report be put under public control by such means as purchase or perpetual easement and incorporated into a regional parks programme.
2. A strip of land of a minimum of 150 feet, but varying with topography, be protected around the lakes and river systems identified. That reserve would allow public access to any point around the lakes, optimize opportunity to develop the recreational potential of each area, protect important wildlife habitats, prevent soil erosion and siltation of lake bottoms and rivers which would destroy fishery habitat and would allow integration of urban and industrial developments into the existing natural environment.
3. A Regional Environmental Council be created to assemble the lands identified in the report. The lands could be held in a land bank until development reached their vicinity and then handed over to the municipality for development and maintenance in consultation with the regional body. The Council would act as an independent environmental advisory, control, liason and monitoring agency.
4. A strip of woodland around important wildlife habitat be left undeveloped, except for foot paths, to act as a protective buffer zone. That would allow wildlife to continue to exist in the area for the enjoyment of the metro citizens.

5. The boundaries of natural environment areas be a perimeter road network of "local street" standards with development only on the side away from the lake or river system. Any roadway carrying heavier traffic could act as a barrier to unsupervised crossing.
6. Special attention be given to the protection of natural environment lands in industrial areas. Their presense in such areas is important because of their aesthetic, recreational and pollution abatement value.
7. A general biological survey of the lakes of the Halifax-Dartmouth area be carried out as a basis for a detailed fishery management plan. The survey would also aid in setting priorities for preserving natural areas.
8. A one-year survey of salt water sport fishing in Halifax Harbour and Bedford Basin be conducted to assess the recreational fishery potential.

Natural Environment Survey

A Description of the Intrinsic Values in the Natural Environment Around the Greater Halifax-Dartmouth Area

Part I

Man and the Natural Environment

Introduction

This section could also have been entitled Man and His World, but that phrase has other connotations, and besides, it conveys an incorrect notion. The earth does not belong to man; it belongs to all living creatures, of which man is one, and if man does not suddenly become aware of the great changes he is creating, this planet may no longer include man among its inhabitants.

We have reached the age of supersonic transport, and in so doing, we have created noise levels that are becoming intolerable. Exhaust particles from supersonic aircraft flying in the upper atmosphere could create new cloud banks that would filter the sun's rays so as to raise the temperature on earth and alter the entire ecology of our planet. A single tanker could spew out 200,000 tons of crude oil that would be capable of contaminating hundreds of miles of shoreline. In the Arctic such a disaster might require centuries for the

environment to return to normal. In megalopoli of the world, the automobile and industrial air pollution have contaminated the atmosphere to such an extent that man cannot survive without artificial aids. Oxygen-vending machines have been installed in some of Tokyo's foulest streets so that passersby can recharge themselves with a gulp of pure oxygen.

Man has a profound effect on his environment. Our most senior levels of government are beginning to realize this and its terrifying ramifications. UNESCO convened a world conference in 1968 where world experts discussed the rational use and conservation of the resources of the biosphere, that part of the earth and its atmosphere which contains living things. To continue that investigation, the UN is holding a conference in 1972 to discuss the human environment. In February of 1970, the Council of Europe passed a "Declaration on the Management of the Natural Environment of Europe" (European Conservation Conference, 1970). They stated six principles:

1. Nature is the provider of resources and amenities necessary for man's material prosperity, physical and mental well-being and spiritual life. These resources and amenities must be exploited in harmony with basic natural processes and equilibria.

2. Rational planning and use of these resources has become essential because of growing populations and technical progress. To solve these problems we cannot dispense with a scientific approach founded on ecology and designed to shape our surroundings in such a way as to satisfy man's present and future needs. This approach must guide all choices and decisions affecting the environment.

3. The costs of conservation should be weighed against the costs of non-conservation.

4. In planning the use of land and natural resources the aim should be to maintain as much diversity as possible, since this ensures stability of the environment and enhances its quality.

5. In Europe and other highly industrialized regions the major environmental issues today are:
   (i) planning of the natural environment and its resources;
   (ii) elimination, disposal and re-use of modern society's by-products and waste; recycling of by-products and waste must be given special attention;
   (iii) use of poisonous substances.

6. These issues can only be resolved if individuals, aware of what is at stake, feel personal responsibility for their environment.

The last point brings the matter down from the nebulous realms of senior governments to persons who are involved with the actual use and management of land -- city administrators and individual citizens. What can the cities of Halifax-Dartmouth do to ensure stability and quality in the natural environment?

As land users and land managers, we must maintain the diversity of our landscape. Too often the natural environment and its wild inhabitants in and around our cities are destroyed as the ground is levelled by the spreading asphalt and concrete. Natural assets are often destroyed because a benefit-cost analysis indicates that this, or that, is the least costly alternative without due consideration of the psychological, sociological, and aesthetic losses to society or of the loss of limited living space to our wildlife resources.

Trees perform a variety of roles in our urban environment, chief among which is the utilization of carbon dioxide

during photosynthesis and the emission of oxygen as a waste product. For example: a hundred year old beech (Fagus) in one hour absorbs 2350 grams of carbon dioxide. That is the volume of carbon dioxide given off by ten single-family houses. During the same period, the tree gives off 1710 grams of oxygen (Ribaut, 1970). Plants thus have a very important effect on the composition of city air but trees and other vegetation are constantly destroyed as a city grows. Studies have also shown that forests can reduce appreciably the amount of ozone in polluted air (Rich, 1970). Noise in urban areas can also be alleviated by trees because of their many leaf-air interspaces which tend to absorb sound. Field trial results show an average reduction in noise of eight decibels per 100 feet of forest stand (Leonard, 1970). Trees can be used to screen factories and highways from sight and sound; they can be used to enhance property value, and they also supply habitat and food to wildlife. Wild animals are very habitat specific. Each species requires a particular type of habitat in which to live, thus, to maintain a variety of living creatures in our environment, we must maintain a variety of habitats.

Marsh lands support a wide variety of birds, mammals, fish, insects, amphibians, reptilies and plants which can exist only in that type of habitat. By destroying marshes we are constantly reducing the limited habitat for a great number of wildlife species, all of which are enjoyed and used either directly or indirectly by man. The U.S. Department of the Interior (1964)

reported that farmers in the United States, either privately or collectively, have affected about 127 million wetland acres, to some degree, since the early days of that country's settlement. That does not include wetlands that have been affected by urban or industrial growth or the loss of wetlands in Canada. Waterfowl are completely dependent on wetlands for their existance. During urban expansion many acres of marsh-land habitat are needlessly destroyed leading to the progressive destruction of waterfowl and other specialized marsh inhabitants.

The purpose of this report is not to foretell doom but to show how to avoid irreparable damage to the natural environment during the expansion of Halifax-Dartmouth. Existing natural assets can be integrated into the urban framework, providing a quality environment for man's use and enjoyment while supporting a wide variety of plant and animal life.

The Natural Environment Around Halifax-Dartmouth

Methods

Air photo interpretation was used to locate areas of intrinsic value in the landscape around the Halifax-Dartmouth region. Most of the areas were field checked at least once; however, a few of the inaccessible lakes were not visited.

The following attributes were identified:

- fragile habitats and ecologically rich or unique areas.
- important wildlife habitats

- lake and river systems having aesthetic and recreational value combined with a variety of habitats for wildlife.

The lands were grouped into four broad categories.

Category 1 consists of natural assets that are unique in the Halifax-Dartmouth area or important on a regional or provincial scale.

This category includes important wildlife habitats and ecologically rich or fragile areas.

Category 2 consists of lands of limited abundance in the Halifax-Dartmouth area. It includes areas of medium importance to wildlife and areas of high aesthetic value based on topographic and vegetation characteristics.

Category 3 consists of lands of recreational and environmental value. These lands afford a wide range of recreational possibilities and protect lakes and rivers from surface run off and pollution. They also serve to create a park-land atmosphere around the lakes.

Category 4 are lands which would normally fall into Category 3 but whose aesthetic and recreational values have been reduced by fire or some

other major disturbance. They comprise dense shrub regeneration but because they border on lakes or rivers they have potential recreation and environmental value.

Each area was described briefly in terms of the common vegetation around the shore and the type of shoreline. Because of the general similarity of most areas, that information is not included in the report except for Category 1 and 2 areas described in Section II. The field notes, however, are on file at the Canadian Wildlife Service office in Sackville, N.B.

The following terms were used to describe the shoreline vegetation:

"dense" - trees spaced so closely together that it was constantly necessary to push branches aside to walk through.

"semi-open" - trees spaced such that it was possible to walk through without difficulty

"open" - semi-open woodland with scattered clearings and openings

"regeneration" - dense growth of trees up to 12 feet in height and with a trunk diameter up to 2 inches at breast height

"middle aged" - woodlands comprised of trees with trunk diameters up to about 10 inches at breast height

"mature" - woodlands comprised of trees with trunk diameters over 10 inches at breast height

A limited amount of data were gathered on the potential of the lakes for sport fishing. Contour maps were compiled

from echo soundings and conductivity and temperature readings were taken. Mr. Brent Lister of the Resource Development Branch of the Department of Fisheries and Forestry has elaborated on that basic information in the fishery section of this report.

Description of the Area

Three general landscape types occur within the study area. The first consists of a series of broad low ridges that are marked by numerous boulders, frequent outcrops of bedrock and poorly drained depressions (MacDougall et al 1963). Much of the area immediately west of Halifax and extending eastward between Dartmouth and Bedford falls within that landscape type. The shallow stony soil is derived from quartzite and is low in fertility. The lakes in the region generally have irregular rubble or boulder-strewn shores and acidic waters that inhibit the growth of lush aquatic vegetation. Occasionally bedrock outcrops are visible along the shores. This area of poor, shallow soils has been slow to recover from the logging and many fires that have ravaged the countryside around the Bedford Basin. The resulting vegetation is a dense cover of regenerating to middle-aged red maple, white birch, white spruce and trembling or large-toothed aspen on the better drained sites and tamarack, black spruce, wire birch and alder in the depressions. The undergrowth of sheep laurel, bayberry, bracken fern, blueberry and other shrubs, forms a tangled ground cover. White pine are commonly mixed with the other trees.

Where large pine, middle-aged spruce and maple combine with large outcrops of bedrock, they create a very attractive

wilderness-like effect. The best examples of this type of habitat occur throughout the Birch Cove - Charlie Lake - Kearney Lake system and around Colbart Lake. Those areas were all graded as Category 2.

There are three locations in which mature white pine are the most common tree species. The combination of their majestic characteristic form and outcrops of granite bedrock produced a very striking and pleasant semi-open habitat. Pine woodlands occur at the east end of Williams Lake, at isolated locations around the western portion of Rocky Lake near the Bedford Industrial Park and around Paper Mill Lake. Those areas were classified into Categories 2, 2, and 1 respectively.

Two other Category 1 areas in this general landscape type are a ravine between Kent Park and Prince's Lodge, and the hillside extending up behind Admiral Cove. The ravine, which I have arbitrarily named Hemlock Ravine, provides an excellent example of mature hemlock-yellow birch association. Trees in this small strip of forest range from 100-150 years old. There are no comparible stands of birch and hemlock of that age anywhere else in the Halifax-Dartmouth area.

The second general landscape type is comprised of gently undulating to rolling topography and consists of fair to good croplands. The areas to the southeast of Dartmouth commencing from Topsail and Loon Lakes and extending down to Cole Harbour and McNab Island are located within this landscape type. It also includes those lands in the Sackville area from

are deeper than those in the preceeding landscape type, more moderately textured and range from sandy loam to sandy clay loam. They are derived chiefly from sandstones, mudstones and shales. Because of the deeper and richer soils in these areas, the vegetation around the lakes is generally of greater variety. Yellow birch, oak, ash, hemlock, beech, witch hazel, Juneberries, Virburnums, pin cherry and choke cherry are commonly found in the woodlands on these soils. The variety of vegetation attracts a wide variety of birds and small mammals. Squirrels, ruffed grouse, cedar waxwings, blue herons, bitterns, water-fowl, and red-winged blackbirds are some of the wildlife species that are most evident.

The rivers and streams flowing through the deeper soils of this landscape type carry sediments of silts and sands. As a result small sandy beaches and sandy-bottomed areas occur in Bissett Lake, Powder Mill Lake, Sandy Lake, and Third Lake. Also, in a number of cases, inlet streams have formed shallow deltas of rich alluvium resulting in a number of small productive water-fowl marshes. In other cases sediments have accumulated in the shallow bays of some of the lakes giving rise to a variety of water plants, creating other wildlife habitats.

The scattered sandy shorelines and small marshes are considered an important part of the total environment because they introduce variety into the landscape and afford special habitat requirements for a large number of plant and wildlife species. Because those habitats differ from the surrounding

and recreation. Most of them are classed as Category 1.

The third general landscape type consists of areas that have been formed or affected by the Atlantic Ocean. The two areas of concern are Cole Harbour and the sand dune and marsh complex at Lawrencetown and West Marsh. These two large units, both Category 1, are of particular importance to the growing urban population in Halifax-Dartmouth. They offer a wide variety of recreational activities based on the natural features and the wildlife populations, they contain areas of ecological interest from both the scientific and interpretive view points and they encompass habitats that are important for a number of wildlife species.

Natural Potential of the Halifax-Dartmouth Area

The natural environment around greater Halifax-Dartmouth offers a potential that would be envied by many city administrators in North America. Included in this natural landscape are numerous uncontaminated fresh water lakes, tidal bays frequented by large flocks of migrating ducks and geese, a small forest of 100 to 150 year old hemlock and birch, fresh water marshes providing a variety of waterfowl and song birds, large expanses of sandy beaches, (Figure 1) a heron colony and lakes and rivers inhabited by a variety of game fish. What all these things have in common is that they are natural, existing values which we can develop and utilize to their fullest extent or destroy by poor planning or improper use.

They are virtually non-renewable resources from which man and his urban environment can benefit if they are recognized. If they are not recognized and protected, they will be permanently lost.

The immediate values of a tidal marsh, a heron colony, a virgin hemlock-birch forest, or a barrier beach-sand dune complex are not readily apparent to the expanding urban societies that now comprise the majority of the population of Canada. Yet the preservation and development of diversity in and around urban centres will allow citizens to experience and enjoy a fuller and more complete existence within their immediate environs. Many of these habitats have developed in specific and very restricted locations. Their unnecessary destruction aids degradation and pollution of our environment. Protection of wildlife and fishery habitat not only assists in the maintenance of our wildlife resources, but also creates an area of high aesthetic and recreational value.

Man can use the intrinsic values identified in this report and thus benefit from them if the features outlined are used as a basis for a regional park system. Such a system would preserve the best and most interesting features in the natural environment around Halifax-Dartmouth. At the same time it would preserve the widest possible diversity of habitats for the native fauna and flora, thus helping to create a high quality environment for the citizens of the area.

Land Acquisition

One of the principle proposals of this report is

that the entire shoreline of all the lakes should be under public control. That control would ensure that an entire lake shore and its park-like fringe is open to everyone. It should be accomplished by the preservation of a border, of a minimum of 150 feet or greater, depending on topographic features, around each lake (Figure 2). The border should follow natural features of the landscape and thus would vary considerably in width. McHarg, (1969, p.86) in his land use plan for the Green Spring and Worthington Valleys of Baltimore Co., Maryland, followed a similar pattern advocating the retention of a 200-foot strip of natural vegetation on each side of streams in that region.

The total programme, shown on the insert map in the back cover of the report, includes approximatelly 6500 acres. (Appendix I). It should be emphasized that these figures were calculated using a dot grid method, and are approximations only. When more detailed investigations are conducted on each area, and exact boundaries are fixed, then more precise acreage figures can be computed. An estimated 1400 acres is already owned or controlled by a public agency or one of the municipal, provincial or federal governments. Assuming that some lands can be acquired as grants or donations, 5000 acres will have to be acquired. An average cost of $1,500.00 per acre was arrived at by discussions with personnel at the Secretariat (Cabinet Committee or Planning and Programmes, N.S.). This gives a rough total of $7,500,000.00 required to complete the whole capital lands programme. The total sum, of course, would be spread over a period of years, depending on various factors,

Figure 2. Penhorn Lake, Dartmouth, April 16, 1970.
Common example of the result of leaving inadequate distance between a lake shore and peripheral road. In this case 50' - 60' was left and as can be seen this narrow border soon becomes misused or over-used destroying the aesthetic qualities of the lake and downgrading the recreational experience.

but it is beyond the scope of this report to go into the budgetary considerations.

To facilitate the most economical appropriation of funds the following priority list, based on the ratings on the insert map and the imminence of danger of development, is suggested:

Areas of immediate concern -

Name	Approximate Land Acreage	Name	Approximate Land Acreage
1. Paper Mill Lake	60 acres	8. Settle Lake	25 acres
2. Hemlock Ravine	75 "	9. Oat Hill Lake	15 "
3. Admiral Cove	70 "	10. Mitchell Br. (south bank)	45 "
4. Russell Lake	65 "	11. First Lake	80 "
5. Bissett Lake	90 "	12. Second Lake	70 "
6. Williams Lake (Category 2 area)	10 "	13. Washmill Lake	45 "
7. Bell Lake	35 "	14. Kearney Lake	60 "

Approximate total: 745 acres

Areas of immediate concern for long-range planning - although development of these lands is not necessarily imminent, their importance dictates that they be secured as soon as possible.

Name	Approximate Land Acreage	Name	Approximate Land Acreage
1. Cole Harbour	715 acres	7. Rocky Lake	150 acres
2. Lawrencetown and West Marsh	400 "	8. Powder Mill Lake	50 "
3. Sandy Lake	400 "	9. Third Lake	55 "
4. Lake William Marsh	30 "	10. Charlie Lake	25 "
5. Birch Cove Lakes	335 "	11. Colbart Lake) 12. Williams Lake)	85 "
6. Sackville River (part of)	285 "		

Approximate total agreage: 2530

The case for acquisition and development of public parks in the Halifax-Dartmouth region could also be viewed in the light of the provincial tourist industry. Figures published in the Nova Scotia Export Quarterly (July, 1969), dealing with characteristics of tourists visiting the province in 1968, indicate that 52.1% of the parties travelled to the Halifax-Dartmouth region. During the entire tourist season, hotel and motel accommodations in the metro areas are extremely difficult to secure. The region would benefit by the establishment of one or more large trailer and camp grounds close to the metro areas. A number of the areas identified in the Natural Environment Survey would make ideal locations for such developments.

Management of the natural environment would not only serve the provincial tourist industry, but would also ensure that the growth of the major distribution centre of the Maritime region occurred in a sensitive and well-planned manner, to the long-term benefit of Nova Scotians and other Canadians. A long range environmental programme for the area should be established.

The acquisition and management of recreation-natural environment lands is, at present, the responsibility of the municipalities of Dartmouth and Halifax and the County of Halifax. The city of Halifax, with a population of 122,000, now has a total of 500 acres of public open space including playgrounds, baseball diamonds etc. The Land Use Task Group's sub-committee on Recreation and Open Space proposed a standard of 20 acres of open space and recreational lands per 1000 people

for the Halifax-Dartmouth region. Accordingly Halifax should have approximately 2,440 acres of public park and recreaction lands. It therefore has a deficit of 1,940 acres. The city of Dartmouth presently has a total of 100 acres of public open space serving a population of 59,000. According to the above criteria, the city should have in the vicinity of 1,180 acres. A deficit of 1,080 acres exists. It is apparent from these figures that the municiple parks and recreation departments' capabilities are inadequate to meet their present demands without the added responsibility of trying to finance a long range regional programme. Furthermore, many of the areas required for a regional programme are outside the boundaries of the two municipalities and would fall within the jurisdiction of the County of Halifax. However, the County of Halifax does not have an agency responsible for the acquisition or management of public open space. There are only 40 acres of publicly owned land in the county devoted to open space or recreation, including 22 acres of school grounds.

The situation appears to warrant a regional body charged with the responsibility of assembling natural environment lands within the area. This broader outlook would ensure that adequate regional environmental values would be assigned to lands rather than values derived from the necessarily narrower viewpoint of the municipalities. Such measure would ensure that funds were allocated in the most economical manner and that the most valuable lands in the region would receive top priority. Relieving municipal departments of some of the responsibility for land purchases,

would release part of their budget to be channelled into development and maintenance.

It is therefore recommended that a Regional Environmental Council be established. The Council could be delegated a number of regional responsibilities such as:

(1) development of a regional recreation - natural environment programme

(2) acquisition and assembly of lands for the above programme

(3) independent professional advisory body to the municipalities on air, water and landscape pollution

(4) independent pollution monitoring agency

(5) professional liason between municipalities and citizen pollution and environmental groups

(6) professional liason, advice and assistance to planners and developers in the area

The Council, made up of professionals drawn from universities or other agencies in the Halifax-Dartmouth region, should consist of a marine ecologist, a plant ecologist, a wildlife biologist, a fishery biologist, a recreation planner, a landscape architect and regional and municiple planners.

The main function of the council would be to maintain environmental quality control of air, water and landscape in the Halifax-Dartmouth region. A small permanent Secretariat could carry out the day to day work of the council. A real estate section of the Secretariat would be responsible for

assembling the natural environment lands through negotiation with land owners, developers, business firms* and citizens groups. Council members would be responsible for preparating reports and assisting with the integration of local developments into regional programmes such as the Natural Environment - Recreation programme.

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* An interesting scheme for the laying out of wooded parks was introduced in Switzerland two years ago. A life assurance company decided to set up tracks on the outskirts of large towns to enable town-dwellers to regain contact with nature and to make up for their lack of physical exercise. The tracks in question are about 2 or 3 km long and consist of 20 stages. At each stage the individual carries out a number exercises, with or without equipment provided on the spot. The whole course requires an effort equivalent to a gymnastics lesson and takes place in the open air. These Vita tracks, as they are called, are becoming more and more popular and anybody can do the course at any time he chooses.

This is obviouly a very interesting idea. One of the most striking things about it is the close co-operation between the local authorities and organisations which make the wooded areas available and the private company which pays for the installations.

Development, Utilization and Care

Most citizens have only recently become aware of the adverse effects of development on our natural environment. Those effects and public reaction to them can be seen every day in our newspapers. Generally speaking, however, people are still not aware of the advantages and uses to which our natural landscape can be put, except perhaps for the unlimited absorption of garbage, old automobiles and litter that is constantly jettisoned around the uninhabited places.

Figures 3 and 4 illustrate the common practice of allowing private properties to completely encircle a lake. The potential of those lakes for scenic attraction and use by the general public is completely lost. Furthermore, if there had been any wildlife habitat around the shores, it has been completely destroyed. It would not be too difficult to predict that the only forms of wildlife commonly seen in the area would be starlings, house sparrows (English sparrows), perhaps robins, and the occasional pigeon and crow. By contrast, one might see any number of warblers, thrushes, kingfishers, loons, squirrels, chipmunks, and a host of other birds and wild creatures around any of the undisturbed lakes in the vicinity. Many wildlife species would still frequent lakes with a wooded fringe even in the centre of built-up areas. Besides the loss of wildlife, public access to lakes is very limited or lacking when private property extends down to lake shores. For example, the only places for the public to launch boats on Lake William, one of the largest

lakes in the area, are at the Nova Scotia Department of Lands and Forests ramp or the Cheema Canoe Club, after you have obtained permission. Obviously, in planning development around its shore, neither the general public nor the natural potentials offered by this lake were considered. Examples of the result of private control of beach areas can be seen at Cole Harbour and Lawrencetown (Figure 5). Both areas are posted with "No Trespassing" signs. The owner of the beach at West Lawrencetown stated that he had been forced to exclude the public in order to protect his property against people who insisted on dumping garbage on the beach. Sand is being extracted commercially at Cole Harbour. These are some examples of misuse or under-utilization of a resource. A concerted effort should be made to develop fully the potential offered by the existing assets in our natural environment.

(a) Development

The natural environment described in this report, requires very little initial development before the lands are suitable for general public use. The minimum requirement is slight manipulation of the vegetation or landscape and the establishment of trails so that people can use and appreciate its amenities. Initial surveys by a team comprising a wildlife biologist, a plant ecologist and a fishery biologist from the Regional Environmental Council should identify and describe the fauna and flora in the area. Other factors such as spawning grounds,

nesting areas, important food species or feeding areas, escape cover and rare plants should be explained and mapped in detail. Those critical areas can then be given special attention during development, so that they are not destroyed and so that the public is aware of their importance in the total landscape. This initial examination is of prime importance to the Category 1 and 2 lands so that buffer zones can be established around wildlife habitat to prevent too much human disturbance during breeding and young-raising periods, and to prevent destruction of fragile habitats. Recreation specialists and landscape architects from the Regional Environmental Council could then integrate people requirements into the development plan. The two stage approach ensures that the populace would benefit on a continual basis from the wildlife resources as well as from the recreational resources of the area. Benefits from the aesthetic value of the lands would naturally follow a sensitive and comprehensive development.

(b) Utilization

There are many benefits to be derived from the natural environment.

1. Pollution control.

   Amelioration of air and noise pollution by vegetation has already been mentioned.

Maintenance of a park land boundary around lakes and along river banks will greatly assist in preventing runoff from silting and clouding the waters.

2. Interpretation.

An understanding of our natural environment and of the relationships and interactions of the various species and ecosystems is becoming increasingly important to our existence. The preservation of ecologically unique areas and of a variety of valuable wildlife and fish habitats will offer numerous opportunities for interpretive programmes to be integrated into the park and recreation programmes.

3. Flood control.

Woodland and parks around natural waterways retard the melting of snow, slowing down the rapid spring runoff. The vegetation also encourages the absorption of rain by slowing its flow to the natural waterways. Water is metered slowly into the rivers helping to prevent flash floods in the spring and fall and assuring a continuous flow during the dry summer months. Although not a severe problem in the Halifax-Dartmouth area, flooding can be a problem where cities insist on expanding into river flood

plains and then replacing the vegetation along the river banks with asphalt which has no moisture-holding capacity.

4. Public buildings.

The purchase of land for public buildings such as schools, firehalls, libraries, museums or cultural centres is a constant expenditure for a growing city. Some of them could be located on parts of the recommended 6500 acres of environment lands without detriment to the landscape. In the case of schools such a location would facilitate out-door science classes and field trips. Integrating selected public buildings into the natural environment lands, would relieve the municipalities of some of the expense of land purchase. When such developments are considered, the Regional Environmental Council team of a wildlife biologist, ecologist, and landscape architect should be consulted at an early stage.

5. Enhancement of Urban Areas.

Forest tracts, parklands and views over rivers and lakes are long established attractions in prestige subdivisions. Preserving strips of parkland and natural environment around valuable landscapes ensures that everyone in the community has access to them. In the case of lakes, it may be said that

everyone in the community has a lakeshore lot. Strategic location of high-rise apartments around the periphery of natural environment areas could afford pleasant views for the tenants as well as help to ensure adequate acreages of open space in high density zones.

6. Recreation

With proper planning and management the features of the natural environment described in this report can afford a wide variety of recreational activities in the heart of a suburban area. some examples are:

cycling	riding	ice skating
swimming	hunting	scuba diving
canoeing	walking	ice fishing
water skiing	interpretation	sailing
fishing		

7. Tent and Trailer Parks

Accommodation facilities for tourists in the Halifax-Darmouth area are inadequate. A number of the natural areas could incorporate camping sites and trailer parks.

8. Picnic sites and playgrounds

Facilities for family outings and amusements for small children would almost certainly be an integral part of the development of the natural environment lands.

9. Wildlife

Properly developed and managed, the natural environment would attract a wide variety of animal and bird life to enhance the range of experiences offered in the urban setting and to increase the enjoyment of the local citizens.

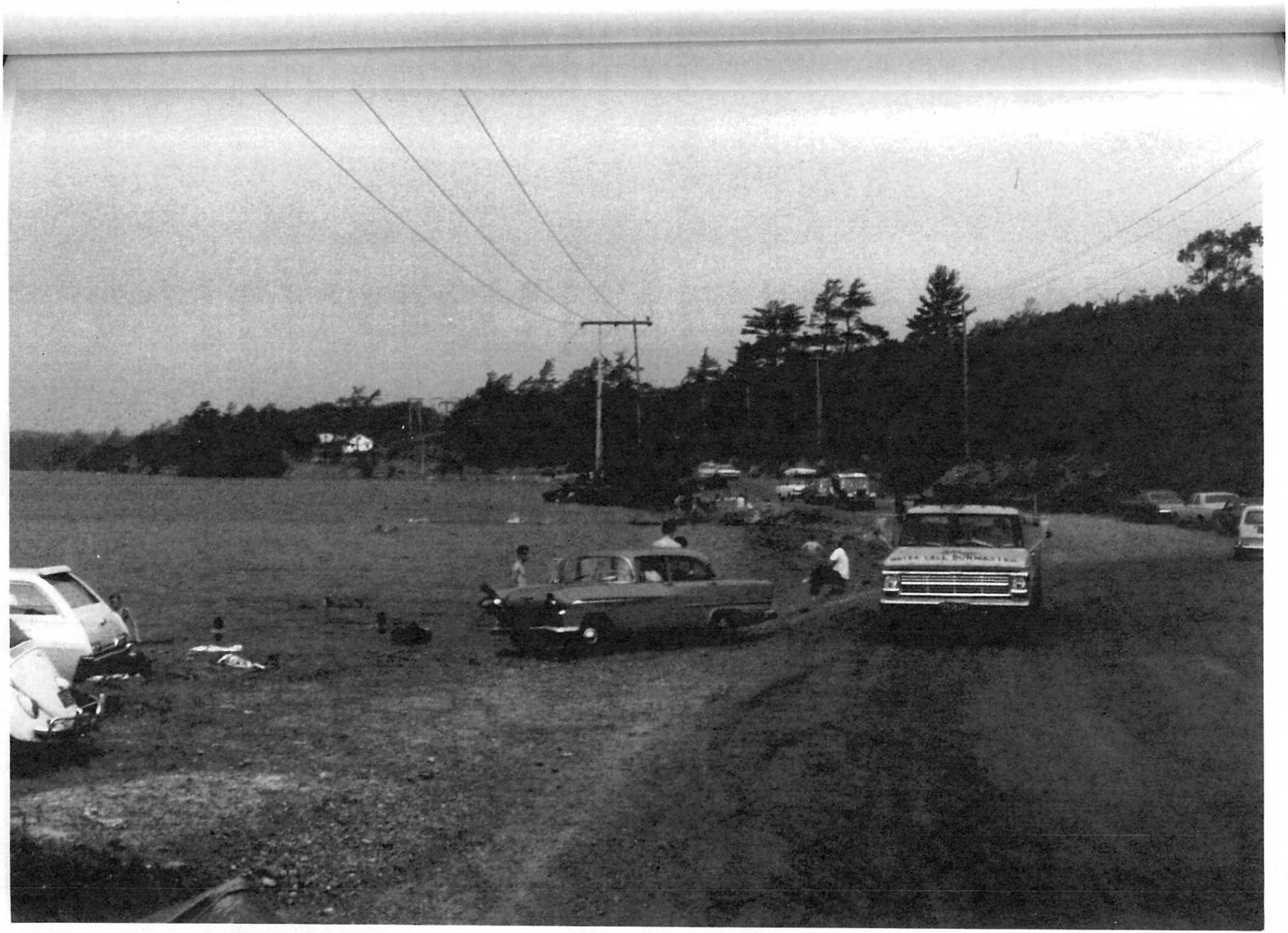
10. Industrial Parks

Industry and natural environment lands need not be incompatible. With proper planning the natural environment within or bordering on industrial areas can be an asset to the many workers during noon hour or other break periods. The opportunity to leave the factory surroundings for a swim or a relaxing walk along a wooded lake shore would be a welcome change for many of the daily occupants of an industrial park. Bicycle trails through an interlinking green belt system from residential to industrial areas may even encourage people to leave their automobiles at home and cycle to work.

(c) Care

The value of public control of natural assets in the landscape can be negated by poor management or incompatible development in adjacent areas (Figure 6). For example, parents are usually reluctant to allow children to cross heavily travelled roads. An arterial highway or expressway bordering a park area can therefore be an effective barrier to its use. It

Figure 6. A portion of Kearney Lake July 28, 1970. This is an example of how lack of planning destroyed the aesthetic value of a lake. As well as the increase in accident hazards, the recreational value is seriously degraded. Cement trucks regularly travel this road to and from the cement plant just up the road from this site.



is therefore recommended that, wherever possible, boundaries of natural environment areas should be perimeter roads of "local street" standards. Further, in keeping with the scheme of simplifying public access to parks and lake shores, buildings should be permitted only on the side away from the lake shore. There would then be no interference with public access. The entire park area and, if present, the entire shore of a lake would be open to everyone.

Wildlife within an urban or suburban area is, with the exception of some common species of birds, relatively rare. When a wild animal or unusual bird is seen in town the occasion usually warrants front page coverage in the local newspapers. Around the shores of a few of the lakes in the Halifax-Dartmouth area, for example Russell Lake, Bissett Lake and Third Lake, there are marshes that support a variety of wildlife and each year see the production of two or three broods of Black Ducks. At the moment the lands surrounding these lakes and marshes are not heavily build up. To protect them from destruction the surrounding woodlands should be left in a relatively natural state. Doing so will allow natural cover to remain for nesting and feeding

and the trees will also serve as a protective screen to reduce noise and human activity. That would allow wildlife to continue to live there with a minimum of disturbance. A system of pathways through the woodland cover should come close to the water's edge at a number of vantage points so that people may view the marsh. Interpretive signs could explain the various activities happening in the marsh and woodlands.

Recreational Fishery Resources

Introduction

North Americans are devoting an ever-increasing proportion of their time and income to various forms of outdoor recreation. Recreational fishing is among the more important of the outdoor activities pursued - surpassed in participation only by sightseeing, picnicing and swimming (Stroud and Martin, 1968). Recent (1966-1969) freshwater angling license sales in Nova Scotia have increased at an annual rate of 6 percent. United States' statistics for the period 1955-1965 show that annual growth rate in sport fishery participation (3%) has exceeded the total population growth rate by 80 percent.

This section of the report presents a general description of the fishery resources of the Halifax-Dartmouth Metropolitan area and indicates possibilities for their protection and development.

Population of Anglers in Halifax-Dartmouth

In 1969, freshwater angling licenses were issued to 76,598 Nova Scotia residents over 17 years of age. Approximately 18,000 of those licenses were purchased in the Halifax-Dartmouth metropolitan area. That represents about 13.5% of the area's population in that age group (Atlantic Year Book, 1970). If a comparable representation (13.5%) exists in the 10-17 year age group there would be another 5,000 anglers, for an estimated metropolitan area total of 23,000.

The number of persons participating in salt water sport fishing in Halifax harbour and Bedford Basin is unknown.

Environmental Assets

(a) Lakes

The large number of small lakes distributed throughout the metropolitan area constitute an extremely valuable fishery resource. Most lakes have not been seriously polluted and most have not yet suffered aesthetically from the encroachment of industrial or residential development.

Of the 58 lakes (minimum estimate) in the area, 40 are probably capable of providing sport fishing. Their total surface area is estimated at 6400 acres. They range from 20 to 837 acres and from 20 to 99 feet maximum depth. A list of the

selected lakes and their gross physical characteristics is presented in Appendix II.

In keeping with lakes and streams elsewhere in eastern N.S., the waters of the Halifax-Dartmouth area are usually acidic, have a ~~high~~ low mineral content, and are consiquently not very productive. They do, however, have one important compensating ecological feature -- extensive and varied shorelines with a high ratio of margin to surface area. That factor greatly enhances their value as production areas for such game fish as speckled trout (Salvelinus fontinalis) and smallmouth bass (Micropterus dolomieu).

(b) Streams

The Sackville River is the only stream in the metro area with any significant potential for fishing. The main river below Webber Lake is 6 miles long and carries a mean annual discharge of 150 cubic feet per second. Until the early 1960's it supported populations of sea-run speckled trout and Atlantic salmon (Salmo salar). The annual salmon run was estimated to average 200 fish. Due to the extensive excavations in the Sackville Valley, which was accelerated in the mid 1950's, those populations have all but disappeared.

The federal Department of Fisheries used to operate a salmon and trout hatchery, at the mouth of the

Sackville River. It was closed in 1961 because of heavy silting and periodic chemical pollution of the water supply. During the 1950's, 100-300,000 eggs were collected annually from the Sackville salmon population for hatchery propagation.

Both the main Sackville and its tributary, the Little Sackville, have suffered greatly from intensive land use in the watershed. Heavy silt deposition throughout the Little Sackville and the lower 2 miles of the main Sackville has rendered those areas virtually useless for salmon or trout. Large-scale gravel removal operations in the middle section of the main river have affected $1\frac{1}{4}$ miles (about 20%) of its length and have ruined the main spawning areas in the system. Only $2\frac{1}{2}$ miles of river (40%) suitable for juvenile salmon or trout rearing remains.

The Sackville River is a good example of how lack of concern for environmental protection can lead to almost irreparable damage and the loss of a valuable aesthetic and recreational resource.

Present Fisheries

Officers of the Canada Department of Fisheries and Forestry annually estimate the freshwater angling catch in the lakes and streams of the metropolitan area. Because of sampling difficulties, the figures derived must be considered

as minimum estimates of catch. In the last decade the highest estimated catches have been 3000 speckled trout and 1100 smallmouth bass.

On the basis of total lake area the yield of speckled trout approximated 0.15 pounds per acre. Lakes in the Halifax-Dartmouth area can probably yield annually, without intensive stocking of catchable-size hatchery-reared fish, one to two pounds of trout per acre - at least six times the present level (Smith, 1952). That yield is not being realized for several reasons now. Many of the lakes probably lack suitable areas for trout spawning, competitor species may be limiting trout survival. Also, about 41 percent (2600 acres) of the total available lake area is virtually unfished, due to either poor road access or restrictions on public access.

Present Fishery Management Programmes

Management and conservation of the fishery resource is a federal government responsibility which is exercised through the Fisheries Service of the Department of Fisheries and Forestry. At present, that Department's activities in the metro area are concentrated mainly on lake stocking of hatchery-reared speckled trout and on environmental protection.

The Fish and Wildlife Division of the provincial Department of Lands and Forests, is also involved with trout

stocking in the metro area. Under a cooperative program with the federal Department, 150,000 fingerling speckled trout from federal hatcheries are transferred each fall to provincial facilities for rearing through to the following spring, when they are stocked as yearlings. The provincial government trout stocking programme is concentrated mainly in Halifax County, whereas the federal stocking effort is spread throughout all counties of Nova Scotia.

In 1969 a total of 17,000 yearling speckled trout were stocked in seven Halifax-Dartmouth metro area lakes accessible to the public. The provincial and federal government programs contributed equal numbers to the stocking effort.

Problems of Access and Environmental Protection

Urbanization is affecting the opportunity for individuals to particiapte in recreational fishing. Proportionate participation of people in large cities tends to be lower than that in smaller, rural centres. In the Yukon, resident sport fishermen comprise 30% of the total population over 16 years of age, whereas in Ontario and Quebec they comprise only 12% (Tuomi and Krajcarski, 1970). In Nova Scotia, freshwater angling license sales comprise 15% of the population over 17 years of age.

Participation in urban areas is undoubtedly affected by the distance from fishing opportunities, by private control of access to lakes and streams, and by the overall environmental deterioration. An effort to preserve recreational

opportunities near cities will favour greater participation, particularly by those lacking either time or transportation, and will help to satisfy the rapidly increasing demands for outdoor recreation. Forty percent of all leisure time is available for short periods after work or after school, when travel distance and time are major considerations (McFadden, 1969). Preservation of fishing opportunities near cities will be of particular benefit to young people, and will aid in stimulating and maintaining their interests in the outdoor environment.

Growth of the metropolitan area will mean the inclusion of more and more surrounding watersheds in special zones with access limitations. At present the public is prohibited from using some 1470 acres of lakes (23% of the metro area total) which form the water supplies for Halifax and Dartmouth. Private ownership and Department of National Defence (Appendix II) account for a further restriction of public access to 778 acres of lakes. As recreational demand increases, the single-purpose use of lakes and streams will become less defensible. In New York State, public water supply reservoirs are now being used for fishing. Suitably governed sport fishing is compatible with the maintenance of an adequate public water supply.

Land erosion and domestic sewage will likely be the major sources of water quality impairment in lakes and small

streams of the metro area. Considerable advance planning, involving developers and resource agencies, will be needed to ensure that environmental damage is minimized. Most lakes in the area are small and shallow. Any enrichment from sewage will in winter draw on what are now probably barely adequate reserves of oxygen, thus rendering the environment unsuitable for trout.

Potential for Development of the Fishery

The numerous lakes of the Halifax-Dartmouth area, varying in size and depth, offer ample opportunity for imaginative application of fishery development methods. The results could satisfy a very substantial recreational demand in the area. At Crecy Lake, New Brunswick, an annual angling effort of 72 hours per acre has been reported (Smith, 1968). In the United States the total annual angling effort presently amounts to 57 hours per surface acre of freshwater (McFadden, 1969) with up to 2000 hours per acre being recorded in some cases (McFadden, 1969). A popular Connecticut lake sustained 140 hours of fishing effort per acre per year (Wilde, --). These examples would suggest that angling effort in the order of 300,000-500,000 hours could be easily accommodated on lakes of the Halifax-Dartmouth area each year.

To develop the resource fully over the long term, detailed knowledge of water quality, fish food production and of the existing fish population structure, will be needed for each lake. The general management techniques required have

already been developed. Successful application of known techniques to this area will, however, require a sound scientific approach, with regular evaluation of the programme.

Likely prospects for increasing the fishery resource of the Halifax-Dartmouth area are outlined in the following paragraphs.

(a) Trout Stocking

Stocking of catchable-size (8-12 inch) hatchery-reared trout can increase yield considerably in lakes that receive heavy fishing pressure. Angler yields in the metro area are now under 1 pound per acre, whereas yields of 10-20 pounds per acre could be attained by more intensive stocking (Alexander and Shetter, 1969; Smith, 1955). Returns to the angler from yearling trout stocking are generally high, in the order of 30-70 percent of the number stocked.

Non-native trout species, such as the brown (Salmo Trutta) and rainbow (Salmo Gardinari) trout, could be used to diversify the fishery with respect to seasonal timing (Alexander and Shetter, 1969; Wilde, --). The native speckled trout enter the fishery mainly in spring, April-May, whereas brown and rainbow trout are generally taken to a great extent in summer and fall. As each species also differs to some degree in feeding habits, stocking a combination of these species would also result in greater utilization of available food sources.

In lakes lacking adequate trout spawning areas, and where no competitor species exist, the stocking of fingerling trout (4-6 inches) would be feasible and much more economical than planting of catchable-sized fish.

(b) Lake Reclamation

Inter-specific competition greatly reduces the survival and production of the more desirable game fish such as trout. The yellow perch (Perca flavescens) is a common and abundant trout competitor in this area but is little sought by anglers. Yields of certain lakes could be increased several times by application of short lived poison (probably rotenone) to eliminate all fish and by restocking with fingerling trout. That approach would be feasible only where re-infestation by undesirable species, via inlet or outlet streams, can be easily prevented.

(c) Smallmouth Bass

The smallmouth black bass, a warm-water game fish not native to Nova Scotia waters, has been introduced to the Dartmouth Lakes. There is evidence from rather limited angling effort that it is well established and more abundant than is generally realized. Once fishermen become aware of it, it should provide increased angling opportunity during the warm, summer months, long after speckled trout angling has tapered off.

Bass are more difficult to manage than trout because they are higher on the food chain and the habitat here is at best marginal for them. But lakes which are found to be unsuited for trout production could be used to establish bass and suitable forage fish populations.

Investigation of the abundance and inter-relationship of various species in the Dartmouth Lakes chain would indicate the factors which control production of smallmouth bass. A lack of suitable spawning habitat may be rectified through appropriate habitat improvement measures. If suitable fish forage species are lacking, consideration could be given to introductions of non-native species.

(d) Sackville River

This river's proximity to a large centre of population makes it a potential asset. Most of the Sackville has deteriorated, but about 1/3 of the lower river remains in a near-natural state and those sections where gravel was removed could be partly rehabilitated to provide suitable angling water. Stream improvement measures could be used to provide pools and to channel the existing flow, which is now spread among several channels. A fishery could be developed over the next decade by stocking of hatchery-reared seaward migrant Atlantic salmon, or sea-run strains of speckled or brown trout, in combination with stream improvement.

(e) Ice Fishing

Angling for all game fish is prohibited between November 1 and April 1 mainly to protect speckled trout, which are highly susceptible to angling in winter. This is particularly true in the smaller lakes where fishermen are likely to have access to most of the surface area.

In other provinces and in the northern United States there are now a limited number of lakes open to ice fishing. Large lakes are usually chosen, and species other than speckled trout, such as lake trout, whitefish, perch, pickerel and burbot are the main ones sought. Experience elsewhere suggests that the larger lakes of the Halifax-Dartmouth area, particularly Micmac, Charles and William, could be opened to ice fishing without undue detriment to speckled trout populations.

Biological Investigations Required

(a) General Lake Surveys

Routine biological surveys are needed on all lakes with apparent potential for game fish production in order to define their suitability more precisely. Important water quality parameters should be measured at two-month intervals through one annual cycle, with particular attention given to the critical periods in August and March. Species composition and gross size structure of the fish populations should be determined for each lake.

Summer distribution of trout relative to temperature should also be noted. The survey should be carried out over a two to three year period.

(b) Dartmouth Lakes

An investigation of about two years' duration should be initiated on the Dartmouth Lakes chain (Banook, Micmac, Charles, William) to determine the status of various species, particularly smallmouth bass, and how best to manage them. The investigation would aim at determining the species composition, size and age structures, food habits, and seasonal changes in distribution of each species.

(c) Trout Stocking Evaluation

Regular stocking programmes, using tagged yearling trout should be instituted to develop the most effective stocking methods for the area. The evaluation programme should last at least two years. Initial plantings would go to the smaller, more accessible lakes where fishing pressure is likely to be highest. Probable choices would include: Loon, Bell and Albro Lakes in Dartmouth; Sandy, Kearney and Paper Mill Lakes in Rockingham; Third Lake system in Sackville; and William Lake in the Spryfield area.

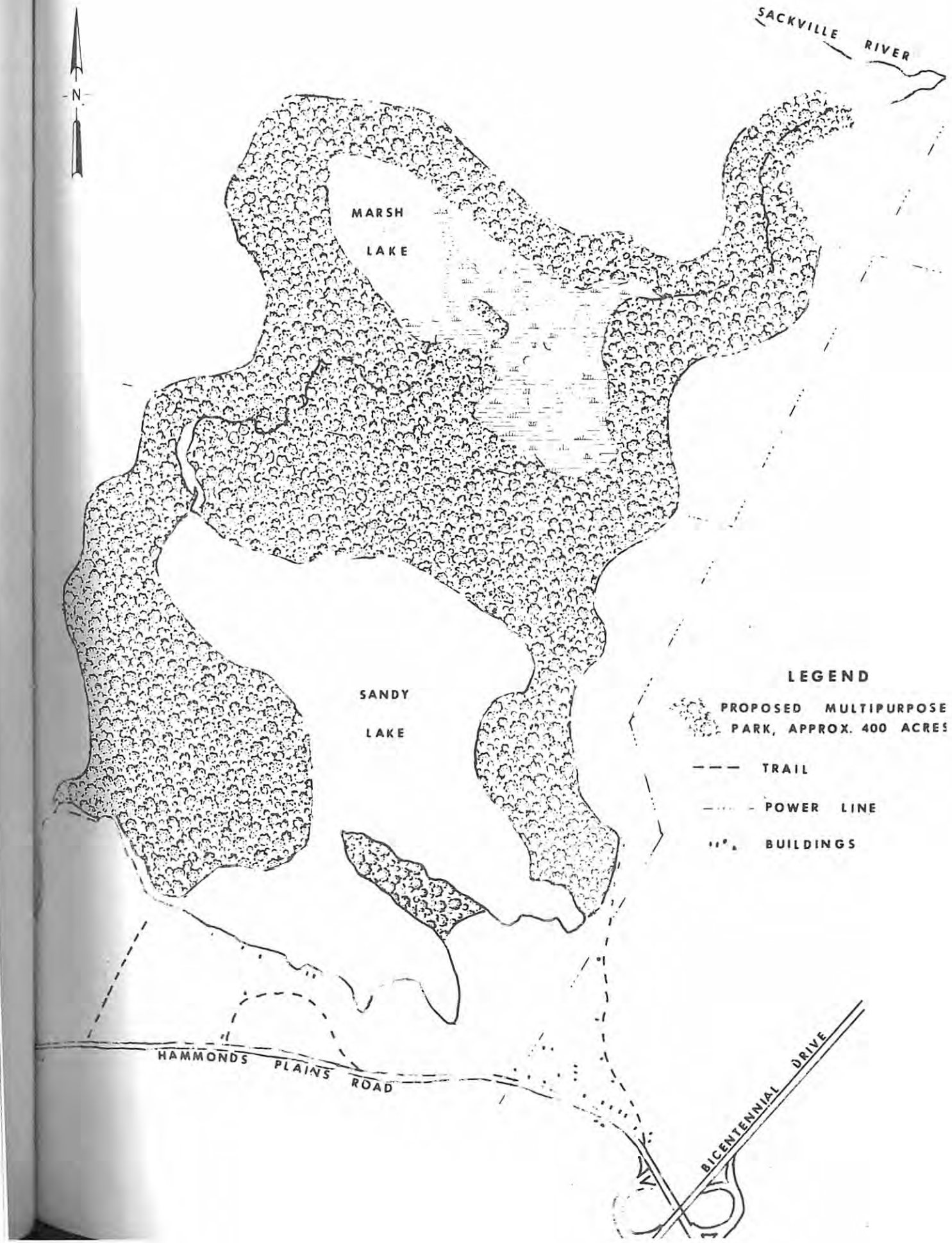
joined by foot bridges and ideal locations for picnic sites abound. The potential of the lake to support a fish population is outlined in the fishery section of this report. More detailed investigations should be made before plans are developed.

Sandy Lake

Location - To the north of Hammonds Plains Road and one-half mile from the Bicentennial interchange.

Intrinsic Value

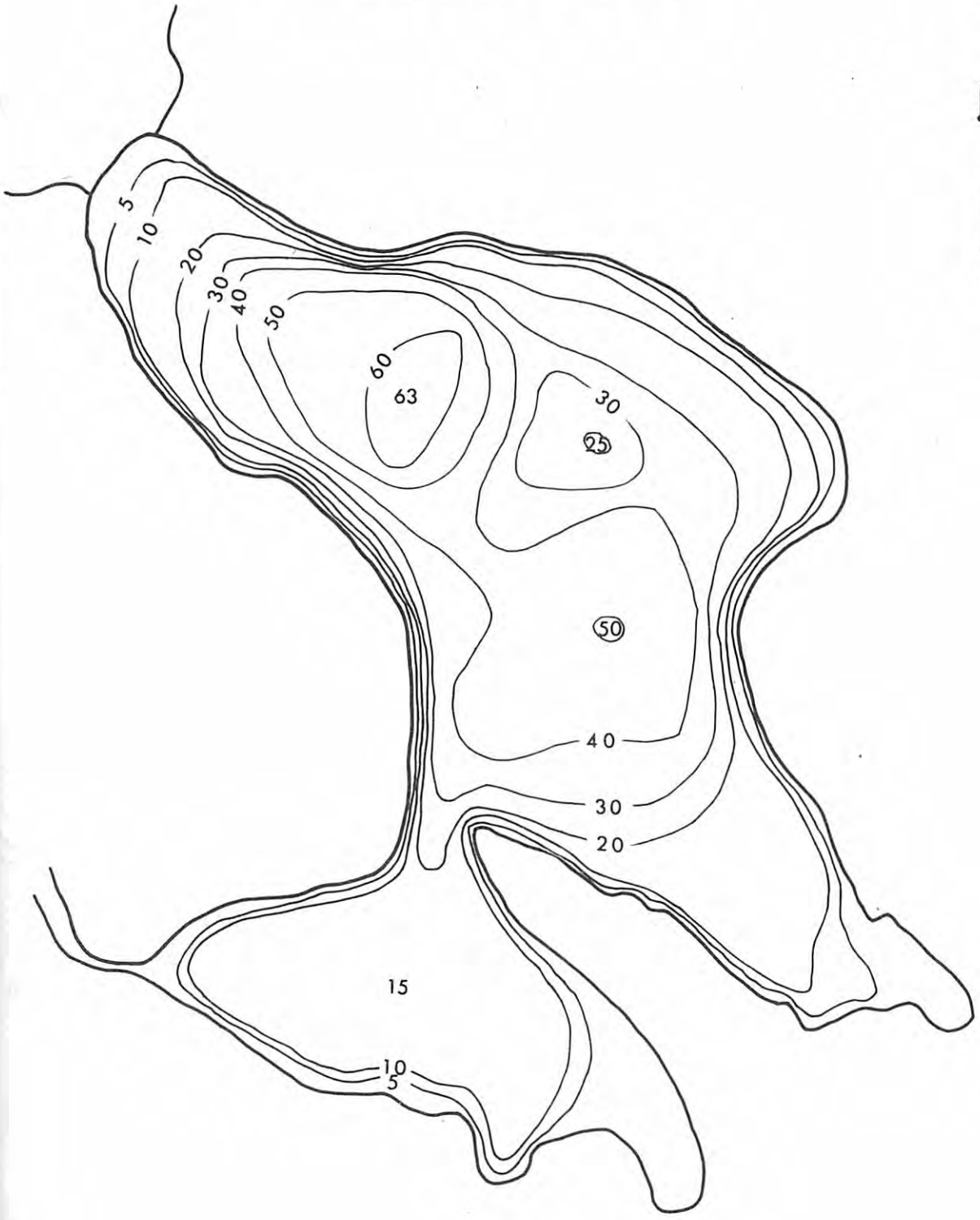
Sandy Lake is probably one of the finest fresh water lakes in the Halifax-Dartmouth area. It is surrounded by gently rolling hills rising to 75 and 100 feet, offering excellent views of the lake. The forest cover varies from dense to semi-open mixed stands of various ages. Mature white pine, hemlock, spruce, maple, birch and beech are common, with elderberry and wild cherry in the clearings. The shoreline is regular, varying from smooth rubble to a sandy beach. Investigations showed water depths of 63 feet in the northern end of the lake. The fishery in the lake is being investigated. The outlet stream follows a fast rocky course down to Marsh Lake which is in marked contrast to Sandy Lake. One-half of Marsh Lake is less than five feet deep and is filled with aquatic vegetation. The western end is basin shaped with a maximum depth of 20 feet and has one old, active


N
SACKVILLE RIVER
MARSH LAKE
SANDY LAKE
LEGEND
PROPOSED MULTIPURPOSE PARK, APPROX. 400 ACRES
TRAIL
POWER LINE
BUILDINGS
HAMMONDS PLAINS ROAD
BICENTENNIAL DRIVE

SANDY LAKE

DEPTH CONTOURS

SOUNDED JUNE 22/70



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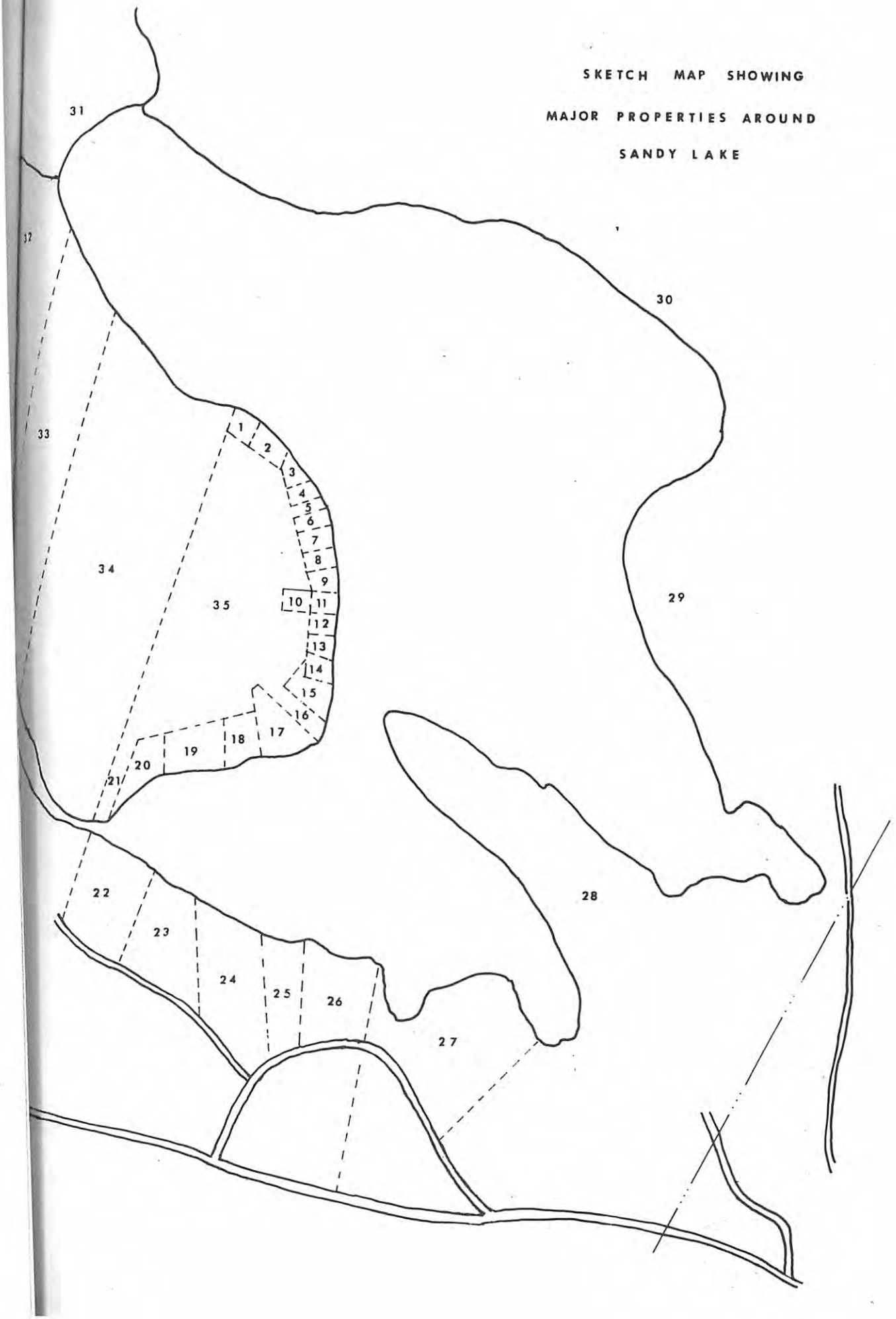
SKETCH MAP SHOWING

MAJOR PROPERTIES AROUND

SANDY LAKE



Partial list of property owners around Sandy Lake.

Property number	Owner
1	Charles L. Scott
2	Evie and Gisele Keirstead
3	Douglas and Audrey Lauder
4	Douglas and Audrey Lauder
5	Right of way
6	Mrs. Catherine Fisher
7	Charles L. Scott
8	Charles L. Scott
9	John E. Merritt
10	Melbourne H. Sarty
11	Melbourne H. Sarty
12	Sylvia A. Ireland
13	Myles Boutilier
14	Bert Giles
15	Harding F. Giles
16	Right of way
17	Emmett and Bell
18	J.J. Barr
19	Thornton
20	L. Duggan
21	Right of way - 50 feet
22	Mrs. Elizabeth O'Leary
23	Mrs. Francis E. Chaulk
24	Unknown
25	Francis Emmett
26	Roy M. Giles (Leo Duggan ?)
27	Scotia Investment
28	Elizabeth McClettan Estate - 75 acres approx.
29	Windsor Road Lots - Heirs of Wilfred H. Smith
30	John Greenman - 80 acres approx.
31	Pender
32	Frank Pender
33	Foster
34	Walter Giles
35	Alice M. Giles

beaver lodge. One pair of common loons with a single downy young were seen at the time of survey. The surroundings of Marsh Lake are similar to those of Sandy Lake, the two together forming an interesting and picturesque unit. The outlet from Marsh Lake forms a natural link with the Sackville River. The lakes and river system form an attractive and challenging canoe route when the water levels are high in the spring.

Suggested Developments

Approximately 400 acres have been outlined around Sandy and Marsh Lakes. Since this lake and its surroundings comprise one of the finest landscape units around the metro area, a large parcel of land has been suggested to protect the lake from adverse development and so that public access and use may be assured. This lake was designated Class 3 for recreation on the Canada Land Inventory Recreation Capability Survey and as such received the highest rating of any inland site around the metro area. The 400 acres could be developed as a multi-purpose park encompassing a wide range of activities that would serve the enlarged future communities including such areas as Glen Moir, Bedford and Sackville. If properly planned, the area could accommodate nature reserves, quiet open spaces, camping and picnic grounds, a riding school and trails, a cultural

centre, or other types of recreational activities. This area, like many others in the immediate vicinity of Halifax-Dartmouth, should be reserved immediately for public use before it is irreparably damaged by adverse developments or permanently lost to public use because of exorbitant costs. Options should be negotiated on the land now. Our preliminary investigations have indicated that some property owners are willing to sell. Since the land need not be developed immediately, considerable flexibility is available in bargaining with the owners. It should be emphasized that this is a prime park land - nature reserve site in an excellent landscape setting.

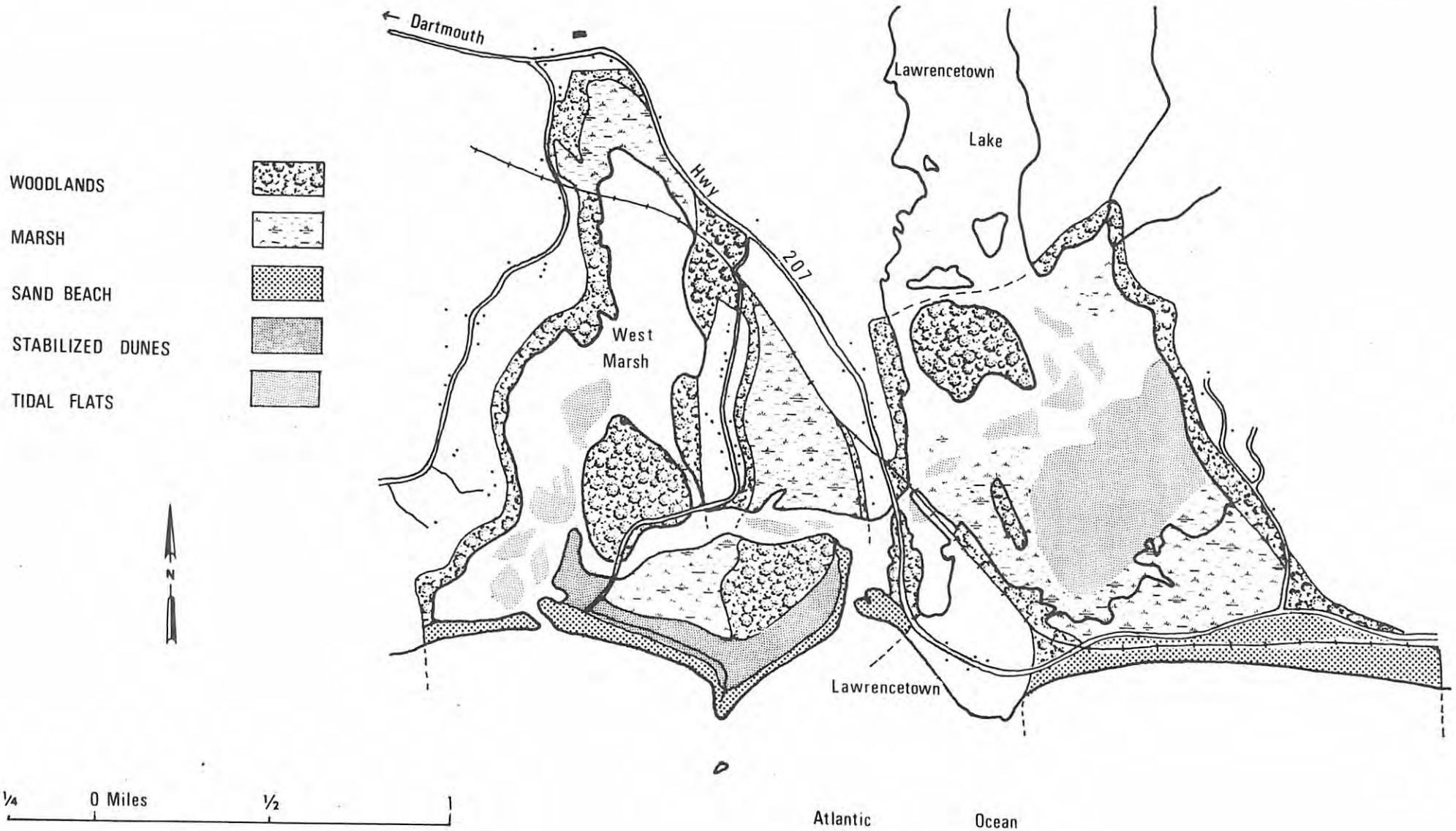
Lawrencetown - West Marsh

Location - approximately ten miles east of Dartmouth City limits on the Cole Harbour Road.

Unique Features

The marshes and sand dune complexes in this area combine to present a variety of interesting and enjoyable features. Over two miles of fine sand beaches are available for summer recreation and are presently used to a considerable extent by the metro population. It is common to see numerous cars with out-of-province licence plates parked behind the dunes during the peak of the tourist season. The sand dune - spruce grove

LAWRENCETOWN, WEST MARSH



ecosystem along West Marsh beach offers an excellent opportunity for nature interpretations. Another valuable attraction are the marshes which offer good breeding habitat for black ducks and teal as well as a host of other birds. As in the case of Cole Harbour, these marshes are a valuable feeding ground for heron and osprey populations in the region. Finally, the area is attractive to sportsmen during the waterfowl hunting season.

The interesting and attractive features of the area, however, make it necessary to sound a warning as to overuse and ill-planned development of the lands for recreation. The sand dune - white spruce succession on the West Marsh portion is ecologically fragile and overuse can cause its rapid deterioration. The marshes are important breeding and migration habitat for waterfowl and a host of shorebirds. They are much more tolerant of human activities than the sand dunes but any developments should be sensitively planned and constructed so as not to destroy the attractiveness of this ecotone and its wildlife inhabitants.

The sand dune complex comprises an excellent opportunity for nature interpretation. The story is relatively simple and readily seen. It is possible to read the development of the West Marsh beaches by

standing on the point leading out to the island and looking inland. The islands to seaward indicate that the point at one time extended out much further than it does now. This was gradually eroded by the waves and the fine sand carried landward and deposited as an offshore sand bar where the present beach is. This bar gradually built up till it became exposed and eventually protected the marsh area behind it from direct wave action. Incoming tides continued to bring in sand and silt. Eventually the marsh area grew shallower and began to support a variety of aquatic plants. It is only in recent years that the strip of beach extending westwards towards Cole Harbour closed off the outlet from the marsh to the ocean. Beach development is in a state of flux at the moment opening and closing channels from the Atlantic into West Marsh depending on the weather, but it is reaching a stage in its succession where it will eventually remain closed.

Looking from the point to the spruce groves one is given an excellent example of plant succession and sand dune evolution. Wave action eroded the original point and carried the sand inland depositing it in bars that eventually built up to expanses of sand flats. The sand was then built into dunes by a combination of wind and wave action. Dune grass, one of the few

plant species that can live in this habitat of dry, shifting sand, became established and slowly stabilized the dune so that it no longer drifted with the wind. That original dune is the innermost one in the spruce grove (Figure 10). As it became stabilized and as more sand was brought in by the wind and waves, successive dunes were built up in front of it. Once established, the dune grass, which grows by sending out horizontal runners from its root system, was able to advance onto the succeeding dunes and eventually stabilize them. It is possible to walk inland from the beach into the spruce grove and count the dunes as you go (Figures 9 & 10). When a number of dunes became covered with dune grass, other species of plants became established. The succession of dunes altered the microclimate on the original dunes so that the effects of wind and weather were not quite so severe. Decaying vegetation altered the pure sand substratum so that eventually white spruce became established and were also able to advance over the dunes towards the ocean.

Care must be taken when the area is developed for recreation. If it is heavily utilized by the public, the dune grass may be killed. The stabilizing mechanism of the dunes would then be destroyed and the sand would once again begin to be blown and moved by the winds.

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~~Pages 12 - 20 follow~~

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