Deep Bay Watershed
&
Lake Management Plan

EXECUTIVE SUMMARY

DEEP BAY WATERSHED VISION STATEMENT

"To identify, document, and protect the unique and valuable characteristics of Deep Bay and its Watershed for the benefit of current and future residents."

Our Community Envisions Deep Bay to be a place where:

- The beauty of the landscape, the tranquility of the surroundings and the quality of the water are protected and preserved;
- Precedence is given to activities that maintain the natural and social qualities of the lake that promote environmental sustainability; Wildlife, fish and plant habitat are safeguarded;
- The lake is a shared experience, where respect and dignity are shown to others and expected in return;
- Our community balances the needs of those that desire tranquility with the needs of recreational users;
- Public spaces are maintained for everyone to enjoy;
- The community is actively involved in stewardship; and promotes education as a way to ensure respect for their neighbours and the law.

THE NEED TO PROTECT OUR DEEP BAY WATERSHED AREA

The Deep Bay Watershed is located on eastern Georgian Bay in the Township of Carling, Parry Sound, Ontario. Deep Bay is unique in that it shares the characteristics of both a lake and a bay, as it is connected to Georgian Bay through a narrow channel (Collins Channel), which is the only source of outflow

The steady decline of water levels in Lake Huron and Georgian Bay in recent years … has impacted Deep Bay making it particular vulnerable to water quality problems such as those that developed in the summer of 2004. At that time, a dense plankton bloom persisted for most of the summer. In response to the situation, Carling Township hired Dr. K. Schiefer to undertake a Water Quality Survey of Deep Bay and his findings were published in December 2005.
The Schiefer Report recommended that the community develop a Lake Plan in response to the troubling outbreak of plankton blooms that developed in the summer of 2004. This

document is the benchmark report to measure our success on moving forward to improve water quality.

THE DEEP BAY WATERSHED LAKE PLAN

The Lake Plan is a document prepared by the Deep Bay Association which identifies and documents the special characteristics and features of Deep Bay and the watershed. The concerns and priorities identified by the residents regarding this area have been given careful consideration. In preparation of this document, information was gathered from the results of the Carling Township Questionnaire mailed out to all residents living within the Deep Bay Community Watershed in February 2011. In addition, numerous community discussions have highlighted concerns and interests of the public living within this area.

A general description of Deep Bay has been included that identifies the significant natural, physical, economic, and social characteristics that make Deep Bay and the watershed a desirable place to live, work, play, and visit. A series of guiding principles, goals and recommendations have been developed in order ensure the health and sustainability of Deep Bay both now and into the future.

STEWARDSHIP OF THE DEEP BAY WATERSHED

Why is stewardship important?

The community has *a vested interest in the social and economic benefits of having a clean and healthy environment on Deep Bay.* Fluctuating water levels, safe navigation of the Collins Channel narrows, wetlands, residential, recreational, commercial and agricultural activities within the watershed have an impact on water quality. These impacts have been addressed in detail throughout the Lake Plan. . If we are to protect Deep Bay for current and future generations, active stewardship of this precious resource is necessary by all residents.

GOALS AND RECOMMENDATIONS

The goal of the Deep Bay Association in creating this lake plan has been to identify and document the valuable characteristics of Deep Bay and the watershed. In an effort to protect Deep Bay for current and future generations, 15 recommendations were developed and incorporated into the plan to address the areas of common interest identified by the residents and ratepayers living within the Deep Bay Watershed.

GUIDING PRINCIPLES

The following Guiding Principles support Deep Bay as a completely unique body of water that is part of Georgian Bay totally dependent on the flushing effect of the Narrows much like an umbilical cord that sustains life to the Deep Bay Watershed.

These are the Guiding Principles for making decisions concerning Deep Bay and Watershed. All decisions shall:

1. Support the necessary actions required for sufficient water flow through the Narrows to maintain or improve water quality, protect fish habitat and wetlands, and ensure the safe navigation through the Narrows of Collins Bay, the channel which connects Deep Bay to Georgian Bay.

2. Protect, maintain and/or enhance the Water Quality of Deep Bay as assessed from continuous surveillance and water quality testing processes.

3. Promote a positive social and recreational environment for all Deep Bay stakeholders by encouraging communication, community participation, and a strong Stewardship effort.

4. The Deep Bay Watershed & Lake Management Plan shall be an integral part of the Carling Township Official Plan.

SUMMARY

The Deep Bay Association encourage you to familiarize yourself with The Deep Bay Watershed & Lake Management Plan. For a more thorough review of the contents you can obtain a copy from the DBA website at www.deepbayassociation.com

Deep Bay Watershed
&
Lake Management Plan

"The Plan"
Original Version Of
31 August 2012

Prepared by: The Deep Bay Lake Planning Steering Committee

Sponsored by: Deep Bay Association
Contact: Info@deepbayassociation.com

Deep Bay Community Watershed & Lake Management Plan

Front Cover: *The photograph on the front cover is a view of the Deep Bay. The image is intended to reflect that the document is about the entire Deep Bay Watershed, although the focus is on Deep Bay.*

This lake management plan is understood to be a living document that can be adapted in time.

About This Version

This is the latest draft version of the Deep Bay Watershed & Lake Management Plan.
It replaces any previous versions.
Supplementary maps and reports relating to the Plan will be released on an occasional basis. Please see www.deepbayassociation.com for more details. Comments on this document may be sent to Info@deepbayassociation.com
This document can be obtained in both print and web formats.
Web version available in PDF format at www.deepbayassociation.com

Deep Bay Watershed & Lake Management Plan

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LIST OF FIGURES (Proposed Figures – Note to Draft - in preparation)

ACRONYMS AND ABBREVIATIONS

CEWF Coalition for Equitable Water Flow
COSEWIC Committee on the Status of Endangered Wildlife in Canada
COSSARO Committee on the Status of Species at Risk in Ontario
DBA Deep Bay Association
DFO Department of Fisheries and Oceans (federal)
(aka Fisheries and Oceans Canada)
DOC Dissolved Organic Carbon
FOCA Federation of Ontario Cottagers' Associations

ha hectare (100 hectares = 1 square kilometer)
MOE Ministry of the Environment (Ontario)
MNR Ministry of Natural Resources (Ontario)
NHIC Natural Heritage Information Centre
OMB Ontario Municipal Board
PWQO Provincial Water Quality Objectives
SARA Species at Risk Act
TKN Total Kjeldahl Nitrogen
TOC Total Organic Carbon

Deep Bay Watershed & Lake Management Plan

1 INTRODUCTION

1.1 THE PURPOSE OF A WATERSHED & LAKE MANAGEMENT PLAN

The purpose of a Watershed & Lake Management Plan is to recognize and protect the unique character of a watershed and the body of water contained therein. Ways to ensure the long-term protection, maintenance and restoration of natural, social and physical features are recommended. Because most people tend to live around one or more lakes within a watershed, these plans are frequently referred to as "Lake Plans".
Lake Planning is a community-based process that considers the interests of all stakeholders within the watershed surrounding a particular lake. These stakeholders include shoreline owners and residents, commercial operators, private and crown land managers and lake users. The Deep Bay Watershed & Lake Management Plan will become an integral part of Carling Township's Official Plan.

1.2 THE DEEP BAY WATERSHED AREA

The Deep Bay watershed occupies a unique location on eastern Georgian Bay, Ontario. The uniqueness of Deep Bay is that it is connected to Georgian Bay through a narrow channel which is the only out flow. Deep Bay functions as both a bay and a lake.

In recent years water quality problems have emerged in bays along the Georgian Bay coast. Where isolation from Georgian Bay results in low natural flushing rates and limited water mixing, resulting in higher nutrient levels in the water, reduced water clarity, plankton blooms, and deep water oxygen depletion. These are classic symptoms of eutrophication and/or nutrient enrichment. Deep Bay because of its water shed and physical characteristics is susceptible to these types of water quality problems.

1.3 THE DEEP BAY WATERSHED & LAKE MANAGEMENT PLAN

The Deep Bay Watershed & Lake Management Plan (referred to as the Plan) describes a series of principles and targets that are important in order to ensure the health and sustainability of our watershed for future generations. The Plan provides a general description of Deep Bay and identifies the significant natural, physical and social characteristics that makes our bay and surrounding watershed a desirable place to live, work and visit. A key influence is the well established cottage owners community which brings with it a whole subculture and an array of aspirations and expectations.

(Some recommended actions could be presented to the Municipality of Carling Township with regards to enhancing land use policies and tools to protect the special features of the Deep Bay environment. The majority of recommended actions should be understood as for everyone to consider because they are focused on stewardship and education actions designed to protect the area's superb quality of life.)

1.4 WHAT THE PLAN IS NOT

Every effort has been made by the Deep Bay Steering Committee to ensure that this document is not a self-serving exercise to advance the special interests of any one party.

1.5 HOW THE PLAN WAS DEVELOPED

In the summer of 2009, the members of the Deep Bay Ratepayers Association endorsed a proposal from the DBA Executive to form a Steering Committee to develop a Lake Plan. Various existing Lake Plans in North America and the Lake Plan Handbook where sourced and reviewed to develop this Plan.
These inputs and the results from the DBA February 2011 survey formed the basis for the identification of key issues, options and possible solutions.

A further round of consultation then allowed the Steering Committee to confirm priorities and to build consensus around a series of recommend actions aimed at ensuring the long-term sustainability of the Deep Bay Watershed and Lake for future generations. These actions encompass concern for such things as improved water quality, wildlife habitat, recreational opportunities, and appropriate residential and commercial development.

A Draft Lake Plan was made available and efforts were made to distribute a copy to all property owners on Deep Bay as well as all stakeholders. The summary and complete versions of the Plan will also be posted on the website. Feedback was and will be encouraged. A preliminary presentation was made to Carling Township Municipal Council and more discussions are expected to be held with the municipal planning department. Council will be asked to review the Draft Lake Plan and will be asked for comments and support of their continuing interest in the lake planning process for Deep Bay. As a result of comments received during the consultations, a revised Draft will be released on submitted to the DBA for review.

A meeting was planned in conjunction with the DBA Annual General Meeting on 7 July 2012 which was open to members as well as non-members of the DBA. The Plan was presented and approval was requested to move forward to present the plan to Township of Carling in Fall 2012.

1.6 SPONSORS AND SUPPORTERS OF THE PLANNING PROCESS

The Deep Bay Watershed and Lakes Management Plan was sponsored by the Deep Bay Association, whose members provided the majority of funding and volunteer support. Significant in-kind support was provided by (*in progress*).
Mapping data was obtained free of charge from (*in progress*)…. We acknowledge their support with thanks. Additional cash contributions were provided by (*in progress*).

1.7 SOURCES OF PUBLISHED INFORMATION

A list of reference materials is provided at the end of this document. Many individuals, businesses, not-for-profit and government organizations have been as source of both encouragement and valuable information regarding one or more aspects of the Lake Planning exercise. They include;

- The Municipality of ((*in progress*).
- The Township of (*in progress*).
- The Ontario Ministry of (*in progress*).

The DBA Steering Committee appreciates and values ALL who have provided input.

1.8 THE LAKE PLAN IS JUST THE BEGINNING

Lake Planning is a *process* and so the production of a Deep Bay Watershed and Lake Management Plan is only the first step in an on-going community effort to maintain and enhance the natural, social and physical environment that is the Deep Bay experience.

1.8.1 Deep Bay Lake Planning Steering Committee

Committee Members of 2009 - 2012
Gary Bauer
Ed Casey
Roy Cronkright
Bernard Casey

1.9 DISCLAIMER

Note to Draft - Important - To be reviewed with legal advise…

(The maps and figures presented in this document are for reference purposes only. No representation is made or warranty given as to the accuracy or completeness of any content. The user assumes all risks of use. Neither the DBA Lake Planning Steering Committee nor the DBA assumes responsibility for any loss resulting from such use.)

2 VALUES, VISION & PRINCIPLES

2.1 COMMUNITY VALUES

The purpose of this Lake Plan is to identify, protect and improve the important natural, physical, and social values and characteristics of Deep Bay. The planning process and the execution of the Plan are designed to find common ground for the diversity of needs and interests that exist among those who have a stake in and an impact on the continuing health of Deep Bay. The Plan will also assist the various stakeholders, including but not limited to the appropriate levels of government such as the Township of Carling, in determining land use polices that will protect the special properties of the lake that attracted many of us to the Deep Bay in the first place. The Lake Plan is a cornerstone to protecting what we have, in common *value*. More than anything else, the vast majority of our community values the

preservation and maintenance of the natural environment. The 2011 Survey determined there was a strong consensus in regard to the things such as water quality and natural environment that people value. The qualities and activities that survey respondents were categorized as either very, or somewhat, or not important.

Figure 2.1 Ranking of Lake Quality Values – Overview of Results from 2011 Survey

Important Qualities: General Overview
- Water Quality
- Natural Shoreline
- Wildlife
- Tranquility
- Night Skies
- Scenery

Important Activities: General Overview

- Swimming
- Canoeing /Sailing
- Fishing
- Power Boating
- Hunting

2.2 VISION FOR THE FUTURE

Three questions influenced the development of the Lake Plan: (see appendix)

1. What will Deep Bay Lake look like many years from now?
2. What do we value sufficiently that we feel is worth protecting?
3. How can we ensure that future generations will be able to enjoy what we have today?

The answers to these questions from the 2011 Survey led to the following vision statement:

Our Community Envisions Deep Bay to be a place where:

The beauty of the landscape, the tranquility of the surroundings and the quality of the water are protected and preserved;
Precedence is given to activities that maintain the natural and social qualities of the lake that promote environmental sustainability;
Wildlife, fish and plant habitat are safeguarded;
The lake is a shared experience, where respect and dignity are shown to others and expected in return;
Our community balances the needs of those that desire tranquility and maintaining the wilderness quality with the needs of recreational users;
Public spaces are maintained for everyone to enjoy;
The community is actively involved in stewardship; and promotes education as a way to ensure respect for their neighbours and the law.

Figure 2.2.1 Vision Statement

"To identify, document and protect the unique and valuable character of Deep Bay and it's watershed for the benefit of current and future residents."

2.3 GUIDING PRINCIPLES

A set of guiding principles with key elements was prepared to focus the Lake Plan on several key values and start the process of making the Vision a reality.

Overview of Principles

The natural, social and historic character of the lake is to be protected, enhanced and, if necessary, rehabilitated. The Plan will focus on realistic actions to achieve results that reflect to the high priority issues. Implementation of the Plan will favour stewardship and educational approaches with voluntary compliance over legislation and regulation.

Overview of Key Elements

Water quality – That the water of the Deep Bay not contain contaminants in excess of the natural historic levels (i.e. the level of contaminants that would occur in nature prior to human habitation) nor in excess of current officially regulated standards;

Fish and wildlife – That Deep Bay supports a sustainable fish population including optimum habitat for natural reproduction and maintain stability in the bio-diversity of wildlife species and their habitat. That the further introduction of "invading species" be prevented;

Natural shorelines – That the protection and rehabilitation of the lake shoreline and creeks, that can be described as a "source of life" that supports a diverse range of fish and wildlife species, be promoted to increase the amount of natural shoreline;

Trees and vistas – That the natural vista from Deep Bay be maintained and that buildings and structures have a minimal impact on the natural appearance of the shoreline and on the views from the lake;

Economic and property development – That a cooperative working relationship exist between residential, recreational and commercial members of the community to ensure that proposed development and activities respect the environment and the character of Deep Bay and watershed, as well as maintain property values;

Historical, cultural and natural character – That the historical, cultural and natural character of Deep Bay and Watershed is recognized, protected and restored, where appropriate;

Social life – That a range of social and recreational activities are promoted consistent with the natural character of Deep Bay and Watershed, thereby preserving the health and ambience of Deep Bay, and fostering a sense of community.

2.4 PERSONAL AND COLLECTIVE ACCOUNTABILITIES

To protect the things we value and to achieve our vision, we all have important roles to play, both as individuals and as a community:

Residents and Cottagers have an obligation to protect the natural environment and demonstrate those community values which will help the community to realize its Vision;

Commercial Operators and Land Owners need to respect the environment and the desires of the community to ensure that any further commercial development, construction, and change to the environment is respectful of the communities' stated values and vision;

Government organizations need to listen to the community, respond to its needs and protect the environment as a public trust;

Recreational Users, Visitors, Landlords & Renters need to be aware of, and encouraged to act in accord with the values of the community; and finally

All of us need to be open to learning how best to be good stewards of the Deep Bay watershed and to be willing to coach, mentor and support our youth to be the future custodians of this natural resource.

3 LAKE DESCRIPTION

3.1 GENERAL LOCATION

Deep Bay empties into Georgian Bay via the only outflow, the narrows to Collins Bay to Parry Sound into Georgian Bay. It is estimated that over 60 million cubic meters of water flow through Deep Bay Lake annually (Michalski, 1996). The Deep Bay Watershed falls within the Georgian Bay UNESCO Biosphere Reserve.

3.2 DEEP BAY CHARACTERISTICS

Deep Bay is both deep and shallow with both warm and cold-water characteristics. Deep Bay is situated on the Canadian Shield, which is dominated by insoluble, pre-Cambrian granite. The size and shape of both the watershed and the lake and the flushing rate are also important parameters when characterizing this lake's water quality. Lakes with long residence times such as Deep Bay (flushing rate 0.19/year or turnover rate of 5.3 years - Michalski, 1996) have a higher potential to recycle nutrient inputs year after year while lakes with short residence times will flush nutrients faster than can be utilized.

Figure 3.1 Deep Bay Physical Parameters *(Note to Draft - To be reviewed for accuracy…)*

Deep Bay Surface Area	2.85 square km (285 ha)
Deep Bay Watershed area	26.76 square km (2676 ha)
Lake Volume ($m^3 \times 10^6$)	(60 $m^3 \times 10^6$) x 5.3) = …
Maximum depth (m)	18 m
Mean depth (m)	10 m
Flushing rate (times per year)	0.19…(Michalski 1996)
Turnover time (years)	5.3… (Michalski 1996)
Total Annual Outflow ($m^3 \times 10^6$)	60… (Michalski 1996)
Height above Mean Sea Level	176 m (577 feet)

Latitude and Longitude North 45 ° 24 ' West 80 ° 12 ' (ref MNR 1978 Bathymetric Chart)

Sources: M. Michalski Associates, 1996., K. Schiefer 2005., Eco. Survey of Eastern Georgian Bay Coast – MNR 2005

3.3 DEEP BAY WATERSHED

Deep Bay is an extension of the Big Sound of Parry Sound with a direct and navigable connection through Collins Bay. With this connection, water levels in Deep Bay are regulated by the water levels in Georgian Bay and Lake Huron. This has resulted in significant water level fluctuations in Deep Bay over the past decade.

Although Deep Bay can be technically viewed as a bay off Parry Sound, the long, narrow and shallow connection between Deep Bay and Collins Bay has the effect of restricting water exchange between Parry Sound and Deep Bay, resulting in Deep Bay having certain water chemistry and limnological features which more resemble an isolated lake than a connected bay. This is an important factor influencing water quality and aquatic ecosystems in Deep Bay.

The watershed of Deep Bay is illustrated in (Figure ---). Relative to the water surface area of Deep Bay, the total area of watershed is relatively small with no major tributaries. Several significant watershed features or observations include the following:

- The surface area of Deep Bay is approximately 2.8 square kilometers (285 ha).
- Total area of watershed draining into Deep Bay is approximately 26 square kilometers (2,600 ha);
- This relatively small watershed with no significant tributaries results in a low flushing rate for Deep Bay. This could mean that any nutrients, contaminants, etc. introduced into Deep Bay waters would tend to remain in this waterbody, as opposed to being rapidly flushed into Parry Sound and Georgian Bay. The flushing effect of waters passing through the Narrows has not yet been studied, and may have some impact on the flushing rate for Deep Bay.
- The watershed drains significant areas of wetlands, consisting of marshes and swamps. These can be a source of chemical nutrients from tributaries draining these wetlands into Deep Bay.
- The watershed also has a considerable amount of human activity. Access roads and a secondary highway provide accessibility to most of the watershed and much of the lakeshore of Deep Bay (see Figure ---). Lakeshore development in recent years has increased human activities on Deep Bay, especially in those areas with road access. This process in ongoing. Some agricultural activity also occurs in the watershed along Highway 559 and adjacent to Alves Bay. These activities could potentially all affect the water quality and aquatic ecosystems in Deep Bay.

Figure - Map 2 The Deep Bay Watershed – Ref - Schiefer Report of 2005
(see appendix)

Figure 3.4 – (see appendix) this is a bathymetric chart of Deep Bay from the files of the Ontario Ministry of Natural Resources. This version is a chart and is included here as a useful resource as reference. It was prepared in 1978 and has water depth contours intervals of 1 meter.
Maximum depths in Deep Bay achieve 14 to 16 m in the larger central and eastern basins and 18 meters in the smaller western basin of the Bay. The bays extending to the north and west are shallower, with depths generally under 8 m. The deeper basins are deep enough summer thermal stratification, as is discussed (see Section 7.0).

3.4 OWNERSHIP OVERVIEW

A detailed description of land ownership, zoning and land use within Deep Bay and Watershed is provided in Map (see Figure 3.3 appendix). Specific zoning information is also available from the Carling Township municipal office – see www.carlingtownship.ca

Almost the entire shoreline of the Deep Bay Lakes is either privately owned or crown land and is zoned for waterfront residential use; except the Inverlochy Properties (zoned commercial) and the original Alves farm area (agricultural use). There are a few areas designated as 'open space' or are under 'environmental protection'.

Much of the back-lot space around the Deep Bay Lakes is zoned 'rural' and is either privately owned or is crown land. The Provincial Hwy 559 and other roads cross the watershed area. A number of canoe routes, snowmobile, ski and hiking trails also pass through the area and may possibly provide a modest network of historic rights-of-way.

3.5 ACCESS

There is limited access to the Deep Bay & Watershed. Most access is by road and a number of people access their property by water; historically using water access from then original Alves Farm area, Inverlochy Resort area, Bayview subdivision area, and beyond the narrows. A boat launch and gas has also historically been available at Inverlochy.

There are no public beaches on Deep Bay, although there are ownership limited beach areas at Inverlochy and Bayview. Other beaches are private property.

Under the completed '911 project' all properties around the Deep Bay now should have a unique road name and number, or designation. A detailed road atlas is available from the District of Parry Sound in both print and on-line versions (see http://www.Parry Sound county.ca Maps and GIS page) and a printed map is available from tourist information locations.

3.6 WATER LEVELS

Although the seasonal variation of Deep Bay in recent years has generally been about 1 feet there can be considerable variation from year to year and so it is helpful to understand the typical high and low water levels for any given date, as well as the mean. A representation of this data is shown in Figure --- for the years since 1988.

Figure --- Historical Variation of Water Levels (Note to Draft - in preparation)

3.6.1 Fluctuating Water Level Issues

The key issues relating to water levels in the Deep Bay Lakes are inextricably linked with the broader issue of managing Georgian Bay and Lake Huron. As such, studies and developments within this larger water area are of particular significance to Deep Bay.

As reported in the Federation of Ontario Cottagers' Associations: (FOCA) Lake Stewardship Newsletter (Summer 2006), the management of lake levels alters the natural environment and can affect natural lake ecosystem functioning and system productivity. The manipulation of water levels can cause a variety of changes, such as water temperature, dissolved oxygen, and clarity; increased salinity, nutrient enrichment, and runoff; erosion and property damage; obstruct migration routes for some species; expand the range of invasive species; disturb spawning behavior and habitat; destroy diversity of habitats and species; and affect navigational waterways. Wetlands and natural shorelines are especially vulnerable.

The duration, frequency, and magnitude of water level changes are perhaps the most important factors that affect the health of any lake. High water levels can create flooded conditions and increase wave action along the shoreline which can cause erosion, loss of vegetation, and increased nutrient enrichment and mercury deposition, as well as other water quality changes. Extended periods of low water levels can expose sediments in the littoral (shallow) zone and change temperatures patterns throughout the lake, which will result in the loss of some optimal habitat and can create 'barren zone' shorelines for near-shore animal and plant life species at this low water mark of the lake.

A recognition of the negative impacts water-level fluctuations have on the environment, water safety, access and economy including their effect on property rights and values can be an important issue for Deep Bay residents and property owners if the water levels continue to drop.

Deep Bay Lakes has a number of rock shoals and other navigational hazards. None are officially marked with buoys, although a few have been marked by lake residents with a variety of objects such as plastic bottles.

Fluctuating water levels create water-access issues for some residents in order to operate and dock a boat. Docks sometimes need to be extended to provide suitable boat access.

3.7 Water Quality

Water quality when applied to fresh water lakes is subject to two basic processes, natural conditions, events and phenomena, and artificial or human induced conditions and events. Even without human intervention, lakes would exhibit widely varying water quality both statically and over time. There are many natural conditions that affect lake water quality such as: depth, surface area, lakeshore topography, rate of water exchange, size of watershed and age. Human induced conditions are easier to understand, they include pollution from habitation (septic systems), agriculture, industrial activity, mining, logging and boating to name a few. There is, of course, no

amount of human activity on or around a lake that doesn't negatively impact the water quality of that lake.

Generally speaking, when we assess water quality, we look at the physical characteristics (clarity, colour, odour, toxicity, feel and taste) and the underlying chemical and biological concentrations that can affect these characteristics. The standard concentrations and chemical analysis are: Total Phosphorus, dissolved organic solids, fecal Coliform and chlorophyll. Other analysis such as conductivity turbidity, pH and alkalinity are also used to assess quality. Dissolved oxygen at various depths is used to assess the ability of the lake to support different type of fish.
Even without any human impact, not all lakes would exhibit ideal, or even similar water quality. We must moderate our expectations of water quality in Deep Bay by understanding its underlying nature.

Over many decades, scientists studying lakes, have developed a classification system based on the concentration of nutrients (eutrophication) in the water. The key indicator used to classify the degree of eutrophication is the concentration of phosphorous. Phosphorous is an essential nutrient that enters the lake from rainfall, runoff over land and human activities. Phosphorous is not only non-toxic to aquatic live, its presence tends drive the growth of plants and microorganisms, which use up dissolved oxygen in the water and change its characteristics. The range of eutrophication is assessed by the total phosphorous concentration in micrograms-per-liter (ug/L) of the lake water.

The three tiers of eutrophication (trophic states) generally used are:

Oligotrophic (0 – 10 ug/L) – geologically young, deep, clear, cold lakes with very low nutrient concentrations and low biotic activity. The tend to have gravel or sand lakebeds. These lakes are high in dissolved oxygen and support deep water fish such as lake trout.
Mesotrophic – (10 – 20 ug/L) mature lakes, shallower, limited clarity, warmer with considerable biotic activity. Low dissolved oxygen, particularly in mid-summer, selects against trout in favour of shallow water fish such as pike, bass and perch. Trout can survive in deep water if there is sufficient dissolved oxygen.
Eutrophic – (more than 20 ug/L) old lakes, shallow, weedy , murky and warm with very high biotic life – very susceptible to algae blooms in summer.

Based on Phosphorous measurements over the past 8 years, Deep Bay is solidly in the Mesotrophic range. At several times in the past 8 years, Phosphorus measurements have exceeded the 20 ug/L threshold. The trend over this measurement period has been upwards from an average 11 ug/L to about 17 ug/L, although the last two years have seen a flattening in the trend. Dissolved oxygen tests done by Schiefer indicate that there is insufficient oxygen in the summer to support lake trout in Deep Bay.

A key unique characteristic of Deep Bay is its connection Parry Sound through the Narrows, which exhibits a bidirectional flow pattern and enforces water level fluctuations in concert with those of Georgian Bay. This feature undoubtedly has an impact on the water quality in Deep Bay, although it has not been quantified.
What is certain is that Deep Bay is challenged by eutrophication, a challenge that must be taken up by its residents..

3.7.1 Indicators of Water Quality

3.7.1.1 Water Clarity

Water clarity is a widely accepted indicator of lake trophic status, which measures the level of turbidity or water clarity using a Secchi disc (a 20 cm in diameter, black and white disc, which is lowered into the water by a rope marked in 1 m increments to determine the depth to which light penetrates the water column). The common assumption is that the deeper the Secchi disc is visible from the surface of the water, the clearer and more oligotrophic the lake. Clarity is affected by suspended physical particles (sediment) and biological particles (algae and bacteria). Physical particles can enter the water through natural or human caused soil erosion, waster discharge, or disturbance to an inflowing riverbed. Biological particles may enter the water through waste discharge (bacteria) or by proliferation of algae during warm summer months (algal blooms). High turbidity can increase water temperatures, reduce light levels for photosynthesis for plant growth, clog the breathing gills of fish and macro-invertebrates (benthic insects) and decrease habitat diversity.

3.7.1.3 Chlorophyll a

Chlorophyll a is the most common type of green pigment found in phytoplankton (photosynthetic microscopic algae which are the basis of the food chain on which all other life in the lakes depend). The amount of chlorophyll a in a lake sample is an estimate of the abundance of phytoplankton and/or biological activity in the water. Average summertime chlorophyll a concentrations < 3.5 µg/L indicates low algal (phytoplankton) densities or oligotrophic conditions.

With the potential support of MNR lake surveys, MOE data, and the Self Help Program chlorophyll a concentrations *µg/L* for Deep Bay could be studied in the future. Occasional periods of short-term pulses which increased concentrations during warm, calm periods in midsummer could provide valuable information to the stability of the water quality of Deep Bay.

Disregarding any occasional pulses or anomalies and having only observations based information we suspect that densities of suspended algae in Deep Bay could be considered as *semi-enriched* status. However with the increasing frequency of warm, drying summer conditions and intense rain events due to climatic changes and land use changes within this watershed experiencing nutrient enrichment may be a future potential consequence. As well, Deep Bay Lake has a low flushing rate of approx. *0.19 times* per year, which means that nutrients and pollutants are retained for longer periods of time increasing their hazardous impact potential for the ecosystem (MNR 1984). A chlorophyll a monitoring program through organizations such as the Lake Partner Program is recommended and encouraged.

3.7.1.4 TP (Total Phosphorus, Phosphate)

Phosphorus is a natural element found in rocks, soils and organic material (e.g., human and animal waste). It is also found in storm sewage and runoff as a byproduct of human created products and activities such as farm and industrial waste water, soaps and fertilizers. Under natural conditions in aquatic systems, phosphorus is a nutrient in limited supply, which enables natural control of the size of algae and plant populations in lakes. Elevated levels of phosphorus leads to increased aquatic plant growth, which may result in excessive algae production, and foaming, which decreases water clarity and reduces the amount of available dissolved oxygen to bottom waters and the amount of available habitat for aquatic life. Algal blooms can also harm aesthetic and recreational values of lakes. Total phosphorus (TP) is a

measure of the combined amounts of all sources of organic and inorganic forms of phosphorus.

Any form of land use that deviates from undeveloped 'forested land' will contribute more phosphorus to a water-body because clearing forests or shoreline vegetation reduces the lands ability to retain phosphorus. Phosphate-based detergents and fertilizers; improperly sited and maintained septic systems; agricultural drainage; storm-water runoff; waste water treatment effluent; animal waste; road de-icing products; and atmospheric deposition increase phosphorus levels in aquatic systems.

Although the available data indicates that Deep Bay has not been impacted by excessive phosphorus loading, programs and ideas should be considered to ensure that incremental phosphorus loading does not negatively impact the water quality of Deep Bay into the future.

3.7.1.5 Nitrogen (Ammonia and Nitrates)

Nitrate (NO_3) is the principal form of nitrogen in natural waters and results from the complete oxidation of other nitrogen compounds including Nitrites (NO_2) and ammonia (NH_3). Nitrate is absorbed directly into surface waters through atmospheric deposition, from surface water runoff, wastewater effluents and discharge, or through the seepage of groundwater to streams and lakes.
In well-oxygenated waters, nitrate is readily taken up by aquatic plants and algae and used for growth. Nitrite, nitrate and ammonia levels are analyzed to determine water quality conditions to protect aquatic life. Another test for nitrogen in water (Total Kjeldahl Nitrogen or TKN) measures the sum of ammonia plus organic nitrogen. If concentrations of nitrogen exceed 0.3 mgN/L in the spring, there is sufficient nitrogen to support summer algal blooms.

Note to Draft - Tests for ammonium (NH_4), nitrates (NO_3) and TKN are not known to have been performed on Deep Bay and should be considered in the future. It is suggested to control the concentration values for ammonium not to exceed the values of 0.02 mg/L.

Early life stages of aquatic animals are more sensitive to nitrate than are juvenile and adult animals. Larval stages of amphibians appear to be particularly sensitive to subtle effects from nitrate exposure. In most Canadian lakes and rivers, concentrations of nitrate are less than 4 mg/L liter of water. Higher levels, which may exceed the freshwater guideline of 13 mg/L, typically occur in waters near heavy urban or agricultural development. As nitrate concentrations in groundwater are most often higher than in surface waters, particular attention should be paid in areas where groundwater comes into contact with surface waters (i.e., up-welling in stream beds).

3.7.1.6 Dissolved Oxygen and Temperature Profiles

Most aquatic animals breathe oxygen that is dissolved into the water from the atmosphere or produced by photosynthetic activities of aquatic plants. A consistently high level of dissolved oxygen in the water is, therefore, critical to support aquatic life functions and is considered a prime indicator of overall water quality. Dissolved oxygen levels vary with water temperature and depth, flow velocity, shape of the lake, and the presence of aquatic

plants and animals. Studies have shown that fish require at least 5-6 mg/L of dissolved oxygen.

Humans can affect the amount of dissolved oxygen in water through the addition of oxygen-consuming organic wastes to the water, such as sewage and food wastes, nutrients and chemicals, and by altering flow regimes. If lakes lose oxygen faster than it can be replaced by photosynthesis and atmospheric exchange, the lake may become anoxic, without oxygen. When anoxia occurs, a chemical reaction takes place in bottom sediments, which releases sediment-bound phosphorus into the water column and perpetuates the cycle further. Oxygen levels are most critical for the protection of cold-water fish species like lake trout and a decrease in deepwater oxygen levels below 4 mg/L, therefore, reduces the availability of lake trout habitat. Temperature and dissolved oxygen are important limiting factors for determining lake trout habitat (MNR 1985).

Water temperature is also a fundamental biological determinant that regulates habitat selection by aquatic animals. Oxygen profiles are completed to determine if oxygen depletion is a factor, with respect to ecosystem health, and to assist in the management of cold-water species.

Thermal stratification occurs in lakes with a thermocline (sharp temperature gradient below the water surface) forming in June and persisting to the end of September at an approximate depth of 7 meters (MNR 1978-1993). In general, the location of the thermocline fluctuates with temporary or seasonal temperatures; during the summer months the thermocline tends to be deeper and during the spring freshet it may be closer to the surface or undetectable during turnover. Locating the thermocline will give an indication of the location of optimal (water temperatures < 10° C and > 6 mg/L of dissolved oxygen) habitat for cold-water species such as lake trout.

Fisheries managers in Ontario generally recognize that the most critical water quality condition for lake trout materialize in late summer where water temperature and dissolved oxygen combine to restrict that portion of the lake having suitable habitat for lake trout.

Average dissolved oxygen concentrations and temperature readings throughout the majority of the water column for Deep Bay need to be routinely recorded and analyzed into the future.

Note to Draft - Current testing by Deep Bay residents for a dissolved oxygen concentration in the bottom waters at approximately 18m for Deep Bay average at 4.0 mg/L or greater. Average concentrations from 8.5 to 12.0 mg/L are found throughout the remaining water column. This would translate to healthy dissolved oxygen levels and an adequate cold water environment to sustain lake trout. These are preliminary studies however and further data needs to be collected.

The Schiefer studies of 2005 suggested the dissolved oxygen concentrations for Deep Bay in the summer months were too low below 9 m thermocline to sustain lake trout (see study for details).

3.7.1.7 pH

Erosion of the lake basin's bedrock, leaching from surrounding soils, biological activity and atmospheric deposition are often the main source of chemical species which determine the pH of the water. For example, peat soils and granite rock promote acidic (low pH) conditions and limestone bedrock promotes alkaline (high pH) conditions. All plants and animals are adapted to a certain pH range, usually between 6.5 and 8.0. A change in pH outside the normal range of a water body will cause a loss of species depending on their sensitivity.

The PWQO states that pH should be maintained within the 6.5 to 8.5 range in order to protect aquatic life and recreational users from acidic or alkaline conditions (MOE 1994). The PWQO indicates that water with a pH of 6.5-7.5 is excellent, 5.5-6.5<8 (alkalinity) is good/fair, and 5.0-5.5, 8.8-9 (alkalinity) is poor.

Note to Draft - Based upon MOE sampling done in the 1979 Deep Bay had a pH average of 6.9. These pH values are on the neutral side. The pH readings for the Muskoka-Parry Sound Region averaged at 6.6 for 53 sampled lakes, ranging from 5.6 to 7.3 (Paterson et al., 2001).

3.7.1.8 Alkalinity

Alkalinity (carbonate-bicarbonate concentration) is a measure of the acid neutralizing (buffering) capacity of an aquatic system. Alkalinity can also be generated in soils, groundwater discharge and inputs from runoff. This is especially important during the spring in order to protect aquatic organisms in their primary stages of life against an influx of large amounts of acidic snowmelt and runoff from the adjacent watershed. Aquatic species that are very sensitive to acidification include bass (smallmouth and rock) and lake trout (DFO, Experimental Lakes Area, 2006).

Lakes on the Canadian Shield typically have low acid neutralizing capacities because of the insoluble granite-based bedrock. The soils on the Canadian Shield are typically shallow and acidic due to the organic composition of the area. The PWQO standard for alkalinity indicates that lakes with less than 10 mg/L may be susceptible to acidification, especially lakes with alkalinity levels below 2 mg/L. Therefore, if a lake has a high alkalinity level, it can resist pH changes caused by acid precipitation.

Note to Draft - Based upon MOE sampling done in the 1979 Deep Bay had an alkalinity average from 18 – 23 mg/L. The mean alkalinity levels for the Muskoka-Parry Sound Region is 6.2 mg/L, ranging from 0.4 to 23.0 mg/L (Ref. 3 2001). (MOE, 2004 and Paterson et al., 2001). The average alkalinity levels for Deep Bay was therefore at the high end of the range for the region indicating that Deep Bay is not as susceptible to acidification and less sensitive to acid rain and deposition of strong acids as compared to most of the lakes in the region.

Human-caused acidification of lakes can cause long-term alterations to algal and fish communities by changing their abundance, species composition and spatial distribution. Sensitive species such as bass and lake trout will probably not reproduce (Michalski 1996). As a lake acidifies (pH and alkalinity concentrations go down and sulphate and nitrates go up) cyanobacteria are replaced by filamentous green algae species in the littoral, benthic areas (near shoreline and lake bottom). It is believed that mats of floating clouds of algae, known as metaphyton, shift primary production in the littoral zone of lakes during summer months.

In 2004, notable algae blooms of suspected metaphyton algae, commonly known as 'cotton candy algae' were found on many shallow areas along the shoreline of Deep Bay. Other sources could have contributed these types of blooms as a side-effect of a changing landscape and climate, and invasive species. For example, a dry, warming climate increases the events of heavy rains, which create flash flood conditions washing nutrients into the lake and drought conditions reduce the volume of water in the lake, increasing the concentration of certain nutrients.

Metaphyton algae are not toxic, but are also not a favoured food resource because most grazers (zooplankton) have a hard time digesting filamentous algae; therefore, these algae species accumulate. Large mats, however, can over shadow substrate based vegetation, out-competing local species and changing the local community. These mats also become stagnant and make recreational swimming unpleasant. When pH falls below 6.0 and alkalinity concentrations are reduced metals and compounds such as aluminium, nitrates and sulphates are released into the water column and can become toxic to aquatic life if sufficient quantities are present. Nitrates in acid precipitation and runoff can accelerate the eutrophication process in unproductive lakes. Under low oxygen conditions, the chemical changes are intensified.

3.7.1.9 Carbon (Dissolved and Total Organic)

The natural world is carbon-based, and carbon affects all biogeochemical processes and nutrient cycling. Carbon is, therefore, an important water quality indicator since organic matter (both dissolved and particulate organic carbon) plays a major role in the ecology of aquatic systems. Carbon is measured as dissolved and/or total organic carbon (DOC and TOC), the measurement of the carbon dioxide released by chemical oxidation of the organic carbon in a water sample. It's what gives lakes a deep amber colour, which helps to limit the penetration of light down
the water column by absorbing ultra-violet radiation. In natural waters, DOC/TOC ranges from 1 to 30 mg/L with values less than 3 mg/L representing oligotrophic conditions.

Note to Draft - Deep Bay was tested for DOC (dissolved organic carbon - mg/L) in the Michalski Nielson Report of 7 Dec 2009. The results of this report indicated a sample range of 7.1 – 10.1 mg/L DOC taken in a 2002 study in Deep Bay. A testing program of samples should be considered in the future to provide further information on dissolved organic carbon values.

In general, both Parry Sound and Muskoka lakes have sustained trends over the past decade of increased concentrations of DOC from 4.3 to 4.8 mg/L, respectively (MNR 2001 and Patterson et al).

3.7.1.10 Conductivity

Conductivity is a measure of the quantity of dissolved substances in water. The major contributing ions are calcium (Ca), magnesium (Mg), sodium (Na), potassium (K), carbonate

(CO_3), sulphate (SO_4) and chloride (Cl). These ions are leached from rocks and soils in a stream's watershed and are also deposited from atmospheric precipitation or dust, surface runoff, and industrial waste. Some minerals, such as sodium and potassium are not toxic, high concentrations do strongly indicate possible contamination from more damaging compounds. Other metals and chemicals sampled, which also measure hardness and pollution, include silicon (Si), zinc (Zn), aluminium (Al), copper (Cu), nickel (Ni) and lead (Pb). Lakes with conductivity levels at <100 µS/cm (umhos/cm) are excellent.

In June 2006 conductivity levels for the 3 tributaries (incoming water) sampled of Deep Bay ranged between 25.0 and 28.0 µS/cm (umhos/cm), typical of "soft acidic and ground stained waters draining the granite shield". The conductivity levels for 5 of Deep Bay sampling locations ranged between 84.0 and 87.0 µS/cm (umhos/cm), showing a high degree of uniformity in Deep Bay. (Reference Schiefer Study) Averages for the Muskoka-Parry Sound Region were calculated during a 2001 study of 53 lakes; the mean was measured at 43.3 µS/cm (umhos/cm), with ranges between 22.2 and 87.0 (Ref. 3 2002).

Current conductivity measurements for Deep Bay has not been updated. Measurements of conductivity would be beneficial because increases in conductivity concentration would be a good indicator of landscape changes such as erosion of bedrock, sedimentation or pollution, and climate change. Routine measuring and trending of conductivity is therefore recommended.

3.7.2. Water Quality Conclusions

In general, water quality trends are influenced by watershed characteristics, (presence of wetlands), biological activity and changes in climate. Recent changes in global climate patterns and noticeable land use changes within the watershed have occurred. Long-term base data and continuous monitoring using standardized techniques is therefore recommended so that a long-term range health assessment is possible and the mechanisms contributing to lake changes can be identified to implement appropriate management options.

Protecting and conserving the natural systems that work together to maintain water quality can also be considered for responsible lake management decisions. While there is general agreement that the use of pesticides, herbicides and fertilizers needs to be reduced, there is a lack of consensus as to how to do this. A 'best practices' review of leading communities in Canada, the United States and Europe clearly indicated that only those communities that passed a bylaw and supported it with education had a high degree of success
Reference - (http://www.toolsofchange.com/English/CaseStudies/default.asp?ID=117).

3.7.3 Provincial Standards & Objectives for Deep Bay - Lakeshore Capacity Assessment

The Ministry of Environment ("MOE") is the governmental body responsible for water quality of inland lakes with in the Province of Ontario. For planning purposes, the MOE has developed a "Lakeshore Capacity Assessment" program for the purpose of determining the impact of development on the shoreline of an inland lake and to set targets for the maximum permissible development on a lake. Deep Bay is subject to this program and a Lakeshore Capacity Assessment has been done in connection with the Inverlochy project.

A Lakeshore Capacity Assessment uses a scientifically developed and peer reviewed model to do two things:

1. Create a baseline total phosphorous ("TP") concentration for the lake as it would have been prior to any human habitation or development on the lake.
2. Calculate the TP concentration added to this baseline by the current level of development on the lake.

The MOE sets a target maximum TP for any lake as 50% above the baseline. Any future development on the lake is subject to this maximum. In short, development is only permitted so long as the model predicts that such development will not push the TP level to more than 150% of the baseline level.

While the science behind the model is sound, and the goals and methodologies are relatively simple, there is a significant variation in output that can arise from the quality of the input. There is also a known problem with the model when it is applied to "Tea-Stained" lakes such as Deep Bay. The model has not been calibrated for this type of lake. In such cases, the MOE has discretion to permit development that does not fit within the "baseline plus 50%" criteria.

3.7.4 Model input characteristics of Deep Bay

Note to Draft - See Michalski Nielson Report of 7 Dec. 2009 and Carling Township Official Plan.

3.8 WATER QUALITY SURVEY of 2005 – DEEP BAY

The following section details the Dr Karl Schiefer Deep Bay Water Quality Study.

3.8.1 Water Quality Survey – Excerpts from Schiefer Report of 2005

In recent years, water quality problems have emerged in bays along the Georgian Bay coast where isolated from the main lake results in low natural flushing rates of water mixing. Similar problems are being seen in other shield lakes where high rates of lakeshore development over the past four to six decades are resulting in higher nutrient levels in the water, reducing the water clarity, plankton blooms, and deep water oxygen depletion.

A large plankton (algae) bloom occurred on Deep Bay in 2004, reducing water clarity and imparting a distinctive green colour to the water for much of the summer. This caused a high level of concern among property owners on Deep Bay. Some preliminary water quality sampling an August of 2004 showed that several water quality indicators provided cause for concern. The water quality survey in June and September is in response to that concern (ref: Schaeffer report of 2005).

3.8.2 Survey Objectives

The objectives of this water quality survey on Deep Bay in 2005 included the following:

- To determine the present condition of water quality in Deep Bay, especially as this relates to eutrophication (nutrient enrichment) processes;
- To identify any high impact areas or "hot spots", for higher intensity monitoring and/or remedial action;
- To establish a long-term water quality database to ensure future protection of natural water quality in Deep Bay;
- To foster a sense of stewardship and commitment to protecting water quality and aquatic ecosystems within the community through education and sharing; and
- To provide the type of technical information required for input to future land and water use planning in the Township, and provincially, to preserve valued aquatic resources and ecosystems in Deep Bay.

3.8.3 Deep Bay Water Conductivity

Water conductivity measurements, which are directly related to the levels of total dissolved solids (TDS) and minerals in the water, provide a good chemistry "marker" which illustrates the complex hydrology and water mixing patterns which occur in this area. Broad-scale sampling along the Georgian Bay coast illustrates the water chemistry gradients which occur within these channel and island complexes, ranging from water chemistry typical of open Georgian Bay around the outer islands (high conductivity or "harder" water) to water chemistry more typical of granite bedrock runoff around the interior channels, islands, and isolated bays such as Deep Bay (low conductivity or "softer" water)-(Schiefer, 2003). This high variability of water chemistry relates to the hydrology and mixing patterns characteristic of this complex coastal area affects many other aspects of water quality and aquatic ecosystems. It also illustrates the problem of concentrating intensive human activities in isolated bays with poor water circulation, based on the fallacy that all Great Lakes coastal areas have good water mixing and dilution potential.

Water conductivity measurements taken in Deep Bay in June of 2005 (ref: Schaeffer report of 2005). Three tributaries sampled had conductivity of 25, 26 µS/cm and 28 µS/cm, typical of the "soft", acidic and brown-stained waters draining the granite shield. Granite bedrock weathers very slowly, resulting in very little in the way of dissolved minerals in the waters flowing over it. Water conductivity in the five Deep Bay sampling locations ranged from 84 to 87 µS/cm, showing a high degree of uniformity throughout the bay. This implies a good degree of mixing within the bay. By comparison, water conductivity in Collins Bay was 128 µS/cm showing the influence of "harder" water from Georgian Bay.

As noted above, Great Lakes water is harder, with higher conductivity, because of the more soluble limestone bedrock on its western shores. Even Collins Bay is below the more typical conductivity of 190 to 195 µS/cm for Georgian Bay, showing the influence of dilution from granite bedrock runoff. These conductivity measurements illustrate that water mixing between Deep Bay and Georgian Bay is limited by the long, narrow and shallow connection between these two waterbodies. Conductivity measurements are thus useful as indicators of water mixing patterns, but have no effect on assessing whether water quality is good or bad.

3.8.4 Deep Bay Water Clarity

Water clarity is one of the most obvious and easy to measure indicators of water quality. Generally clearer water is considered to be of higher quality than turbid, or less-clear water. This is an aesthetic parameter of water quality. However, water clarity is also a good indicator of the degree of nutrient enrichment of lake waters, since higher levels will trigger plankton (or algae) blooms which reduce water clarity. In August of 2004, Deep Bay experienced major and extended plankton blooms which reduced water clarity and imparted a distinctive green colour to the water. High densities of algae were observed in the surface waters. Secchi disc measurements at that time indicated water clarity ranging from 1.8 to 2.1 m throughout Deep Bay, compared to 5.3 m in adjacent Collins Bay on the same date. Collins Bay water was clear and blue when compared to Deep Bay.

In 2005, Secchi disc measurements ranging from 2.4 to 2.7 m on June 9th and from 3.2 to 3.6 on September 6th. The June sampling had considerable algae in the water, giving it a noticeable green colour. With surface phosphorus levels in Deep Bay averaging 14 µg/L during the June sampling period, this early abundance of algae in the surface waters provided cause for concern that a larger plankton bloom would again develop by mid to late summer, as occurred in 2004. However, this did not occur in 2005. By early September, algae abundance was reduced, resulting in the improvement in water clarity to the 3.2 to 3.6 m observed. The average surface water phosphorus level during the September sampling period was 17 14 µg/L, higher than the 14 µg/L in June but apparently not high enough to trigger large late summer plankton blooms under the limnological and water conditions which existed at that time. Plankton blooms are directly correlated with higher phosphorus levels; however, the ability to accurately predict the occurrence, timing and magnitude of a plankton bloom is poor at best, due to the complex interrelationships between nutrient levels and synergy, water temperature, weather conditions and other limnological variables.

3.8.5 Deep Bay Phosphorus

Total phosphorus is generally used as the best chemical indicator of elevated nutrient levels and progressing to eutrophication. As phosphorus levels increased, algal blooms become more abundant, reducing water clarity and deep dissolved oxygen levels.

As a general guideline, phosphorus levels of 3 to 5 µg/L are considered typical of offshore Georgian Bay waters, increasing to 5 to 9 µg/L in near-shore waters (Schiefer, 2005). Levels of 10 to 15 µg/L are showing symptoms of enrichment, levels of 16 to 20 µg/L are significant concern, and levels over 20 are becoming severe.

Table 6.1 shows the total phosphorus measurements from Deep Bay for June 9th and September 6th, 2005. Figure 4.1 shows the locations for phosphorus sampling and the average value for the two sampling dates all lake locations. Turbidity sampling was carried out in June. The following observations can be made:

- Total phosphorus levels in the three tributaries sampled in June were 9, 20 and 64 µg/L. High phosphorus levels can be expected in tributaries draining large areas of wetland, such as swamps and marshes found in the Deep Bay watershed. Although some of the phosphorus levels were high, the flow volumes in these tributaries were quite low in June, limiting the total loadings of phosphorus from this source to Deep Bay.
- Average surface water phosphorus levels ranged from 11 to 16 µg/L over the four samplings with a high of 25 µg/L in Inverlochy Bay. By comparison, the total phosphorus level in surface waters in Collins Bay was 4 µg/L, more typical of natural Georgian Bay values. Phosphorus analysis was carried out by the Ontario Ministry of the Environment, as part of the Lake Partner Program in Deep Bay, yielded phosphorus levels ranging from 10 to 19 µg/L over the May to August period in 2005. The average level 14 µg/L. There was a very high level of agreement in the results of these two independent sampling programs.
- Phosphorus was also measured in deepwater samples collected at 14 m, well below the thermocline, in 2005. Total phosphorus was 19 µg/L in the larger central basin and 37 µg/L in the smaller but deeper western basin. These values indicate that phosphorus cycling from the sediments is occurring during the late summer, likely cue to oxygen depletion in these deeper (hypolimnetic) waters. This is discussed further in Section 7.0. These deepwater phosphorus levels are not yet extreme but could worsen in future years if the eutrophication process continues. When and if this deepwater phosphorus becomes mixed with warmer surface eaters, it can trigger massive plankton blooms, including blue-green algae.

To provide a longer term perspective for phosphorus trends in Deep Bay, the Lake Partner program provided the following results for the prior seven-year period: 1997-12 µg/L, 1998-11 µg/L, 1999-12 µg/L, 2000-12 µg/L, 2001-16 µg/L, 2002-16 µg/L, 2003-17 µg/L. As you can see, the average phosphorus levels for the four years prior to 2001 was 12; the average for the three-year period 2001 to 2003 was 16. This is a significant increase and likely a contributing factor to the large plankton blooms which occurred in 2004.

3.8.6 Deep Bay Water Temperature and Dissolved Oxygen Profiles

Deep Bay has at least two deeper basins which thermally stratify during the summer Water temperature and dissolved oxygen were measured at 1-m depth intervals in the central basin and the western basin on June 9 and September 6, 2005.Figures within the Schaeffer study shows the temperature and dissolved oxygen profiles for these two dates in each basin.

On June 9, 2005, a thermocline was evident at both locations at the 3 to 5 m depth, with surface water temperatures from 22 to 25 C and deeper waters below the thermocline ranging from 8 to 12 C. Within he thermocline, water temperatures dropped rapidly from 22 to 12 C. Dissolved oxygen levels were good, above 6 mg/L (or parts-per-million, "ppm") in the entire water column except for the 1 m zone immediately above the lake sediments.

By September 6, 2005, the thermocline had moved deeper to the 7 to 9 m depth in each basin. Deeper waters below the thermocline remained at 8 to 10 C while surface waters were at 21 to 23 C. Dissolved oxygen levels dropped rapidly through the thermocline and were below 1 ppm from the thermocline to the lake bottom. This anoxic condition would preclude the survival of any coldwater fish species below the thermocline.

One of the other problems with anoxia in the deep waters below the thermocline (hypolimnion) is the release of phosphorus from deep organic lake sediments. This occurs because of the presence and action of anaerobic bacteria in the sediments and the absence of oxygen. As discussed in the Schaeffer report, this accounts for the higher phosphorus levels measured in these deep waters in September of 2005.

3.8.7 Deep Bay Sonar Reconnaissance

The coldwater fish community provides an excellent bioindicator of the trophic status for temperature climate lakes. The health (population dynamics) and seasonal distribution patterns of these coldwater fish species directly reflect the temperature and dissolved oxygen conditions in deeper lake basins, since these species require cold, clear and well-oxygenated waters to survive and prosper. As lakes become more eutrophic (nutrient enriched), these species are the first to discover as deeper waters become deoxygenated. In the deep waters of Parry Sound, the coldwater fish community is comprised primarily of cisco (lake herring), whitefish and lake trout.
The Schiefer report provides a high sensitivity sonar chart recordings of transects taken through the deep western basin of Deep Bay on June 9 and September 6, 2005. To help interpret the distribution pattern of coldwater fish species recorded by the sonar, the corresponding temperature and dissolved oxygen profiles are provided beside the sonar chart.

The grey and black scatter-band at the top of the chart, from 0 to 6 feet (2 m), is caused by plankton in these surface waters. The black line with grey below it along the bottom

of the chart is the lake bottom, in this case ranging from 50 to 60 feet (16 to 18 m). The black arches seen on the June chart denote fish, the larger fish creating a larger arch and the smaller fish a smaller arch or hook mark.

In June, the thermocline was at 3 to 5 m depth (10 to 16 feet). This is indicated by the yellow band where the water temperatures (red line) drop from 22 to 10 C. Below this, the colder water, at 8 to 10 C, extended from the thermocline to the bottom. Oxygen levels in this deep coldwater zone were high, above 6 mg/L (blue line). As a result, there were significant numbers of fish recorded on the sonar in this high quality habitat.

By September, the thermocline had been pushed down to a7 to 9 m and dissolved oxygen levels below the thermocline were reduced to near zero (blue line). \no fish were recorded in or below the thermocline. This is almost certainly due to the severely depressed oxygen levels in these deeper basins by late summer.

There is a further interesting observation on the sonar chart in September. The grey stippled area shown below the thermocline is recording small gas bubbles suspended in the water column. Water samples collected from this deepwater zone confirmed that this was hydrogen sulphide (H2S), which imparts a strong sulphur smell to the water. The presence of hydrogen sulphide gas baffles in these deep anoxic waters is a further indicator of anaerobic bacterial activity in the deep sediments. It is this process which also releases phosphorus from the sediments.

3.8.8 Deep Bay Survey 2005 - Discussion

The water quality study carried out in the summer of 2005 provided two broad, general observations. First, that the surface water quality remains generally good in Deep Bay and, second, that the process of eutrophication (nutrient enrichment) is evident and likely increasing in this waterbody. The symptoms of this include:

- Reduction in water clarity due to plankton blooms;
- Elevated phosphorus levels in surface waters;
- Deoxygenation of the water column below the thermocline by late summer;
- An absence of coldwater fish below the thermocline in late summer;
- High phosphorus levels in the deepwater basins, indicating that anaerobic processes in the sediments are releasing nutrients to the water above them;
- The presence of hydrogen sulphide gas bubbles in the deeper water, also related to anaerobic decomposition in the sediments; and
- The occurrence of major and prolonged plankton (algae) blooms throughout Deep Bay as was seen in August of 2004.

Deep Bay is particularly sensitive to eutrophication for the same reasons that Sturgeon Bay and other isolated embayments off of Georgian Bay have encountered water quality problems. This relates to the following:

- A long, narrow and shallow connection between Deep Bay and the much larger water mass of Parry Sound, limited water exchange and mixing between the two;
- A small watershed with only a few small tributaries, resulting in a low flushing rate of Deep Bay Waters. As a result, any nutrients or other materials introduced to Deep Bay waters will tend to remain in Deep Bay;
- Extensive areas of swamp and marsh in the watershed, which can be a source of nutrients draining into Deep Bay;
- An extensive road network surrounding Deep Bay, providing access for altering land use within the watershed;
- A relatively high presence of human activity in the watershed, including agriculture and lakeshore development;
- Mounting evidence that septic systems placed on granite bedrock and shallow soils close to the water (less than 200 ft or 70 m) do not prevent nutrients from leaching into the lake.

Because of these factors, special consideration needs to be provided for all land use planning around Deep Bay and within its small watershed.

The dense plankton blooms which persisted for most of the summer of 2004 did not recur to the same extent in 2005. However, water quality conditions which would support such events in the future remain in Deep Bay. Increasing phosphorus levels almost always result in an increased biomass (abundance) of algae in the surface waters of lakes. The ability to accurately predict the occurrence, timing or severity of algae blooms, including blue-green algae, remains poor because of the complex interactions of other and related factors such as weather, water temperatures, currents, winds, etc. Nevertheless, should eutrophication processes continue to worsen in Deep Bay, the symptoms listed above can be expected to increase in magnitude and frequency.

4 NATURAL HERITAGE FEATURES

This section examines the natural heritage features of the Deep Bay watershed in order to identify them for present and new land development and resource management purposes. Vegetation, wetlands, streams, fish and wildlife, invasive species and species at risk are discussed in this section.

4.1 VEGETATION (Reference Michalski 1996.)

The Deep Bay Watershed is located within the Parry Sound region and is part of Georgian Bay. The vast majority of this area is forested and non-agriculture mainly because of the rock outcrop and associated shallow soils, rough topography, stones and wetlands. The forests are in a transitional zone between the southern deciduous forest and the northern coniferous boreal forest of Ontario. The species are tolerant hardwood, containing a number of boreal influences. Historically logging was a dominant industry in the past, with the last major clear cut occurring 60 to 100 years ago.

The area was logged extensively for Eastern White Pine in the late 1800's and extensive lakeshore development commenced in the Parry Sound region in the late 1940s. The landscape is speckled with tree and shrub species tolerant to extreme conditions, such as fluctuating rain events and nutrient-poor or acidic soils. The riparian, shoreline and other wetland areas support hardwood and mixed (conifer hardwood) forests whose canopies typically include red maple, balsam poplar, black ash, eastern white cedar, black spruce, tamarack and speckled alder. In the dryer, well-drained upland sites species, the forest canopies typically include sugar maple, white and red pine, jack pine, white birch, American basswood, white spruce, trembling and large-toothed aspen, red oak and American beech.

The exposed bedrock outcrops along the shoreline support characteristic associations, typical of the Georgian Bay shoreline, consisting of grasses, ferns and shrubs (poverty grass, common juniper, bearberry, bush-honeysuckle, blueberry, bracken fern, and sweet fern) (Michalski 1996). Terrestrial and aquatic vegetation found in the water, along the shoreline, and on the uplands adjacent to a lake is important for maintaining the health of a lake system. Plants provide shade in the littoral zone, which decrease water temperatures; filter runoff from the landscape; prevent shoreline erosion; provide food and shelter for fish and wildlife; and increase the beauty of the surrounding landscape.

The lakes' shorelines contain three distinct vegetated zones – littoral, riparian and upland – each with its own characteristic communities of organisms. Although each of these zones contributes separate functions to the health of the lake, it should be noted that the shoreline is a natural progression of each zone, seamlessly transitioning into the next. Therefore, alteration of any zone affects the entire shoreline by diminishing the shore's ability to support life on the lake.

4.1.1 Littoral Zone

The littoral zone extends out from the shoreline into the lake towards a point where sunlight is no longer capable of penetrating the water column down to the lakebed (bottom). It is a highly productive transitional zone between terrestrial and aquatic ecosystems. Various submergent and floating aquatic wetland plants, such as duckweed, arrowhead, pickerel-weed, bulrush, cattail, water milfoil, water lily, pondweed, horsetail, sedges and grasses, grow within littoral zones as similar to Deep Bay pertaining to small bay and shoreline wetland areas (ref; Michalski, 1996).

Aquatic plants are the lungs of the lake and capture nutrients, sediments and toxins from the terrestrial and atmospheric component of the watershed. Plants, rocks, branches and logs scattered along the shoreline provide in-lake shade and cover for fish, food for wildlife, and habitat for algae and animals to adhere to. Many plants and animals such as frogs, turtles, fish, and numerous insects fulfill important portions of or their entire life-cycles within this zone.

4.1.2 Benthic (Lake Bottom) Community

Aquatic macro-invertebrates or large insects, such as mayfly, stonefly, caddis fly, damselfly and dragonfly nymphs, are a great food source for fish and wildlife and are also good indicators of water quality. These insects require cold, well-oxygenated water to survive. If

water oxygenation reduces, these species will disappear from the population and be replaced by more tolerant species, such as worms, leeches and snails. These insects make-up a small part of the benthic community found in the substrate and water column of the littoral zone. A rich diversity of habitat and food sources provides for the abundance of fish and wildlife in a lake.

4.1.3 Riparian Zone

The combination of trees, shrubs and herbaceous plants in lowland speckled alderwillow-dogwood thickets, wet grass-bulrush meadows, cattail marshes and leatherleaf-sweet gale shore fens along the natural shoreline makes up the riparian zone of the lake, which is designated by a minimal to 30 meter set-back (Michalski, 1996). The riparian zone is an exceptionally important portion of transitional land between the lake, river, stream, floodplain or wetland and the upland ecosystems.

The typical vegetation of the riparian zone of Deep Bay shoreline includes a mixed forest of deciduous and coniferous tree and shrub species such as eastern hemlock, eastern cedar, white birch, poplar/aspen, speckled alder and other upland species tolerant to shade and/or wet soil conditions. The complex web of tree roots and foliage help to control erosion from fluctuating water levels, wakes and heavy rains and winds, as well as filter toxins, capture sediment and buffer surface runoff. The riparian vegetation provides shelter and food for wildlife, and important corridors to move between core habitats such as deer yards. Leaf litter also helps to maintain the nutrient cycles and provide micro-habitats in the littoral zone.

There is a significant relationship between good water quality and habitat availability and the density of shoreline vegetation in the riparian zone. Water quality is maintained, which enable the aquatic systems to support life and life cycles, when riparian vegetation remains intact. Maintenance of well vegetated buffers between septic fields and the lake will mitigate nutrient inputs, although most will eventually reach the lake via ground water or leaching (MNR, 1991).

4.1.4 Upland Zone

The upland zone is the periphery of a lake's riparian zone. It is an area typically forested with trees and slopes having well-drained soils in comparison to those found in the riparian or lowland areas. The tolerance level of each species to varied environmental factors (soil type, bedrock and topography, depth of water table, precipitation and shade) determines the species composition of the upland zone. Upland and riparian trees filter an estimated 90 % of run-off from winter snow and rains before it enters the lake. Protecting this buffer ensures that silt and sediments from shoreline development do not reach the lake.

The areas of deeper, well-drained soil support highly productive stands of Sugar Maple commonly mixed with a variety of other hardwoods and conifers. While common hardwoods cover the hilltop and side hill areas in the upland zone of the lakes, conifers are predominantly found in low lying areas and along shorelines.
While 70% of the forests in the Deep Bay Lake watershed are hardwood dominated, only 30 % feature conifers prominently. This ratio is reversed along the shorelines of Deep Bay Lake due to the dominance of conifers in shoreline areas.

Many tree species typical to Georgian Bay are growing in the forests surrounding Deep Bay. This natural variety is supported by the range of landforms. Removal of vegetation creates conditions favourable for the introduction of hardy ('weeds') invasive species. The shorelines of Deep Bay are typical of many lakes on the shield and within MNR site-district 5E-9, with shallow till and rock ridges of varying heights dominating the landscape (MOE, 1988).

The lake has irregular shorelines, and plentiful shallow water for aquatic plant production. Steep, vertical rock cliffs reaching heights of 196 meters above sea level, or 20 meters above the lake level, are found along the shorelines of Deep Bay, especially along the southern half of the lake near the outflow to Deep Bay. Moderately, sloping treed shoreline ridges dominate Deep Bay. The lake has exposed rocky shoreline outcrops, largely of granite-origin, and pockets of small wetlands in sheltered bay areas and natural, sandy beaches, remnants of glacial outwash, scattered throughout the periphery of the lake.

Note to Draft - Trees, Shrubs and Herbs Common to the Watershed in the Parry Sound District (Unconfirmed References for review…)

The following Trees, Shrubs and Herbs are a reference source for future study of the Deep Bay Watershed:

Red or Soft Maple Acer rubrum
Sugar or Hard Maple Acer saccharum
Mountain Maple Acer spicatum --
Yellow or Golden Birch Betula alleghanensis
Paper Birch Betula papyrifera --
American Beech Fagus grandifolia
Black or Swamp Ash Fraxinus nigra
White Ash Fraxinus americana
Northern Red Oak Quercus rubra
Eastern Hemlock Tsuga canadensis
Balsam Fir Abies balsamea
Tamarack or Larch Larix laricina >
White Spruce Picea glauca
Black or Swamp Spruce Picea mariana
Red Spruce Picea rubra
Eastern White Pine Pinus strobus
Red Pine Pinus resinosa >
Balsam Poplar Populus balsamifera
Ironwood Ostrya virginiana
Large-tooth Aspen Populus grandifolia
Trembling Aspen Populus tremuloides
Black Cherry Prunus serotina
Eastern White Cedar Thuja occidentalis >
Basswood or American Linden Tilia americana
White Elm Ulmus americana >
Striped Maple Acer pennsylvanicum --
American Fly-honeysuckle Lonicera canadensis --
Partridge-berry Mitchella repens --
Bunchberry Cornus Canadensis --
Leatherleaf Chamaedaphne calyculata --
Beaked Hazelnut Corylus cornuta --

Hobblebush Viburnum alnifolium --
Wood Sorrel Oxalis Montana --
Sensitive Fern Onoclea sensibilis --
Wild-lily-of-the-valley Maianthemum canadense --
Wild Sarsaparilla Aralia nudicaulis --
Northern Starflower Trientalis borealis --
Spotted Jewelweed Impatiens capensis --
Goldthread Coptis trifolia --
Rose Twisted-stalk Streptopus roseus --
Marsh St. John's Wort Triadenum fraseri --
Grandular Wood Fern Dryopteris intermedia --
Shining Clubmoss Lycopodium lucidulum --

Source: Ecological Review of Eastern Georgian Bay Study MNR 2005

4.2 WETLANDS

Wetlands are land types such as areas of shallow open water, swamps, marshes, fens and bogs, including peat lands. They occur intermittently across the landscape along lakes, rivers and streams, or in any area where the ground water table is close to the surface. Deep Bay has significant wetland areas present. Wetlands provide important habitats to a variety of species, act as sponges holding large quantities of water (releasing water slowly to prevent erosion and flooding and to allow time for water purification), and act like giant filters. Typical threats to wetlands include development; draining, dredging and filling to create fertile land; peat harvesting; non-native, invasive species; climate change; and air and water pollution. All these special features and functions result in substantial ecological, social and economic benefits, and opportunities for the local residents including fishing, boating, other recreational activities, wildlife viewing, and an overall appreciation for nature. The protection of wetlands is therefore a crucial component of watershed health.

According to the 2005 Provincial Policy Statement (PPS), all municipal official plans must protect natural features and areas for the long term; therefore, development and site alterations shall not be permitted in significant wetlands on or off the Canadian Shield (p. 15). The PPS provided policy direction on matters of provincial interest related to land use planning and development. Development and site alteration may be permitted on adjacent lands (120 m from the wetland boundary) provided that an Environmental Impact Assessment demonstrates no negative impact on the natural features or their ecological functions. However, the PPS does not provide similar protection for regionally or local significant wetlands, and this should be considered in the municipal official plan and zoning by-law.

4.2.1 MNR's Wetland Evaluation System – Provincially Significant Wetlands

The wetland evaluation system is based upon scientific criteria and was primarily designed to serve the needs of Ontario's planning process. The evaluation system recognizes the critical role of wetlands in maintaining healthy ecosystems. The system identifies and inventories the biophysical features or values of a wetland, and provides a way of rating wetlands relative to one another using a point system that quantifies these wetland values. The Ontario Wetland Evaluation System identifies four wetland types: marsh, swamp, fen and bog.

Deep Bay is on the Precambrian/Canadian Shield and MNR Site Region 5E, 6E and 7E and is within the guideline stipulated within the Northern Manual—Ontario Wetland Evaluation System.

In total an estimated 15 environmentally protected areas can be found in the Deep Bay watershed. This number does not include small ponds, which may include in the wetland category if they are greater than 0.5 ha in size.

Note to Draft - Wetland are significant in the Deep Bay watershed. Wetland designation of the watershed area should be reviewed.

MNR considers protection of all local wetlands to be important as they are vital to the health of a lake. Specific initiatives in Carling Township have been considered to ensure that provincial and local zoning bylaws are enforced to ensure wetland protection

4.2.1.1 Marshes

Marshes are wet areas of standing or flowing water found along shorelines and inlets of lakes, rivers and ponds, and are frequently interspersed with channels or pools of deep or shallow open water (Environment Parry Sound, 2004; MNR WET, 1994). Marshes may be bordered by a peripheral band of trees and shrubs, but the predominant vegetation consists of a variety of emergent, non-woody plants, including cattails, reeds, grasses, sedges and rushes. Water remains within the rooting zone of these plants for most of the growing season; marshes are the most productive wetland habitat. A band of low shrubs, such as sweetgale, red osier, leatherleaf and winterberry, may also occur in marshes along the shoreline. These plants are excellent shoreline buffers to trap surface nutrient and pollutant runoff, provide stability against erosion, and a hedge row against geese habituation (source). Maintaining these shoreline buffers is the best quick-fix for protecting water quality and habitat conditions. Within the open water areas, floating or submerged plants dominate, such as water milfoil (Myriophyllum species), waterweed (Elodea species), pondweeds (Potamogeton species), water lilies (Nymphaea and Nuphar species), water plantain (*Alisma plantago-aquatica*) and broad-leaved arrowhead (*Sagittaria latifolia*). These plants provide excellent fish nursery and rearing habitats, turtle nesting sites, and moose feeding grounds.

4.2.1.2 Swamps

Swamps are wooded wetlands and may be isolated or found along rivers, streams and lakes. The soil is usually saturated due to fluctuating water levels in spring; especially after the snow melt and rain events have flooded the area. The substrate will usually remain waterlogged, but in some areas soils may dry due to the dryer conditions of late summer or a receding water table. Swamps are often nutrient rich and productive. By definition, swamps have a 25% or more cover of trees and tall shrubs, which distinguish it from a marsh. The vegetation is composed of predominantly coniferous trees – black spruce and tamarack, as well as deciduous trees – black ash and silver maple, and tall shrub thickets, commonly speckled alder, herbs and mosses.

4.2.1.3 Bogs

Bogs are hummocky wetlands commonly found in northern parts of Ontario, north of the Canadian Shield, and are peat covered areas with a high water table and a general lack of nutrients. Bogs rely solely on atmospheric deposition for its nutrient and moisture supply; therefore, as a result, bogs usually have low biological diversity (often having less than 12 different plant species), and the surface water and underlying peat are strongly acidic and "nutrient-poor" (deficient in mineral soils). Due to poor drainage and the decay of plant material the surface water of bogs is strongly acidic. Bogs are characterized by Sphagnum mosses, ericaceous (heath) shrub species, such as bog laurel (*Kalimia polifolia*), sheep laurel (*Kalmia angustifolia*), bilberry (*Vaccinum myrtilloides*) and swamp blueberry (*Vaccinium corymbosum*), and cotton grasses and sedges, which are tolerant of acidic soils and low nutrients; "acidloving plants". Bogs may also support trees, but never exceeding 25% of the total area; black spruce often dominates the upper or crown vegetation of some older peat bogs as well as Tamarack , but only in small numbers and, usually, only along the periphery of the bog. Bogs are generally extremely rare in southern Ontario.

4.2.1.4 Fens

Fens are characterized by a high water table with slow or restricted internal drainage by seepage down low gradients. Fens are characterized by surface layers of peat with varying degrees of decomposition. The water and peat found in fens are less acidic than in bogs, and often are relatively nutrient rich since they receive water through cold, groundwater discharge from adjacent uplands. Their surface waters can be acidic or alkaline. Water slowly flows in and out of these wetlands to a point where they may dry-up completely under drought conditions. Fens are more nutrient rich than bogs and therefore more commonly support trees. Fens are dominated by sedges and some shrubs. Like bogs, they are more commonly found in the north. Several plant species with narrow pH tolerances, such as buckbean (*Menyanthes trifoliata*), bog rosemary (*Andromeda glaucophylla*) and bog willow (*Salix pedicellaris*), are common in fens and are often used as indicators of fen habitats.

4.3 STREAMS

Streams or creeks are an important feature of any landscape. In a watershed, streams and creeks transport water from the atmosphere and the ground, downhill to the lowland areas, filling in lakes and wetlands, and connect chains of lakes through outflows. Streams interact with the valley in which they flow, with the associated riparian areas and flood plains providing many important functions such as water storage, water release, and nutrients and sediment interactions (Horne and Goldman, 1994). Water quality in head-water streams and lakes is incredibly important for the maintenance of downstream lakes that rely on inflow from these sources.

Deep Bay relies on run-off-water fed streams as a water source, so upstream contamination is concern. Removing vegetation and filling wetlands along streams can alter the hydrology of the stream, usually resulting in changes to the flows of run-off.

There are 6 identified inflowing streams on Deep Bay most likely originating from ground water run-off seepage from lakes and streams. These streams are either permanent or semi-permanent in nature, but all are an important part of the water quality, fish and wildlife habitat of Deep Bay. These streams have not been researched, neither identified by name

nor inventoried extensively, and there may be more streams currently unidentified from maps or aerial photographs that connect to Deep Bay. Deep Bay has only one outflow, the Narrows at the south-west end of the lake, which drains into Georgian Bay. Interestingly there are times at when water flows into Deep Bay through the Narrows.

4.4 FISH COMMUNITY

The Ministry of Natural Resources and the Federal Department of Fisheries and Oceans are responsible for the Deep Bay fisheries, including the monitoring and protection of fish habitat and fisheries management practices such as fish stocking, population surveys, spawning habitat remediation, protecting critical fish habitat (littoral zone), and the accumulation of baseline date to develop appropriate fish community support.

4.4.1 Fish Stocking in Deep Bay

There are no known or documented efforts of fish species stocking programs in Deep Bay.

4.4.2 Lake Trout

Lake trout traditionally stay in the deeper parts of lakes where temperatures remain cool. Although the oxygen level concentrations of Deep Bay are found to be lower in the summer months (ref Schiefer 2005), lake trout have been found in Deep Bay. This is significant when some studies indicate otherwise.

4.4.3 Bass Habitat

Smallmouth bass nest in the warm shallow areas of the lake, where the males excavate round, nests in the gravel, sandy sediment, and guard the young once they have hatched (MNR, 2003). Spawning occurs in spring from May to June. To date, bass nest mapping has never been initiated by MNR to identify critical (high density) shorelines for spawning bass. Rock bass generally inhabit the same shoreline areas with other bass and sunfishes, and are also nest builders (MNR, 2003). Nests can usually be found clustered together in suitable habitat within the littoral zone, where the young are able to survive by feeding on benthic invertebrates and other small fish. During spawning, rock bass are quite aggressive and may compete with smallmouth bass for habitat or prey on their un-guarded nests.

4.4.4 Fish Population

Fish population fluctuations are a natural occurrence in nature.

4.4.5 Fisheries Management

Deep Bay does not currently have a fisheries management program. The commonly known species inhabiting Deep Bay are similar to species found in Georgian Bay

Note to Draft - Fish Species Common to the Other Ontario Lakes
(Unconfirmed References for review…)

The following Fish Species are a reference source for future study of the Deep Bay Watershed:

Lake Trout Lake Chub
Rainbow Trout
Pike
Pickeral
Dogfisch
Garpike
Cisco
Crappie
Longnose Sucker Common Shiner
White Sucker Spottail Shiner
Golden Shiner Fathead Minnow
Yellow Perch Longnose Dace
Rock Bass Fallfish
Smallmouth Bass Pearl Dace

4.5 WILD LIFE AND WILDLIFE HABITAT

The wetland and upland ecosystems that make up the Deep Bay environment are intertwined and linked to a variety of smaller ecosystems that provide many habitat-types to support an abundant wildlife population, including mammals, birds, reptiles and amphibians as identified in the below list. The various habitat-types available within the watershed have been identified as preferred habitat for wintering habitat for the white-tailed deer and moose.

Note to Draft - Wildlife Species Common to the Parry Sound District
(Unconfirmed References for review…)

The following Wildlife Species are a reference source for future study of the Deep Bay Watershed:

White-tailed Deer
Moose
Raccoon
Black Bear
Lynx*
Mink
Bobcat
Northern River Otter
American Marten
Striped Skunk
Fisher
Beaver
Muskrat
Porcupine
Bats *(Northern long-eared bat, eastern pipistrelle, and the little brown bat)*
Weasel species *(possibly least, and short-tailed and long-tailed weasel)*
Red Fox
Eastern Chipmunk
Squirrels *(red and grey squirrels, possibly southern flying squirrels)*
Coyote
Wolf *(Gray and, possibly, Algonquin Red-Wolf)*

Woodchuck
(Groundhog)
Mice *(white footed mouse and deer-mouse)*
Mole *(species not identified)*
Shrew *(species not identified)*
Vole *(species meadow vole)*
Snowshoe Hare

Sources…: NHIC, 2006 and Mammals of Ontario, 2002

Protection of habitats are important for the conservation of local biological diversity and the preservation of self-sustaining species' populations.

4.5.1 Significant Species and Habitats

4.5.1.1 White-tailed Deer and Moose

White-tailed deer are at their northern range limit in Ontario because of the harsh winter conditions. Fortunately, deer have adapted themselves to survive these harsh conditions by migrating from summer ranges and herding into dense, coniferous forested "deer yards", which provide suitable winter cover and food for winter survival, as well as protection against predators. Moose also require wintering areas for protection and food, but are solitary animals and will not herd. Moose feed on woody and leafy plant material found in wetlands.

4.5.1.2 Black Bear

The bear is primarily solitary except during breeding or feeding. Nuisance bears are dangerous because they begin to lose their fear of humans and become bolder.

4.5.1.3 Birds

Deep Bay is home to a great variety of bird species. Many of these species are migrant songbirds, which migrate from the South American regions to breed in Ontario during the spring and summer months. Other species such as ducks, geese, owls and some coniferous songbirds are year-round residents and can be seen at various times of the year on or near Deep Bay.

Figure 4.7 Common Birds in the Parry Sound District (unconfirmed)

Note to Draft - Common Bird Species to the Parry Sound District
(Unconfirmed References for review…)

The following Common Bird Species are a reference source for future study of the Deep Bay Watershed:

Common Loon Brown Creeper American Bittern Yellow-throated Vireo
Great Blue Heron Winter Wren Green Heron Warbling Vireo
Canada Goose Golden-crowned Kinglet Turkey Vulture Gray Jay
American Black Duck Veery Mallard Northern Rough-winged Swallow
Wood Duck Swainson's Thrush Green-winged Teal House Wren
Mallard American Robin Northern Harrier Ruby-crowned Kinglet
Ring-necked Duck European Starling Sharp-shinned Hawk Eastern Bluebird
Hooded Merganser Cedar Waxwing Cooper's Hawk Hermit Thrush

Common Merganser Nashville Warbler Northern Goshawk Wood Thrush
Osprey Chestnut-sided Warbler Red-shouldered Hawk Gray Catbird
Broad-winged Hawk Magnolia Warbler Red-tailed Hawk Brown Thrasher
Merlin Black-throated Blue
Warbler Wild Turkey Yellow Warbler
Ruffed Grouse Yellow-rumped Warbler Spotted Sandpiper Northern Waterthrush
Killdeer Black-throated Green
Warbler American Woodcock Canada Warbler
Herring Gull Blackburnian Warbler Black-billed Cuckoo Vesper
Mourning Dove Pine Warbler Black/yell-billed Cuckoo Indigo Bunting
Wild Turkey
Cormorans
Common Loons

The following Common Bird Species Breeding within the Watershed are a reference source for future study of the Deep Bay Watershed:

Belted Kingfisher Black-and-white
Warbler Eastern Screech-Owl Bobolink
Ruby-throated Hummingbird American Redstart Great horned owl Brown-headed Cowbird
Yellow-bellied Sapsucker Ovenbird Barred Owl Red Crossbill
Downy Woodpecker Mourning Warbler Northern Saw-whet Owl White-winged Crossbill
Hairy Woodpecker Common Yellowthroat Whip-poor-will Pine Siskin
Northern Flicker Scarlet Tanager Chimney Swift
Pileated Woodpecker Savannah Sparrow Black-back Woodpecker
Eastern Wood-Pewee Song Sparrow Olive-sided Flycatcher
Eastern Phoebe Chipping Sparrow Alder Flycatcher
Great Crested
Flycatcher Field Sparrow Willow Flycatcher
Eastern Kingbird Black-throated Blue
Warbler Least Flycatcher
Blue-headed Vireo Swamp Sparrow
Red-eyed Vireo White-throated Sparrow
Blue Jay Dark-eyed Junco
American Crow Rose-breasted Grosbeak
Common Raven Evening Grosbeak
Tree Swallow Red-winged Blackbird
Barn Swallow Common Grackle
Bank Swallow Baltimore Oriole
Cliff Swallow Purple Finch
Black-capped Chickadee American Goldfinch
Red-breasted Nuthatch
White-breasted
Nuthatch

Sources….: Ontario Breeding Bird Atlas, 2006

The Ontario Breeding Bird Atlas splits Ontario into 10 square km areas, based on topographical coordinates (UTMs), and relies on voluntary birders to confirm the occurrence of bird species during the breeding season. Breeding evidence, such as observation of young or nest with eggs, is a confirmed occurrence of a bird species within a specific square; only breeding events are tracked, not fly-bys during nonbreeding season (e.g., bald eagle during winter months). All square summary sheets are confirmed by experts and the lists are published. It is assumed by biologists that if suitable habitat and conditions (food, shelter, etc.) are available and species occurrence prevails in a breeding square then it is probable that the species may be present locally.

Habitat preferences vary with each bird species—some prefer the dense upland forest cover while others prefer the shoreline or wetland areas. The variety of birds that exist in the Deep Bay area is a product of the variety of natural habitat available in the region. Wetlands provide exceptional waterfowl staging, moulting and breeding areas as well as significant stopover areas critical during migration.

Therefore, in order to protect this diversity, it is important for the residents to ensure that the current variety of existing habitat is maintained and protected.

4.5.1.4 Ducks

Most duck species make their nests in spring along shorelines of wetlands and lakes for easy access to water resources and a quick escape from dry-land predators. The close proximity of nests to water, however, exposes their nests to flooding, swamping and wave action. The American black duck and the mallard have adapted to increased human activity whereas other water birds, such as the wood duck, prefer the more secluded and protected wetland areas away from human activities.

Shoreline development, angler sinkers and jigs, water level fluctuations, water craft and nest predators put water birds at risk of population declines. The American black duck is the subject of unique concern in northern wetlands and has been suffering continuous decline on its wintering area, whereas the mallard has been steadily increasing its population numbers. It is important for the ecological stability of a lake to have suitable brood-rearing habitat vegetation as found in marshes and swamps for cover and shallow water feeding for the duck species.

4.5.1.5 Loons

Increased human activity is one of the main causes for losses of loon populations on northern lakes. Loons are particularly sensitive to development and shoreline disturbances. Power boaters and other activities that cause waves and noise disturb the nesting loons, loon chicks, or feeding loons. Sensitivity to such disturbances will often cause loons to abandon nesting sites and/or the lake completely. The presence of loons on a lake is often used as a biological indicator of the ecosystem's health. In Deep Bay, loons have seen to be nesting in May or June.

Further References:
For more information on specific bird species or sightings, please contact
Bird Studies Canada at http://www.birdstudiescanada@bsc-esc.org
Ontario Breeding Bird Atlas at http://www.birdsontario.org/atlas
Natural Heritage Information Centre at http://www.mnr.gov.on.ca

4.5.1.6 Heronries

Heronries such as the Great Blue Heron have been observed on the shores off Deep Bay especially during the breeding season. The preservation of dense vegetation and shrubs along the shoreline conserves wetland habitat will support and help protect our heronry populations.

4.5.1.7 Reptiles and Amphibians

Lake shorelines, riparian zones and wetlands are home to a variety of reptiles and amphibians including several rare and/or "at risk" turtle and snake species. There are amphibian and reptile species within Deep Bay sub-watershed (lake shed).

It is valuable to indicate that various biological indicators, such as frogs, and cold-water species, can highlight and identify notable environmental changes in ecosystem health.

Note to Draft - Typical Reptiles and Amphibians in the Parry Sound District
(Unconfirmed References for review…)

The following Typical Reptiles and Amphibians are a reference source for future study of the Deep Bay Watershed:

Amphibians
Lakeshed
Eastern American toad Bufo americanus
Spring Peeper Psuedacris crucifer
Gray Treefrog Hyla versicolor
Wood frog Rana sylvatica
Northern Leopard frog Rana pipiens
Green frog Rana clamitans
Bull frog Rana catesbeiana
Spotted salamander Ambystoma maculatum
Northern Redback salamander Plethodon cinereus
Northern Two-lined salamander Erycea bislineata
Red-spotted newt Notophthalmus viridescens viridescens
Mink frog Rana septentrionalis
Western chorus frog Pseudacris triseriata

Reptiles

Lakeshed
Common Snapping turtle Chelydra serpentina serpentina
Midland Painted turtle Chrysemys picta marginata
Eastern Garter snake Thamnophis sirtalis sirtalis
Watershed
Massassauga Rattlesnake
Foxsnake
Common Five-lined Skink Eumeces fasciatus*
Northern Redbelly snake Storeria occipitomaculata
Eastern Hog-nosed snake Heterodon platirhinos*
Northern Water snake Nerodia sipedon sipedon
Northern Ribbon snake Thamnophis sauritus septentrionalis
Eastern Milk snake Lampropeltis triangulum
Northern ringneck snake Diadophis punctatus edwardsi
(Eastern) Smooth Green snake Liochlorophis vernalis

Sources…: NHIC – Herpetofaunal Atlas, 2000 and ROM, 2006

4.6 INVASIVE SPECIES

Exotic (non-native, alien) and/or invasive (native to Ontario but non-native to local area) species describes organisms that have been introduced into non-native, new habitats. The introduction of invasive species cause widespread and unpredictable changes to habitats, native populations, and local infrastructures. Introductions of non-native invasive aquatic species could pose significant risks to the stability of Deep Bay and Watershed ecosystem.

See (http://www.invasivespecies.com/ and www.obssbo.ca/).

4.6.1.1 Purple Loosestrife

According to the Invasive Species Watch Program, most watersheds across Ontario have been invaded by purple loosestrife. Although there are no reports of Purple Loosestrife found in Deep Bay it is possible however, that wetlands within the Deep Bay sub-watershed may have populations of purple loosestrife. There are other several plant species that mimic or look similar to the loosestrife such as fireweed (*Epilobium angustifolium*), blue vervain (*Verbena hastate*) and water-willow or swamp loosestrife (*Decoden verticillatus*) but, unlike the purple loosestrife, these plants are native.

4.6.1.3 Spiny Water-flea

The spiny water flea is a predacious zooplankton species, which competes directly with native zooplankton for food and indirectly with fish larvae. This exotic zooplankton has been invading Ontario lakes since its introduction into the Great Lakes system from ballast water discharge of Eurasian ships. It has spread throughout all the Great Lakes and more than 60 inland lakes in Ontario. There are no reports of spiny water flea found in Deep Bay.

4.6.1.4 Zebra mussels

Zebra mussels (Dreissena polymorpha) have been invading Ontario lakes since their introduction into the Great Lakes system from ballast water discharge of Eurasian ships. Zebra Mussels attach to boat hulls. If these boats enter inland lakes without the hulls being cleaned, zebra mussels can be introduced into that lake. It is probable that if pH is greater than 7.4 and calcium levels exceed 20 mg/L that zebra mussels can establish colonies. Mussels require calcium to develop shells. Zebra Mussel have not been reported to be found in Deep Bay.

4.7 RARE SPECIES and SPECIES AT RISK

A "Species at Risk" status designation of special concern, threatened or endangered is provided by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and/or the Committee on the Status of Species at Risk in Ontario (COSSARO). These official statuses direct planning, recovery and conservation efforts, and provide legal protection for 'schedule 1' threatened and endangered designated species in Ontario (i.e., Ontario Endangered Species Act and the Species at Risk Act (SARA)). Other species are or may be of conservation concern, but their formal conservation status has yet to be evaluated. For more information regarding the laws and regulations in place in Ontario for the protection of fish and wildlife, please contact the MNR Minden Area Office or visit the MNR web site at http://www.mnr.gov.on.ca/MNR/.

Note to Draft - Reference of Provincially Significant and Rare Fauna in the Parry Sound District
(Unconfirmed References for review…)

The following Typical Reptiles and Amphibians are a reference source for future study of the Deep Bay Watershed:

Typical Species at Risk – Ontario

Blanding's turtle Emydoidea blandingii
Common Five-lined skink Eumeces fasciatus
Eastern Hog-nosed snake Heterodon platirhinos
Eastern Pipistrelle (bat) Pipistrellus subflavus
1 butterfly/moth species:
Pepper and Salt Skipper Amblyscirtes hegon
2 rare Odonata (dragonfly/damselfly) species:
Lake Emerald Somatochlora cingulata,
Williamson's Emerald Somatochlora williamsoni,
Tapered Vertigo (mollusc) Vertigo elatior,
13 rare plant species:
Water Awlwort Subularia aquatica
Woodland Cudweed Gnaphalium sylvaticum
Prickly Hornwort Ceratophyllum echinatum
Bee-balm Monarda didyma
Hidden-fruited Bladderwort Utricularia geminiscapa
Carey's Smartweed Polygonum careyi
Cloud Sedge Carex haydenii
New England Sedge Carex novae-angliae
Sedge Carex trisperma var. billingsii
Goldie's round-leaved Orchid Platanthera macrophylla
Snail-seed Pondweed Potamogeton bicupulatus
Algae-like Pondweed Potamogeton confervoides
Carolina Yellow-eyed-grass Xyris difformis

4.8 CLIMATE CHANGE

Climate variations (warming trends) is a worldwide concern and could affect water quality and quantity of the Deep Bay and Watershed ecosystem in the future generations.

5 PHYSICAL ELEMENTS

This section examines the physical aspects of the Deep Bay and Watershed.

5.1 PHYSIOGRAPHY AND SOILS

Physiography refers to the characteristic of different landforms and how together they create a variable landscape. The overall Deep Bay physiography is a result of advance and retreat of the last continental glaciation of North America, during the Quaternary Period. Known as the Wisconsinan period, the glacial movement of the ice sheet reached the southern margin of the Precambrian Shield about 10,000 years ago. Unlike many other parts of Ontario during the Wisconsinan glaciation, very little drift material was deposited along the shores of Georgian Bay. In fact the Wisconsinan glacier scoured this region, leaving the bedrock mostly bare.

The glacial Lake Algonquin was formed by the recession of this glacier and inundated all of Georgian Bay's existing shoreline and surrounding region for several miles inland. Unconsolidated materials on the shore of Lake Algonquin were washed from the land surface by wave action, although small pockets of glaciolacustrine sediments were also deposited in scattered localities around the lake. Subsequently, glacial Lake Hough and post-glacial Lake

Nipissing actions created sand dunes along their shorelines at approximately the 198 meter contour that reflected historically high water levels. The result of these events is a regional landscape that is dominated by bedrock with a shallow, discontinuous mantle of tills and/or sediments, as well as cobble beaches along southwestern coastlines (Chapman and Putnam 1984).

Soils in the water shed contain a variety of Quaternary deposits including glaciolacustrine sand, glaciolacustrine, unsubdivided sand, silt, clay and minor gravel. This is consistent with the regional patterns. Deeper soils are found in local pockets within the bedrock formation, and at lower elevations like swamps, wetland and the lake bed.

5.2 CLIMATE

The Deep Bay and Watershed area has a moderate continental climate with cold winters and warm summers; both moderated by extensive precipitation spread rather evenly throughout the year. Deep Bay does not have detailed weather observation data, however the Ontario Ministry of Environment maintains an extensive research site at Parry Sound harbor. This climate data is very similar to Deep Bay due to the close proximity to Georgian Bay and the same elevation.

5.3 FLOODPLAINS & BEAVER DAMS

Floodplains are low-lying areas of land surrounding a water-body, which captures and holds the overflow of water during spring freshet (rise in water levels during snowmelt) or other flooding events. Development or disturbances to these floodplains can have a diverse effect on the water quality of the lake and property. Deep Bay & Watershed does not have a typical floodplain.

Deep Bay Watershed does have a community of beavers that build dams. Although the resultant collection of water from the Beaver Dams can be referred to as a water body, this is not typically a floodplain. In recent history of Deep Bay incidents, the breaking of a beaver dam on Sills river coincided with the algae bloom in the summer. Also, a bursting beaver dam in 2008 washed out the bridge on Inverlochy Road E. and left many people stranded although no significant algae blooms resulted in the summer of 2008.The preservation of healthy beaver dams is critical to the water quality of Deep Bay. The sound equilibrium of the beaver population is therefore essential.

5.4 MINERALS AND AGGREGATES

Mining and aggregate operations can have a substantial impact when they occur near a lake or water-body, or along sensitive streams or tributaries. Excavation activities can have potential impacts on ground water levels, sedimentation of lakes and streams, and result in other issues from increased truck traffic, blasting noises and machinery operations.

5.4.1 Sand Pit

There is a commercial sand pit located on the northeast edge of the Deep Bay Watershed near the Carling Township Municipal office.

5.5 NARROW WATER-BODIES - The Narrows

Deep Bay has several physically narrow water body sections and several narrow bays. Burnt Point is a narrow water body centrally located on Deep Bay that needs to be navigated to reach the eastern or western areas of the lake, and the Narrows on Collins Bay is the only route to enter and exit Deep Bay from Georgian Bay. Both narrow bodies are examples of narrow bodies that require special attention from a navigational water safety point of view.

The Narrows can be described as "The heart of Deep Bay" as this narrow body of water is what defines this special ecosystem as both a lake and a bay, off Georgian Bay. Several times the Deep Bay Association has dredged and blasted the Narrows for navigational needs. The deepening is also important from a water quality stand point as it allows the water in Deep Bay to rise and fall easier with the sashing of Georgian Bay. This flushing of the water in Deep Bay is believed to be replenishing Deep Bay with fresh water from Georgian Bay. The water level fluctuation can be as much as one meter in as little as 24 hours.

Consistent with the experiences of the property owners of Deep Bay, the "Narrows" are of immense importance to the environmental, social and economic stability of Deep Bay and it's Watershed.

The depth of the Narrows ensures the safe navigation of boats which is critical to the stability of the social and economic value, as well as migration of fish and wildlife which is important to the environment of the Deep Bay ecosystem.

5.6 STEEP SLOPES AND CLIFFS

The Deep Bay shoreline has numerous steep slopes and rock faces on private and crown land properties.

5.7 FORESTRY

The Deep Bay watershed and most of the surrounding area was old growth forest until the mid to late 1850s. With the arrival of settlers brought extensive logging for timber (mainly white pines) and clearing of land which continued into the 1920s and 30s. Due to the rockiness of the land however only few farms with pockets of good soil survived and remaining today ex. W-Ranch (previously part of Alves Farm). The area was logged for timber (mainly white pine) around the turn of the last century thus changing the historical forest mix from 70% conifers and 30% hardwood forests to a 70% hardwood and 30% conifers mixture of today. A sustainable forest management program for the Deep Bay Watershed is of importance however there is no program currently an place.

6 SOCIAL ELEMENTS

Social elements enhance the quality of life on Deep Bay . To the year round residents living on Deep Bay or in the Watershed "it is a way of life", and to many cottagers, a lake environment is a "place where you can relax, recreate and get away from it all" and thus such benefits as clean water, fresh air and the tranquility of the natural environment are major attractions. Although residents on the lake have diverse interests, there are some

commonly held values that unite most cottagers and residents especially the preservation of natural vistas, containment of noise and night lighting, and a mutual respect for private and common property.

To enjoy the social elements that is part of the natural Deep Bay environment, there is an awareness of the stewardship responsibilities among all residents and visitors that needs to be respected to maintaining these important elements of the "Deep Bay experience".

6.1 RECREATIONAL BOATING

Boating is an important activity on Deep Bay. The depth of the "Narrows" is a critical factor for safe navigation. There are many reasons for the use of a boat such as for pleasure, the enjoyment of water skiing, wake boarding or tubing, and transportation to water-access cottages, friends, visiting Parry Sound, or cruising the open waters of Georgian Bay.

6.1.1 Boating Use

According to the "*Michalski Nielsen report 2006 " there are 150 seasonal and 39 permanent* residents on Deep Bay. Using the provincial average of 2 boats per residence for inland lakes there could be an estimated total of 378 boats on Deep Bay. This estimate report indicates half would be non power boats such as canoes, kayaks, row boats and sail boats and the other half would be power boats. The power boats (including personal water craft) are further estimated to be 50% have larger than 25hp motors.

Accordingly, of the 283 ha of Deep Bay's surface water potentially available for boating, 93 ha can be considered as unsuitable, leaving 190 ha suitable for power boating. The *Lakealert* study (Hough, Stansbury and Associates Limited 1972), the pioneering Ontario work in this field, assumed a standard area requirement for all boats (one boat regardless of type and speed per 4.0 ha). In this regard, numerous studies have consistently demonstrated that at peak times, about 10% of a lake's boating fleet would be on the water at one time This boating population would accommodate 151 ha of the water surface; this is less than the 190 ha which are available for recreational boating.

This level of boat usage does not seem to raise any notable safety and environmental issues for Deep Bay. It is to be noted Deep Bay has direct access to Georgian Bay, and visiting boat traffic is not included.

6.1.2 General Concerns with Recreational Boating

Throughout 'cottage country' there are several common concerns with the increase in recreational boating and a general desire to seek a balanced approach to dealing with these concerns. This is supported by the 2011 DBA Survey results.

6.1.2.1 Speed and Wakes

The environmental impacts of inappropriate boat speeds and wakes can have long term and negative effects on wildlife, vegetation, fish habitat, nesting, as well as docks and private property. As per Canada Shipping Act "A boater is responsible for the wake and the damage it creates". This rule also applies for Deep Bay.

6.1.2.2 Boat Noise and 'Nuisance Traffic'

Noise is a significant issue on many lakes, including Deep Bay. The sound of boat motors, as well as music and loud conversations taking place on boats, resonate easily across open water. Such noise can be disturbing to some residents of the lake who seek a tranquil setting. Nuisance boat traffic especially boats that go back and forth in one area of the lake or bay can also disturb and irritate some residents. A responsible boater should respect these points when enjoying boating on Deep Bay.

6.1.2.3 The Lake Watch Program & Enforcement of Boating Rules

In the Province of Ontario you must have a Pleasure Craft Operator Card, or equivalent to operate a motorized vessel above 10 hp. This assures. "The card holder is competent to operate a pleasure craft as indicated in the Competency of Operators of Pleasure Craft Regulations of the Canada Shipping Act." This should assure that all motor boaters act in a safe and proper manner.

6.1.3 Boating Practices

The following are recommended "Friendly Boating Practices on the Deep Bay"

Minimize your wake especially in narrow channels and near shores so that natural shorelines are not eroded, loon and duck nesting sites are not disturbed and your neighbours' floating docks and parked boats are not bounced around and damaged.

Reduce your speed especially in narrow channels and near shore where other boats and swimmers could be in danger. Please remember that within 30 meters of the shore your speed should be less than 10 km/hr. (This is also the law).

Use the centre of the lake when travelling at speeds or when water skiing or tubing – Please do not ride parallel to the shoreline.

Give everyone a wide berth and travel slowly when pulling away from docks, launching ramps or swimming areas.

Respect your neighbours' tranquility by moving around the lake rather than operating on one small area.

Protect the environment by treating bays as no wake zones, operating in water over 1.2 meters (4 feet) deep to avoid disturbing the lake bottom, stowing garbage until you return to shore, and avoiding spillage of gas and oil into the water during refueling.

When anchored take care not to obstruct navigation for other boats.

6.1.2.3 Pollution

It is estimated one third of power boats on the Deep Bay are powered by 2-stroke engines.

Environment Canada's Environmental Technology Centre tests (Reference Kinisis study) show that conventional two stroke outboards produce 12 times as much benzene, toluene, ethyl benzene and xylenes, and five times as much oil and grease as four-stroke outboards.

According to the Environment Canada 'Green Lane' web site:

"Although outboard motors exhaust their emissions into the water, recent studies of their impacts on lakes revealed that most hydrocarbon compounds in the water migrated into the air within 6 hours, and that samples taken about a meter below the surface showed no contamination. However, heavier hydrocarbons, such as oil and grease, remain on the surface for a longer period of time and may affect the health of microscopic organisms."

"Further comparisons… a 9.9 two stroke outboard and a 9.9 four–stroke outboard showed that the two-stroke produced 50 % more carbon monoxide than the four-stroke…the two-stroke also emitted 15 times more unburned hydro-carbons than the four-stroke." .

6.2 LANDSCAPE AND AESTHETICS

To protect the health and beauty of the lake and maintaining a natural landscape is essential for the social enjoyment of the aesthetic values. There are two important landscape views where development can impact the natural setting of the lake: the shoreline area and the tree landscape lines of the horizon. Any development that changes these landscape views directly impacts the natural setting. Some sources of visual impact in these areas are the construction of structures and buildings, transmission lines, and the removal of natural vegetation.

6.3 TRANQUILITY AND NIGHT-SKIES

Unnecessary noise and indiscriminate lighting can affect the enjoyment of the natural setting because they interfere with the elements and benefits of peace and tranquility for Deep Bay. Lighting can affect many shoreline residents to the point such as lighting that spills over the natural shoreline could and generally is considered as light pollution. Enjoyment of the night sky without unnatural levels of light is seen as a benefit to the "Deep Bay experience".

7 LAND USE

7.1 SUMMARY OF LAND USE

7.1.1 Our Lake – Deep Bay

The shoreline areas of Deep Bay are now fairly developed with approximately 190 cottages and year round homes. With very few exceptions the shoreline area is in private ownership or crown land, and the vast majority of private lots have now been developed.

There are several properties within the Deep Bay watershed that are used for agricultural purposes.

Property developments on Deep Bay currently consists of the Inverlochy Resort redevelopment project from commercial to residential.

Cottage development began in the 1920s. Currently most of the properties have been developed and built upon with a few undeveloped lots remaining.

Few cottages were historically occupied year round. In the past 15 years a steady trend has seen seasonal cottages knocked down and replaced with year round homes as working and retired owners moved, or are preparing to move from the "the city" to use or live at the cottage year round.

Approximately 20 % per cent of dwellings on Deep Bay are now occupied year round. (Reference John Jackson Planner Inc. Nov 12, 2009)

7.2 Ownership

The number of years of ownership of cottages ranges with several established families from several generations enjoying the lake to new family ownership.

An overview of land ownership was provided in section 3.4 As noted most of the watershed area is privately owned or crown land.

Commercial activity based within the watershed includes the Inverlochy Resort that is now in redevelopment phase to a residential status and the Konoval Construction Industrial gravel pit.

Municipal activity based within the watershed includes the Carling Township Municipal Offices and Carling Township Road Maintenance Buildings.

Agricultural activity based within the watershed includes the W-Ranch and several other parcels of land used or zoned for agricultural purposes.

Although current planning regulations do not allow for construction of boat houses on Deep Bay, a number of boat houses were constructed before this regulation came into effect. Although no survey has been done to ascertain the number of boat houses, a reasonable estimate suggests there are approximately 12 -14 boat houses on Deep Bay.

7.3 WASTE DISPOSAL

7.3.1 Septic Treatment Systems

In general cottagers and residents of Deep Bay are concerned about the impacts of septic systems on the lake water quality and public health. Bacteria such as E-coli from ineffectively treated human waste can present serious human health threats. Phosphorus reaching the lake from sewage disposal systems speeds lake eutrophication and can threaten an ecosystem such as Deep Bay. Septic systems main function is to remove bacteria, however are unfortunately not very effective on removing phosphorus, so it is important to remember that the general use of phosphates should be minimized or eliminated.

7.3.1.1 Types of sewage treatment systems

Cottages have essentially four categories of systems for treating waste waters. The statistics for the distribution of systems from the other Ontario survey results are as follows;

Category 1: A full eighty eight percent (88%) of survey respondents use a combination of septic tank and leaching bed. In this system, waste water flows into a tank where solids settle out and scum/grease is trapped in surface baffles.
The effluent from the tank then flows into a system of "leaching" tiles that allow the effluent to percolate into the porous sandy soil bed. In a properly installed and maintained system, soil bacteria and chemistry kill harmful bacteria and remove a portion of the phosphorus from this now groundwater. Other factors aside, the further a leaching bed is from the lake, the greater the neutralization of harmful bacteria and chemicals.
Solids accumulating in the bottom of the tank necessitate it being pumped out at regular intervals, depending upon frequency of use.
For a detailed current discussion of how different tank/bed treatment systems work and their correct operation and maintenance see the CMHC
website http://www.cmhc-schl.gc.ca/en/co/maho/gemare/gemare_009.cfm

Category 2: One percent (1%) currently are using a composting toilet system in conjunction with some sort of grey water disposal system for sink/shower wastewater. When properly maintained, composting toilets are clean, odour-free and release no harmful bacteria to the groundwater and significantly less phosphorus. Compost-like residues are disposed of seasonally, well away from water courses. Composting toilets are a sound environmental choice. If the grey water leaching system is built to code, it should result in phosphorus removal effectiveness similar to the regular leaching bed described above.

Category 3: Six percent (6%) of cottages use an outhouse for human waste.

Category 4: The rest percent (5%) of cottages use other methods such as holding tanks

7.3.1.2 Types of sewage treatment systems on Deep Bay

The statistics for types of sewage systems on Deep Bay do not exist.

7.3.1.3 Further information on sewage treatment systems for Deep Bay

Similar to structure setbacks, leaching bed setbacks have increased over time. The current required setback is 30 meters (100 ft.) – (see Carling OP and Zoning Bi-Law)
Age of septic systems on Deep Bay are expected to vary considerably. The lifespan of a properly maintained system is generally between 20 and 30 years. All systems could also be rendered problematic or ineffective through negligence by such actions as vehicles backing

up onto leaching bed, growth of roots from trees or improper usage such as addition of fats. oils, greases or other chemicals such as chlorine bleach.

It is necessary to accept the importance of pumping and inspecting the septic system tanks regularly as necessary at least every 5 -7 years.

Effective minimization of use of phosphates includes the usage of phosphate free detergents and eliminating other uses of phosphates such as found in typical fertilizers etc. Residents should also adopt good septic system practices such as avoidance of sanitation chemicals that might kill the necessary and beneficial bacteria normally found in a septic tank. Chemicals such as chlorine bleach and hand sanitizers can be extremely harmful to septic systems.

Grey water treatment should respect the current plumbing codes and septic system set-backs.

7.3.2 Deep Bay Landfill

There are no known current land fill areas within the Deep Bay watershed area. Household hazardous wastes, chemicals and old paints etc. should be taken to the official township provided locations.

Land fill procedures using composting should also respect the typical septic system setbacks.
Outhouses should respect the typical septic system setbacks.

7.4 DEVELOPMENT PLANNING

The current status of Deep Bay shoreline is primarily zoned between Waterfront Residential (WF1) and Crown land, and should be so preserved to maintain the wilderness quality of Deep Bay and Watershed.

7.4.1 DBA QUESTIONNAIRE Survey of February 2011Data

Results –see Appendix

It was evident from the questionnaire results that the Deep Bay Watershed Residents were interested and very open with comments and information in support of this initiative.

8.0 PRIORITY ISSUES and RECOMMENDATIONS

Development within the watershed and particularly on the waterfront has an eutrophication impact on the natural environment and the water in the bay. A balance is therefore sought that will allow for development that will sustain natural and social environments in the long term. Stewardship of the lake should also consider the effects of small things being done on existing residential properties and not only the effects of major development projects.

The guiding principle for identifying recommendations in this section are based on maintaining and possibly improving the natural heritage and beauty of Deep Bay and Watershed environment ecosystem for continued and future enjoyment.

8.1 PRIORITY ISSUES

Fifteen (15) high priority issues have been identified that reflect the values and concerns expressed by the Deep Bay community. Each issue is stated as a recommendation and affects the natural, physical, or social environment of the Deep Bay. The statements are intended to capture the essence of each issue.

8.2 Principal RECOMMENDATIONS

The principal recommendations of the Deep Bay Watershed & Lake Management Plan are ways to ensure the long-term protection, maintenance and restoration of natural, social and physical features of Deep Bay and Watershed. At the onset of this Lake Plan process the survey of 2011 indicated that the majority of our community valued the preservation of the natural environment.

These recommendations support the purpose of this Lake Plan and will also identify and improve the important social environment of the Deep Bay community.

Finally these recommendations will identify and set targets as cornerstones that are important to ensure and protect the health and sustainability of our watershed for future generations and reflect the common ground and values of the diversity of needs and interests that exist among those who have a stake in and an impact on the continuing health of Deep Bay.

8.2.1 GOALS AND RECOMMENDATIONS

8.2.1.0 Social Environment of Deep Bay

Promote a community program that nurtures a positive social environment for all Deep Bay stakeholders by encouraging communication, exchange of ideas and community participation.

8.2.1.1 Maintain Safe Navigation Depths within the Narrows

Periodic maintenance of the Narrows may be necessary to maintain water quality, protect fish habitat and ensure the safe navigation of the Narrows of Collins Bay, which connects Deep Bay to Georgian Bay.

8.2.1.2 Water Quality Monitoring of Deep Bay

Prepare updated water quality surveillance procedures and continued testing processes. The results of this surveillance shall be used to assess the current trophic state of Deep Bay and its ability to sustain future development.

8.2.1.3 Water Quality Defense of Deep Bay

Prepare surveillance procedures and continued testing processes for septic treatment systems, landscaping practices, agricultural practices within the Deep Bay Watershed. Ensure the sufficient depth of the “Narrows” to allow an effective flushing rate. Develop a

Deep Bay community educational program to encourage positive practices in support of clean water.

8.2.1.4 Water levels and Depths of Deep Bay

Creation of a Deep Bay Depth Chart Program including the Narrows to monitor and document the water levels.

8.2.1.5 Development Map Status of Deep Bay

Prepare an updated land use map of Deep Bay and its watershed to include outlining the current status of Crown land areas.

8.2.1.6 Natural Shorelines of Deep Bay

Identify and map the physical features such as creeks, wetlands and land structures of Deep Bay.

8.2.1.7 Wildlife Survey for Deep Bay & Watershed

Develop a supportive program to document sightings of wildlife (mammals, reptiles, amphibians, insects, birds, & fish etc.).

8.2.1.8 Vegetation Survey for Deep Bay & Watershed

Develop a supportive program to document types of vegetation (trees, plants, flowers, fungi, water vegetation etc.).

8.2.1.9 Night Sky of Deep Bay

Promote awareness of the need for preservation of "dark skies" on Deep Bay.

8.2.1.10 Boating & Water Activity on Deep Bay

Educate members on how to minimize the negative effects of wake, noise and pollution for boating and water based activities on Deep Bay.

8.2.1.11 Traditional Rights of Way for Deep Bay

Identify and document any currently existing or traditional rights of way in the Deep Bay Watershed.

8.2.1.12 Tranquility Experience on Deep Bay

Promote awareness of the benefits of Tranquility for the balanced Deep Bay experience.

8.2.1.13 Sustainable Forest Management for Deep Bay

Identify and document the status of the forests in the Deep Bay Watershed for future reference.

8.2.1.14 History of Deep Bay

Document and create a repository for shared historical and archival information of Deep Bay's geography, development and people.

8.3 Final Comments

With the formal endorsement of the Deep Bay Watershed & Lake Management Plan by all stakeholders, this plan is expected to be integrated into the Carling Township Official Plan.

Continued stewardship, communication and educational actions will prepare us for further coordinated efforts to gather more detailed information to enhance and improve this plan for documentation and updated resubmissions for future Carling Township Official Plan reviews. We will strive to implement the substance of the recommendations and develop interest especially in our youth to continue the positive stewardship of Deep Bay with the motto

" We are on or about the water "

9 APPENDICES

9.1 RESIDENT SURVEY Questionnaire

9.1.1 Community Questionnaire

- see next pages

Deep Bay
Carling Township - District of Parry Sound
Community Lake Plan

Carling Township
Community Questionnaire

February 2011

Deep Bay Community Watershed
&
Lake Management Plan

Dear Carling Township Community: *The following questionnaire asks you about your thoughts and views of Deep Bay and the Deep Bay Watershed area. This information is very important for the purpose of our work in preparing our Deep Bay Community Watershed & Lake Plan which is a living document that encompasses a community vision for Deep Bay and the Deep Bay Watershed area. As we progress, this document will eventually be part and parcel of the Carling Township Official Plan. We would appreciate your time and effort by reviewing this questionnaire and returning it completed to the below address by 15 April 2011. Thank you.*

Prepared by: The Deep Bay Lake & Watershed Planning Steering Committee

Sponsored by: Deep Bay Association & Carling Township

Contact: www.deepbayassociation.com or Info@deepbayassociation.com

Sincerely yours,

Deep Bay Association

Gary Bauer
DBA President
16 Echo Point Rd - PO Box 2
Nobel, Ontario
P0G 1G0

DEEP BAY
LAKE & WATERSHED PLANNING QUESTIONAIRE
February 2011

Thank you for completing this questionnaire. Individual answers will be kept confidential. If you feel uncomfortable answering any question(s), please disregard it. Answer the questions on behalf of the entire household.

Note: Household refers to immediate and extended family and other permanent or temporary occupants of the property.

1. What is your connection to Deep Bay and its watershed?
   (Please check all that apply)

   □ Principal Resident □ Seasonal Resident □ Commercial Business
   □ Owner vacant property □ Owner rental property □ Operator Farm

2. Over the next 10 years how do you feel Deep Bay shoreline should change with respect to the following; *(Please check only one box per line)*

	More	Stay same	Less	Do not know
Residential development;	□	□	□	□
Commercial development;	□	□	□	□
Forest cover;	□	□	□	□
Shoreline structures;	□	□	□	□
Shoreline rehabilitation;	□	□	□	□
Wetlands;	□	□	□	□
Lawns;	□	□	□	□

3. Values: Please rate how the following values add to your personal enjoyment of Deep Bay; *(Please check only one box per line)*

	Very important	Important	Not important	Do not know
Water Quality	□	□	□	□
Water Level	□	□	□	□
Natural Shoreline	□	□	□	□
Bird & Wildlife viewing	□	□	□	□

Fishing	□	□	□	□
Peace & tranquility	□	□	□	□
Swimming	□	□	□	□
Hunting	□	□	□	□
Power boating	□	□	□	□
Non power boating	□	□	□	□
Night skies	□	□	□	□
Preserving vacant land	□	□	□	□
Retention of Crown Land	□	□	□	□
Water Access to Georgian Bay	□	□	□	□
Cottage safety / security	□	□	□	□

4. Issues and Concerns: During the past 10 years how much impact have the following issues and concerns had on your enjoyment of Deep Bay?

(Please check only one box per line)

	Significant / Positive	/ Moderate / Positive	/ No Impact /	Moderate / Negative	/ Significant Negative
Water quality	□	□	□	□	□
Boat traffic	□	□	□	□	□
Water wakes	□	□	□	□	□
Personal watercraft	□	□	□	□	□
Daytime noise	□	□	□	□	□
Nighttime noise	□	□	□	□	□
Outdoor night lighting	□	□	□	□	□
Vegetation removal	□	□	□	□	□
Development	□	□	□	□	□
Snowmobiles	□	□	□	□	□
All-terrain vehicles	□	□	□	□	□
Water sports	□	□	□	□	□

5. Please comment on how you would like Deep Bay to look like many years from now? *(If you need more space please use the back of these sheets)*

_____

_____

_____

_____

6. What do you value sufficiently of Deep Bay that you believe is worth protecting?

_____

_____

_____

_____

7. Please comment if you wish, on how you feel we can insure that future generations will be able to enjoy the benefits of Deep Bay and Watershed?

_____
_____
_____
_____

_____

Please provide us your contact information:

Name - _____

Deep Bay Address - _____

_____

_____

Deep Bay Telephone Number (705)_____

Home Address - _____

_____

……_____

Home Telephone Number (_____)_____

Email Address: _____

Thank You for your participation!

Please return this survey when completed and the latest (by April 15, 2011) to:

Deep Bay Association
Attn: Gary Bauer
PO Box 2
Nobel, Ontario

P0G 1GO

9.2 RESIDENT SURVEY Responses of Feb. 2011 Questionnaire

Total questionnaire responses received – 151

What is your connection to Deep Bay and its watershed?

□ Principal Residents	38
□ Seasonal Residents	92
□ Commercial Business	0
□ Owner vacant property	20
□ Owner rental property	0
□ Operator Farm	1

Over the next 10 years how do you feel Deep Bay shoreline should change with respect to the following; *(Please check only one box per line)*

	More	Stay same	Less	Do not know	Total
Residential development;	9	84	44	10	147
Commercial development;	4	45	92	6	147
Forest cover;	55	79	1	12	147
Shoreline structures;	15	73	49	10	147
Shoreline rehabilitation;	85	53	4	6	148
Wetlands;	49	85	3	10	147
Lawns;	4	44	93	6	147

Values: Please rate how the following values add to your personal enjoyment of Deep Bay; *(Please check only one box per line)*

	Very important	Important	Not important	Do not know	Total
Water Quality	138	10	1	0	149
Water Level	108	33	4	3	148
Natural Shoreline	90	54	2	3	149
Bird & Wildlife viewing	83	53	11	1	148
Fishing	50	62	33	2	147
Peace & tranquility	99	43	5	1	148
Swimming	94	50	4	0	148

Hunting	12	9	119	6	146
Power boating	27	71	47	3	148
Non power boating	47	78	23	0	148
Night skies	93	43	8	4	148
Preserving vacant land	80	43	15	9	147
Retention of Crown Land	108	26	8	7	149
Water Access to Georgian Bay	105	31	11	2	149
Cottage safety / security	105	35	6	1	147

Issues and Concerns: During the past 10 years how much impact have the following issues and concerns had on your enjoyment of Deep Bay?

(Please check only one box per line)

	Significant / Positive	Moderate / Positive	No Impact /	Moderate / Negative	Significant Negative	Total
Water quality	39	21	31	31	14	142
Boat traffic	6	22	68	36	10	142
Water wakes	6	15	73	28	18	140
Personal watercraft	7	23	52	36	23	141
Daytime noise	7	11	88	22	15	143
Nighttime noise	5	9	97	20	12	143
Outdoor night lighting	7	11	90	27	7	142
Vegetation removal	10	14	73	33	13	143
Development	11	11	49	47	23	141
Snowmobiles	10	11	89	18	15	143
All-terrain vehicles	8	10	75	22	27	142
Water sports	11	28	75	21	7	142

Comment Responses

(Wording and spelling as received)

Please comment on how you would like Deep Bay to look like many years from now?

Would like Deep Bay to look same as it does now with the nature aspect of the environment, especially the shorelines and clean water maintained.
Still the same rustic clean water and no commercial property
With sidewalks, lights, flowers, trails, small cafes, high speed internet, playgrounds, nice community to spend tim with family, play with kids, spend holidays.
Kept as it is, water at edge of lake with clean up garbage and soap suds.
Same as it is now- little or no more building
Status Quo.
Natural shoreline, no lawns, no golf courses, single family cottages/homes, good access to Georgian Bay, restricted development, fish stocks should be monitered.

Basically the same with improvements to boat launching.
Improve water quality and most important is higher water level.
I would like to see water quality and habitat features stay as ther are now. I am not opposed to development- I am some what hesitant to express how I feel as I don't know how info is to be used.
"Improved water quality- when we improve the water quality- most other improvements will follow: fishing, water sports, swimming, septic improvement, etc.
Just like it does now. We are happy that there are no activity restrictions,
Maintain a well balanced natural look. Cottages that fit into the landscape- big or small. Lakeside Saunas connected to Septics etc. Stop any major developments- like inverlochy.
Like it looked 30 + years ago
No more development. I think Deep Bay reached its limit.
As it is today
I would like the forests to stay intact and people to try and preserve the water quality.
We would like to limit development on Deep Bay. (e.g. not to turn it into a Muskoka)
Better water levels. Better marine life.
more uninhabited than inhabited.
As per existing status quo or more natural
I want it to not be saturated with condo's and new developments.
Along with answers to 2, 3, 4- Deep Bay is priceless as it stands today, but we need to preserve and maintain shorelines coupled with less residential and commercial development. Definitely no "public beaches or docks" on crown or vacant lands.
Same but with higher water levels.
We would like to see Deep Bay remain the same or better in terms of natural features. We do not want to see more development, nor do we want to see the shoreline ruined with cultivated lawns and multiple docks. We feel that the natural curves and foliage of the shore is what makes Deep Bay special to us. We also do not like the amount of light that is being used at night. Some cottages are lit up like a Christmas ree for most of the night if not the whole night and this ruins tstar gazing pleasure as well as night photography possibilities. As a devoted photographer, I have tried many times to capture star trails or the northern lights only to be foiled by the extensive lighting of certain cottages. Even minimal lightling on these types of long exposure photos causes the scene to resemble daylight. The stars are one of the best features of being up north.
We would like to see the water quality to improve and ideally we would like to see the water level increase.
Similar to what is there now. No more development and no commercial development
Preserve what we have. Stop unremitting exploitation of the resources. Improve water quality for residents. Stop further shoreline development, absolutely STOP BLASTING the rocks away! Absolutely no lawns and pesticides.
More natural growth of all vegetation (trees, shrubs, weeds). I.e. "not managed", let nature have its way. Certainly maintain Crown Land and current single family lot restrictions and no multi-family developments.
Cleaner water, No more building constructed (Preserved)
More natural

The same as now
Wild
No more communications towers
Beautiful natural Georgian Bay. We purchased the property for its natural beauty, quiet and minimal development.
Much the same as today, residential not commercial with no major development with shared occupancy , no crowding of cottage spaces and as natural as possible .
Clean water, forested shores minimal commercial develpment with good access to Geogian Bay, not affected by water levels.
We would like it to be as peaceful and quiet as we have enjoyed for 40 years now.
Well wooded. Cleaner water, quiet time on the water in early spring when water fowl are nesting and improved fish population.
Improved water quality. Development not o expand from curent level.
Expect current cottage density is about at limit bay can support. Prefer no significant change, however want current residents to enjoy their cottages and environment. Therefore no significant increase in restrictions.
Allow nature to have its way. Only allow single family buildings on or visible from water nor visible from other waterfront cottages/ residence.
Not applicable as we are being forced to sell after 55 years on this shore.
A freeze on new lot creation. Owners returning frontage to a more natural look septic tanks being inspected/ upgraded.
The water level higher
Some pump house on the shoreline look terrible Remove abandoned docks.
Cleaner water, preservation of natural wetlands, decreased dwellings/ cottages in men (stop building!!) Leave as natural as possible.
Clean, biger sand area
A place for cottaging family experience where generations can inter-play a respect one another
Maintain good water quality. Develop existing lots on record- wisely.
About the same as today.
Similar to what it is now.
Clear water, with safe access through channel to Georgian Bay. No new boathouses.
I would like to see good water quality due to sewage controls on the Bay. I would hope to see the water level use. I would like to see healthy fish in the bay and residents enjoy the beauty responsibly.
Basically as it is now- no huge cottage/ homes desired. No raw housing along shoreline. Well spaced dwellings on shoreline.
Similar to the way it is now.
I would like it to look much the same as it is now. I know then will be some development but I hope not too much. I would like to see the water quality BETTER than it is now.
Clean, sandy shoreline, private. Same as it is now.
Same, but no lawns all the way to the shore.
Preserved, not change.

Natural shorelines, limited development.
Attractive to cottage buyers and residents. Attractive to visitors from anywhere. Eliminate any kind of water pollution.
Essentially the same as now but with small/ moderate size marina with boat gas/ repair facilities.
As development happens we should maintain same precentage by new lots of forest/ shore/ lawns as it now on developed areas.
As now. Water clearer/ cleaner.
As beautiful as it does now.
Keep the channel open to the Sound open to small craft. Do a good job of dredging this time with controls in place.
Maintain green space- limit commercial development however- let lodge develop but limit size and number of dwellings.
I would lke to see the opportunity of more road access to remote cottage properties where possible.
Higher water levels. Less boat traffic.
As much of a natural environment as possible, no further development, no further shoreline development, higher water levels.
Same as it is today.
Much the same as now.
Same as the present.
Clean- not overly developed-restocking of game fish (pickeral- small mouth bass-carpies-panfish)
Increase natural surroundings. Less lawn type properties, AWD pasteur land. Water quality will be improved.
Clean water, onobstructed shoreline, no further development.
Clean maintained water with significant levels and sustainable fishing opportunities.
I would like to see Deep Bay back to the depth is was when we bought the property. The water is so far out, it is impossible to swim or boat on it but the taxes keep going up and our propety is almost worthless!
Cleaner water with less run off providing food for water vegetation.
A vibrant natural environment with residents that enjoy the physical area and are actively engaged (physically) (i.e. sports, hiking, water skiing, etc)
Clean water, balanced ecosystem.
Quality homes and cottages kept up to standards. Natural shorelines with reasonable allowances for a floating dock and a small sand beach where relevant. No wind turbines! Noise restriction on personal watercraft.
Given it is generally land locked, limit the development.
Natural as possible
I would like it to remain much the same as it is now.
Very much just like it is now.
Keep commercial development at moderate levels.
Less weeds in the lake- Im concerned about how warm the lake became last summer and the growth of weeds in the water.
As close as possible to present.

Needs to be groomed and kept as a Park setting.
Less monster cottages and lawns, more beaches.
Maintain the negotiations and trees and limit the construction of roads to smaller country lanes.
Pristine, peaceful, safe, forest
As natural as possible, with an abundance of fish, small mammals are birds.
Natural untouched, not patroled by residents.
Clean.
we think that no change would be the best for environment and water quality. Perhaps some children's playground equipment should be the only change, however its not a necessity.
I would not like to see anymore interference to the natural beauty of Deep Bay.
As natural and peaceful as possible. A sanctuary for kids and nature.
As natural as possible! Prefer no boathouses. Prefer no temporary structures on docks or visible on shore. Prefer no structures that dominate the waterfront.
Keep trees. Limit size of big cottages. No commercial development. No lawns. Preserve wetlands, hunting and fishing.
The cottagers n Burnt Point would benefit from the construction of a road. Completion of the Inverlochy project would replace older buildings with more attractive and more environmentally friendly units. The Deep Bay Association needs to serve all cottagers equalty.
As little changed as possible.
Natural, crystal clear, no algae/ no odour, less development (reduced use of motorcraft. Shoreline and vegetation improved. Little night lighting/ quiet and peaceful.
Leave it in its natural state.
As natural as possible and clean, clean, clean.
We would prefer that Deep Bay remain the same with pleasurable additions of boathouses.
Same. Ni windmills of towers.
As forested as today. Nest homes amoung tree. No more lawns or non-native flora- quiet.
I own vacant land and someday retire or build a cottage. I would like it to remain quiet and peaceful: As many trees as possible. We live on a rural property and continue to plant trees and be as environmentally friendly as possible.
I would like to see a beach and access to the Bay by the farm on Alves Rd
I would like it to stay the same as now.
The same as it is today-concern about keeping the water high to maintain the channel.
Better water quality. Maintain Georgian Bay access maintain. The natural state of the shoreline minimizing the effect of docks and structures as much as possible.
Go back a hundred years to nature.
Maintain sameness.
Wont it be great if it could look similar to what it does now!
Like it did id 1950s
More peaceful and tranquil setting Removal of Association control of access points and control given to township.
Natural.
Much the same as it is today.

For the most part it should remain the same, with moderate growth residential growth. The channel is significan and should be maintained and or improve.
Same as it is only good water that is healthy for fish, wildlife and cottagers.
More trees to screen new and existing cottages. Low density resort only, no condominimums, due to limited water space for use and recharge. Continue to maintain naviagble mouth to Georgian Bay.
The same or less in development. Water quality is slowly decreasing. Cleanliness is our big problem.
The same as now. Please help the ratepayers association fight beach erosion.
-More trees to screennew and existing cottages. -Low density resort only, no condominiums, due to limited water space for use & recharge. -Continue to maintain navigable mouth to Geo. Bay.

What do you value sufficiently of Deep Bay that you believe is worth protecting?

Water quality, shorelines, and preservation of habitat for spring breeding grounds of birds and fish. Retention of Crown Lands. Access to Georgian Bay through the Narrows.
Clean water and privacy
Nature, water
Beautiful sunsets. Nice beach to visit and relax.
Water quality, a place for wildlife, birds to visit and stay, limited amount of cottages. Providing a safe winter habitat for deer and other animals (no dogs chasing deer)
Water duality and wildlife habitat.
Water quality, natural shoreline, access to Georgian Bay.
Natural shoreline and clean water. Population- not overcrowded (people or boating)
Fishing and natural shoreline
Wildlife habitat, fish habitat.
Water quality which should include water level. Fishing- swimming- access to Georgian Bay.
The fact that its not overly populated (cottages). Also, the liveliness of the water - boats, sea doos, fishermen, etc.
Cleaning up the water quality and maintaining the access into the big water through Collins Bay. Keeping the beaches cleans- both Deep Bay and Beality.
Lifestyle
Water Quality
The environment (e.g. water quality) etc.
Access to Georgian Bay, clean water
The shoreline, wildlife and peace and quiet. Rental cottages within Bayview seem to be an issue with noise and lack of respect for nature.
Water quality, fishing/ wildlife, access to Georgian Bay.
Its water, marine life, shoreline
Shoreline.

Its predominantly rustic, undeveloped feel: both in terms of commercial and residential
I value that there is a fair amount of land with no developments!
Maintain shorelines, preserving fish sanctuaries designated by MNR, retention of Crown Lands, improve water water quality, preserve natural habitats which presently exist, which all would aid in protecting the total integrity that is Deep Bay.
Water level, water quality, no further development, access to Georgian Bay.
There are many things to value on Deep Bay, but the most important ones are nature an water. Nature means protecting not only the plants and trees and flowers that are native to the area, but also the animals. There is nothing like watching the hawks or osprey or finches or other colourful birds, or the deer in spring and winter as well as the occasional bear (from a safe distance!). Water quality and level needs to be protected as well. People need to ensure that there are not allowing unnatural protects to enter the lake from any means, and we need to ensure a proper flow to the lake to maintain its quality which in turn provides life to shore plants, water plants and fish populations.
Water quality, wildlife and the natural environment, peace and quiet
Natural shorelines and wildlife habitat
Water quality
Peace & Tranquility
The water, vegetation, rocks current quantity and size of buildings visible from existing waterfront properties
Its access to Georgian Bay, protect the fish
Natural state
Being sheltered off Georgian Bay, but have access by boat to it.
Wetlands
Water quality/level
The water quality/ level. Minimal shoreline development. The peace and quiet. The beauty and natural ruggedness of Georgian Bay and the existing wildlife.
Its residential / family nature, clean water and forested areas.
Access to Georgian Bay.
Protect our privacy. Overcrowding would be a problem
The woods with the bird calls. Call of the Loon, sight of deer in the early morning in winter. Clean water for swimming and canoeing.
Current natural state. Water access to Georgian Bay.
Water quality, limited congestion, natural beauty
Water quality all vegetation (not 'managed forests). The shoreline view with current quantity of buildings.
Water quality and clarity. Views and vegetation
The water is key! Being surrounded by nature/ wildlife. Pride in our piece of paradise.
the water and its shoreline.
Water cleanliness and clarity. Deepening the channel helped greatly, should it de deepened or made wider?
The environment and the animals/ fish within area.

Nature and wildlife. Would like running well as was before.
A family oriented bay with respect for each other
Water access for Bayview Association property owners (Private access)
The above- # 3 and # 4 say it all.
Peace and quiet of a natural habitat.
The water, and night sky. Value the people.
I would 1st protect the water- quality and quantity. 2nd the land surrounding the Bay- new development (e.g. Alves Bay) with minimal impact on soil and water and indigenous plants.
Maintain natural shoreline. Well spaced unobtrusive buildings.
Water quality, limited commercial growth, seasonal cottages, natural shoreline.
Water quality, limited commercial growth.
Water quality, access to Georgian Bay, strong community.
Water level (if possible) water is too deep too quickly --> not muvh shallow water area left.
Waterlevels water quality (septic tanks that are faulty) Keep it as "wild" as possible.
Nature and clean water.
Water quality, natural shoreline, protection of wildlife.
The shoreline, the wild life, the remaining forest, the residents/ cottagers beaches, dimensions of building lots and their use.
Spaced out moderately size cottages. Its reclusiveness (not well known lake). Water access to Parry Sound.
Water access by powerboat to Georgian Bay for personnal enjoyment as well as to maintain property values.
Water quality. Water access to rest of Georgian Bay. Minimal night lighting.
See responses to Q3.
Pursuit of living in solitude and free of intrusion from powerful water craft engines. Stop intrusion of big city values on this area.
The water.
Privacy (low population density). Water quality.
Natural environment, forested shorelines, wildlife habitat, clean water, quiet environment, underdeveloped sightlines, limited traffic, both car and boat.
Water levels that sustain flow through Collin's Bay.
Tranquility, clean water, limited development.
Wild life, shoreline, water quality.
Cleanliness of our water and surrounding nature. Cleanliness of our water.
Clean water. Natural shoreline. No lawns.
Beautiful shoreline, small fishing coves, safe boating.
Unspoiled coastlines wetlands and natural fishery and fowl habitats eco areas for campers and visitors.
The shoreline. Deep Bay to bring back our shoreline for family enjoyment and return our property values. Our cottage lot is on DENT BAY. What are you going to do there?
It has a large shoreline with many small bays for fishing and boating.
Water quality!! Natural shoreline!!

Nature, water quality, space, access to Georgian Bay
Clean water, balanced ecosystem.
Access to Georgian Bay. Natural look- no boathouses- maintain setbacks- maintain minimum 100 metre frontages. Water quality & wetland areas.
The natural environment.
Natural wildlife fishing.
Water quality
Natural beauty. Peace and quiet
Forests, wetlands, population growth
Nature- Trees- quiet- clean water.
Wilderness/ pristine cleaniness
Water quality and natural surroundings.
The natural world: animals, plants, trees, fish. The beauty of nature. Peace and tranquility.
Privacy and tranquility
Everything- nothing specific
Quality of water and trees.
Tranquility
I value the cell tower that has not only improved cell phone coverage and therefore safety for all, but its an excellent aid to navigation at night.
Tranquility, natural setting.
Pure will water, beach.
Water quality- vegetation development.
Deep Bay is part of a delicate eco-system which is too quickly vanishing around the whole Muskoka area with swelling populations Carlina Bayview residents appreciate their close links to clean fresh water, rich forestation and the needs for restoration/ preservation.
The water, wetbeds and natural forestation. The area should be protected as part of the biosphere.
Nature. Waterways.
Deep Bay has some prefect wetlands (Alves Bay and Cribbies Bay), abundance of wildlife (deer, fox, bear, ducks, loons, fish) and very natural vegetation and tree cover. This is unique. Out activities and development must be compatible with the protection of these natural gifts.
Wetlands, shorelines, trees, hunting and fishing opportunities.
Water quality and natural shoreline.
Clean water/ no runoffs from cattle eg Alves farm.
Quiet lake, so lets keep it such.
Nature and peace and quiet
Water quality and access to Georgian Bay. Tree lines should also be maintained.
Shorelines. Natural beauty.
Fishing and forests along with water quality.
The water, shoreline and the quiet.
Quality of water- no growth of successful shoreline.
Good water.
Fishing- wildlife and shore and water content.

Hidden away with access to Parry Sound.
Water quality and the watershed areas of the community. A low density environment.
Wildlife, water, trees
Enjoyable/ pleasant location/ to visit.
Water quality, non- commerical development.
Water quality, shoreline.
Natural setting- control development and protect shorelines.
Low density.
Water level- don't ditch the narrows any deeper!
Deep Bay is a calm, quiet and peaceful bay. Commercial development should not be allowed beyond a small group of rental properties- no high rise.
The water right now is not healthy- more time and money spend on inspecting septic systems to make Deep Bay healthy again. I really don't like swimming any more like ou whole family did just 10 years ago
An appropriate density and type of development presently exists in Deep Bay and should be maintained.
Water quality, leaving nature as it is. Try to enjoy nature and not change to suit people.
Clean water. Access to beaches. Fish habitat.
-An appropriate density and type of development presently exists in Deep Bay, and should be maintained.

Please comment if you wish, on how you feel we can insure that future generations will be able to enjoy the benefits of Deep Bay and Watershed?

Health stewardship of the Bay's watershed by all stakeholders, owners and residents. Preparation of a Deep Bay Lake and Watershed Management Plan that can provide guidance. Control and Adherance to Carling Township By-Laws Community needs to develop a septic systems inspection program that is supported by the Township.
control building around the lake
Keep it clean and beautiful
limit development (commercial), control the number of docks per property.
There should be strict limitations put on developments like golf courses, farms, condos, that would affect the quality of run-off and water quality. There should be restrictions on development density so that noise and traffic are kept under control. There should be an out right BAN of lawns and lawn mowers. There should be bylaws limiting loud outdoor noise and music after 11pm. There should be public hearings before any unusally large structure is built along the shore that can be seen from the water.
Too many docks per property at West End.
Boat launching should be ONLY at DEEP BAY and NOT at BEAUTY BEACH. Deep Bay is much more suited for launching with Beauty being more for swimming.
Preserve the natural shoreline, fish habitats and natural vegetation.

Create a watershed plan with realistic controls and bylaws that are to address issues that have an impact- not a "preceived" impact. I would have to review any suggested plan prior to giving my blessing to it.
Improved water level and quality- ensure residential involvment and education- continue with the current DBA task of getting together and ensure that WE all work together on issues and concerns.
Strict septic controls- protect any marchlands- tree planning- keep any crownland as such. Work with the Bayview Ratepayers Association. We enjoy the small cottage lake atmosphere while having access to the Big Water- Best of both worlds- natural shorelines coupled with good design is a must.
Stop or Curtail commercial and residential development. Ensure any development that occurs is in compliance with the official plan, zoning by-laws provinvial and federal environmental controls. To ensure the compliance is met, more money and resources must be provided by the municipality and any and all grants from the senior levels of government be utilized. Deep Bay and other watersheds are dying. Please stop or ensure there is compliance with our own by-laws.
To ensure water access by boat to the Sound by motorboats.
Everyone needs to do their part to not pollute water and shorelines. Thanks for taking the time to do this! Everyone needs to be aware of their actions and consequences to the environment.
maintaining its natural state.
Keep sight of what brought us all here in the first place.
I would like to see the channel dredged so there is better continued access to Georgian Bay.
A plan that is low growth wih high environmental standards that is sensitive to the eco-system that is Deep Hay would be a good starting point. We need to have the Deep Bay remain the way that nature has intended for it so that these future generations can enjoy the uniqueness of Deep Bay as I did as a kid 40 yrs ago.
If the above actions are taken, there should be no problems.
We feel that it is important for the committee to rally against further development, especially the Inverlochy plans as well as maintain the water quality issue and preserving wildlife. Perhaps negotiating to get our shorelines declared as nature preserves would be an idea.
Put in place a lake management plan, ban use of fertilizers.
Enjoy the benefits of Deep Bay and Watershed
As above, question #5
Do not allow any more buildings visible from water except on single lots for one family use. Do not sell my township or Crown Land.
ATVs and snowmobiles are an adbomination and should be outlawed. Also personal watercraft
Get all old septics replaced or septics installed where there is none to improve water quality.
Protect riparian zones, water, quality, limit motorized boating
Minimize future development. Maintain large water frontage for single dwellings. Requirements: Do not allow multiple dwellings with single water front access. Protect the water quality and level.

Limit development, keep lot sizes large, contril pollution, limit size and type of watercraft (i.e. No houseboats serving as residences, limit tree cuttings to diseased and those absolutely needed to be removed for new residences.
See above.
Keep cottages smaller to keep the rustic look of the area. Why do we take all the things of our city homes to the woods. Extra bathrooms and dishwashers require more and better septic systems. When are we going to inspect these old septic systems? What is going into the lake now? Encourage and educate catch and release fishing more.
Improve water quality. Don't allow houses over 2500 sq.ft. Improve cureent natural state.
Need an on-going process for community review and concensus.
Do not sell any township or Crown Land on or near water. No commercial or multi-owner homes. Only single -family buildings. Maintain "lot size restrictions" for new cottages.
Phase out sources into the lake awareness. Get residents/ owners to realize the impacts of their actions
Educate/ inform/ enforce as a last resort the protection of shorelines, wetlands and local environment. An active community organization to instill shared values.
Nude beaches.
Stop increasing population, more buildings mean less privacy, more noise, diminishing water levels, threat to animal life.
Do not increase development in residential area.
Stop to NIMBY attitudes and realize we can not go back but forward responsibly
Educate the general public throughout the township information on how to preserve the ribbon of life around water bodies. Septic re-inspection program. It is important our elected official listen to all the people not just lkae associations as studies indictates lake assoc. only represent less than half the people on the water.
No polution, endeavour to keep water level as high as possible.
By being respectful of environment improvement of water quality through septic testing and maintain water testing.
Education of residents as to the need to protect the Bay and Watershed is essential. Organization like the D.B. Association should spread knowledge "inform residents as to the responsible stewardship of these precious lands.
Limit Development
Communication of issues so we can voice our opinions.
Communication of ongoing issues so we can voice our concerns.
Protect water quality by septic re-inspection controlling development ensuring good flow of water through the narrows, examining the affects of the Deep Bay watershed.
Do not overbuild keep everything as natural as possible.
District development of land and shoreline, district creation of new lots.
Keep taxes reasonable and control building standards. Most township services are now much better then in other townships. Keep it that way!
Smart growth planning with consideration to maintaining or improving the existing flora/ fauna and natural habitat.

Insure water quality does not degrade below current levels.
Educate boaters and cottagers on the issues threatening the environment in Deep Bay.
Stop developments of small lots and the altering of the natural land geography i.e. molding the surface of the property so it looks like down town Toronto!
It appears that boat access cottages are finding it difficult and costly for boat docking/ parking throughout the summer season. There is a shortage. Should Inverlochy remove docking there are no close alternatives.
Limit new development. Protect wetlands and preserve natural shorelines.
Control development particularly on shorelines, monitor water quality and health of aquatic life, control auto and boat traffic , especially during peak periods, involve community member, especially young people in decision making.
I am a hypocrite for saying this because I have a small lot, but limit lots to larger shoreline width.
Strictly limit any further subdividing and development. Oblige cottage owners to maintain their shoreline and property to code.
Limit and monitor growth.
We do not appreciate that we brough species like Canada Goose and Cormorant (ducks) which polluting our waters and eat our fish! In 40 year my family and we did not see these species in Deep Bay intil someone brought them in.
Protect natural run off zones. With natural vegetation. Have areas along shoreline protected from development.
Municipal, provincial and federal control of lands and waters with an area revitalization plan in plan.
So glad you are finally interested in the cottage lot people. Please contact me with further information.
Water line development must be kept low so that the natural beauty of the bay can be enjoyed by all.
Reduced commercial development. Higher standards for septic issues. Zero tolerance of pesticides and herbicide for lawns.
Do not overpopulate, protect all Crown Land!
Stricter septic system regulationsand thorough inspections. Sustainable management of Deep Bay as a Lake not a Bay.
Build a reserve fund for future dredging/ blasting of channel to Georgian Bay. Removal of falling down boathouses on Dean? Rd, off Alves Rd (or rebuilding). Require buildings to be maintained. Control Cormorants.
By monitoring the natural environment habitat.
Actively protest water quality and limit shoreline attractopns in Deep Bay area. Ensure septic system are maintained and serviced regularly.
Be vigilant about environmental concerns. Too populated for wind farms or high density commercial.
Do a lake assessment and habe under water quality as a high priority.
Limit new building and maintain restrictions on new buildings and structures.

Vigilance and proper maintainace of the area.
Trying to keep the water clean realizing that nuture does a good job so we need the marshes etc to keep it clean.
Limit power boating, sea doos, noise, wakes on the water. Limit commercial development.
Have mandatory septic inspections- other than that its hard to say. Money talks on Deep Bay to the extent that those with the money resources do what they want and let their lawyers answer for them. I only need to look next door at # 7 to see that evidence: a paved driveway to water. My frontage along our mutual lane destroyed by an excavator hired by my neighbour to remove the surface material- the damage was so great it polluted my creek which empties into Deep Bay. Neither fisheries/ oceans or Deep Bay Association took him to task over it. OPP did.
Tighter contrls on water pollution from ineffective septic tanks, from people washing in the lake (bodies & hair), banning "lawns" as they need fertilizers. Limiting development- keeping lot sizes large, no commercial.
Calm local residents, and make area accessible to all.
By caring, respecting nature.
With membership and enrollment in the Carling/ Bayview Association awareness, political consciousness, knowledge and education towards preservation are possible. Becoming and remaining politically active and the keep for the future.
By insuring there is so more significant impact on the area that already exists. Current property owners should be prepared to have positive impacts on the area rather than negative.
Prevent or limit overdevelopment. Limit boat noise and traffic.
Ongoing encouragement and education works for many property owners. But unfortunately what is needed is a supplementary plan for others (enforcible rules)
Limit number or size of cottages. No lawns. Improved septics. Sunday Hunting. More trees. Better 6B access.
I kayak and powerboat in Deep Bay restricted access due to water depth would negatively affect me. However I would not want anything to prevent the continued loss of depth or access that wouls negatively affect the natural environment.
Better septic system/ inspections yearly. Fines for addressing the water quality guidelines no large watercraft/ aircraft.
Stop any large resorts or multi unit developments on this lake.
Minimize development and maintain "the narrows"
Testing of on-site sewage system to ensure operation and not entering the lake water.
Outboard motor pollution. Clear cutting lots for building. Speed limits for all boats.
Use of appropriate rules to protect the environment.
Less water skiing in Deep Bay going towards channel. Wakes off boats are destoring docks and beach.
Less development, maintain water. Levels and quality.
No further commerical projects approved by council. No variances approved by council in regards to reducing the minimum lake frontage requirement per lot. On ongoing and continued effort by the warious associations and Carling Township educating the community in ways to reduce our environment footprint.

We live in a "I want" society, regardless of what you want.
Concentrate on all aspects of maintanance of water quality; limit pollution- effluent runoff, etc.
Minimize the housing congestion.
Greater restrictions on watercraft especially sea doos! Push for night sky goals. Respect of neighbours regarding noise. Protection and promotion of waterfront vegetation.
Don't allow Georgian Bay levels to reduce the level of our Bay.
I answered that question in #6/
Clear cutting of trees and shoreline vegetation is the worst thing for a small lake such as this. Screening by existing and new trees allows cottaged and shoreline structures to be enjoyed by all.
Why can we not live with nature and reduce our impact to make it more people convenient.
-cleat cutting of trees and shoreline vegetation is the worst thing for a small lake such as this. Screening by existing & new trees allows cottages and shoeline structures to be enjoyed by all.

9.3 SUMMARY OF Proposed WORKSHOPS (Note to Draft – future proposals)

9.3.1 Deep Bay Natural Environment & Heritage Workshop
9.3.2 Engaging Young People Workshop
9.3.3 Quality of Life Workshop
9.3.4 Other

9.4 GLOSSARY

This glossary is intended for the general reader. It attempts to clarify specific or unusual terms used in the lake-planning process. These are not to be construed as formal scientific definitions.

Acid Lake – A lake that has water with a pH less than 6 standard units
Algae – Small aquatic plants lacking stems, roots or leaves which occur as single cells, colonies, or filaments.
Algal Bloom – Rapid, even explosive, growth of algae on the surface of lakes, streams or ponds; stimulated by nutrient enrichment.
Aquatic Macrophytes – Large water plants - either free-floating or rooted.
Bacteria - Microscopic unicellular organisms, typically spherical, rod-like, or spiral and threadlike in shape, often clumped into colonies. Some bacteria cause disease, while others perform an essential role in nature in the recycling of materials, for example, decomposing organic matter into a form available for reuse by plants.
Some forms of bacteria are used to stabilize organic wastes in wastewater treatment plants, oil spills, or other pollutants. Disease-causing forms of bacteria are termed "pathogenic." Some forms of bacteria harmful to humans include:
[1] Total Coliform Bacteria—A particular group of bacteria that are used as indicators of possible sewage pollution.
[2] Fecal Coliform Bacteria—Bacteria that are present in the intestine or feces of warm-blooded animals. They are often used as indicators of the sanitary quality of

the water.
[3] Fecal Streptococcal Bacteria—Bacteria found also in the intestine of warm blooded animals. Their presence in water is considered to verify fecal pollution.
Beneficial Use – Any of the various uses which may be made of the water, including domestic water supplies, industrial and agricultural water supplies, recreation in and on the water, wildlife habitat, and aesthetics.
Benthic Zone - The lowest level of a body of water, such as an ocean or a lake. It is inhabited by organisms that live in close relationship with (if not physically attached to) the ground, called benthos or benthic organisms. Generally, these include life forms that tolerate cool temperatures and low oxygen levels, but this depends on the depth of the water.
Biodiversity - Refers to the variety and variability of life, including the complex relationships among microorganisms, insects, animals, and plants that decompose waste, cycle nutrients, and create the air that we breathe.
Black-water - Water that contains animal or human wastes. Compare to Greywater.
Carrying Capacity - (General) The amount of human development that can occur in the lake's watershed without causing a significant change in its water quality. This is understood to include a measure of the capacity of a lake for boating, skiing, bathing - recreational use in general - and residential occupation of the shore and shore border land without patent overcrowding, pollution and consequent danger to health and safety. Carrying capacity may be greatly limited if a single use is given priority; also it may be expanded if the surface area of the lake is zoned for particular uses and the time for use in each zone is specified. Some of the factors involved in determining carrying capacity: size, shape, depth, character and location of swimming areas and beaches, regulatory and zoning restrictions, season of year, accessibility (public or private), available services (marinas), level of pollution, parking facilities, usable frontage and fish (abundance, species).
Carrying Capacity - (Biologic) The biologic carrying capacity of a lake refers to its natural productivity. In relation to fish production, or other aquatic life, the numbers which the natural food-supply, or pasturage, will support adequately.
Cultural eutrophication – An accelerated rate of lake aging induced by human sources of nutrients, sediment and organic matter.
Cut-off – Refers to the cut off angle, of a light fixture – defined as the angle between the vertical axis and the first line of sight at which the bare source (the bulb or lamp) is not visible (see http://calgary.rasc.ca/lp/definitions.html).
Dissolved Oxygen – Molecular oxygen freely available in water and necessary for the respiration of aquatic life and the oxidation of organic materials.
Erosion – The wearing away of the landscape by water, wind, ice, or gravity to smaller particles, usually sediment.
Eutrophic – Literally, "nutrient rich". Generally refers to a fertile, productive body of water. Contrasts with oligotrophic.
Grey-water (gray-water) - Waste water from a household or small commercial establishment which specifically excludes water from a toilet or water used for washing diapers.
Hydraulic Retention Time – The time required for all the water in the lake to pass through the outflow.
Intermittent Streams – A stream that only flows for part of the year, as after a rainstorm
Lakeshed – immediate drainage basin of a lake.
Leachate - is the liquid produced when water percolates through any permeable material. It can contain either dissolved or suspended material, or usually both. This liquid is most commonly found in association with landfills where the result of rain percolating through

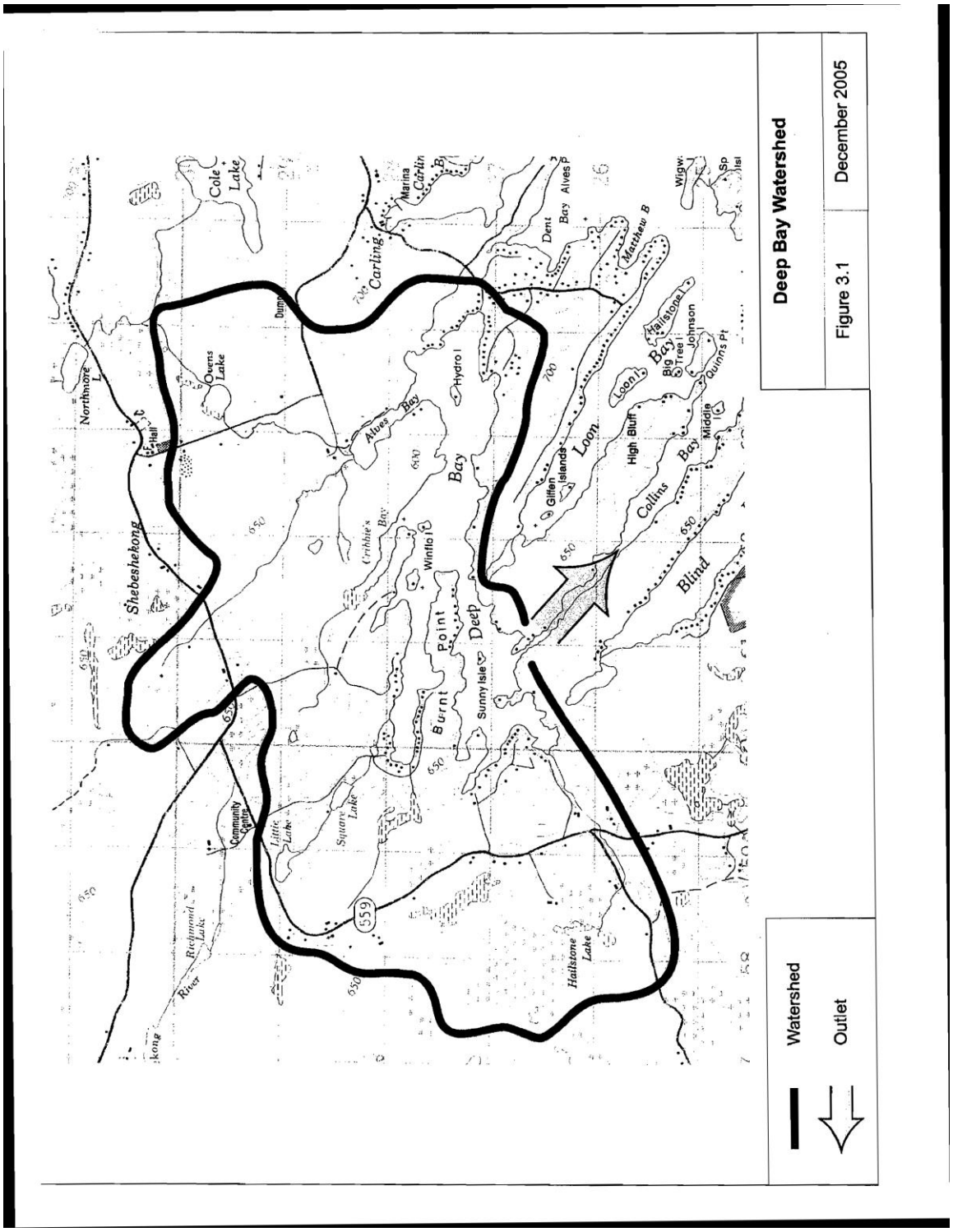
the waste and reacting with the products of decomposition, chemicals and other materials in the waste produces the leachate. If the landfill has no leachate collection system, the leachate can enter groundwater, and this can pose environmental or health problems as a result.
Typically, landfill leachate is anoxic, acidic, and rich in organic acid groups, sulfate ions and with high concentrations of common metal ions especially iron. Leachate has a very distinctive smell which is not easily forgotten.
Littoral Zone – The region along the shore of a non-flowing body of water: more specifically, the zone extending from the shoreline to a depth where the light is barely sufficient for rooted aquatic plants to grow - corresponds to the 'riparian zone' for a flowing body of water. In tidal areas it is the zone of the sea flood lying between the high and low tide levels.
Load – The amount of substance, usually nutrients or sediment, discharged past a particular point; expressed in weight per unit time.
Mesotrophic – A term applied to freshwater lakes where nutrients are available but not abundant (moderately nourished).
Non-point Source – Pollution discharged over a wide land area, not from one specific location.
Nutrient Loading – The addition of nutrients, usually nitrogen or phosphorus, to a water body.
Nutrients – Elements or compounds essential to life, including by not limited to oxygen, carbon, nitrogen and phosphorus.
Oligotrophic – A term applied to freshwater lakes where nutrients are in short supply (little nourished).
Pelagic Zone – The area of a lake beyond the influence of the bottom (i.e., open lake waters).
Phosphorus – An essential nutrient for aquatic organisms, derived from weathered rock and human sources.
Plankton - Any drifting organism that inhabits the water column of oceans, seas, and bodies of fresh water. They are widely considered to be one of the most important organisms on Earth, due to the food supply they provide to most aquatic life.
Point-Source Pollution – Pollutants discharged from any identifiable point, including pipes, ditches, channels, sewers, tunnels, and containers of various types.
Riparian Zone - Land areas directly influenced by a body of water. Usually such areas have visible vegetation or physical characteristics showing this water influence. Stream sides and marshes are typical riparian areas.
Setback – the distance from a built feature to either the regulated high water mark of the lake or a lot line.
Steady–State – Assumes no change with time.
Stewardship - Administrative and/or custodial actions taken to preserve and protect the Natural Resources, particularly the plant (Flora) and animal (Fauna) life, of an area or Ecosystem
Storm-water runoff – Surface water runoff, usually associated with urban development, which carries both natural and human-caused pollutants.
Total Maximum Daily Load – A pollutant budget most simply expressed in terms of loads through quantities or mass of pollutants added to a water-body. Typically this budget takes into account loads from point and non-point sources, and human-caused as well as natural background loads.
Thermal Stratification – The distribution of heat within a lake forming separate strata based on water temperature.

Viewscape - A viewscape is all of the land and water seen from a point or along a series of points (a lake, road or trail). Viewscape management includes describing, planning, and designing the visual aspects of all components of the area. Managing the seen aspects may greatly affect the perceived spirit of a place.
Water Quality Standard – Legally mandated and enforceable maximum contaminant levels of chemical, physical, and biological parameters for water. These parameters are established for water used by municipalities, industries, agricultures and recreation.
Water Quality – A term used to describe the chemical, physical, and biological characteristics of water with respect to its suitability for a beneficial use.
Watershed – An area of land that drains surface water runoff into a stream, lake or other body of water and is generally defined in terms of hectares or square kilometers.
Wetlands - Wetlands are transitional lands between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is often covered by shallow water during some parts of the year.

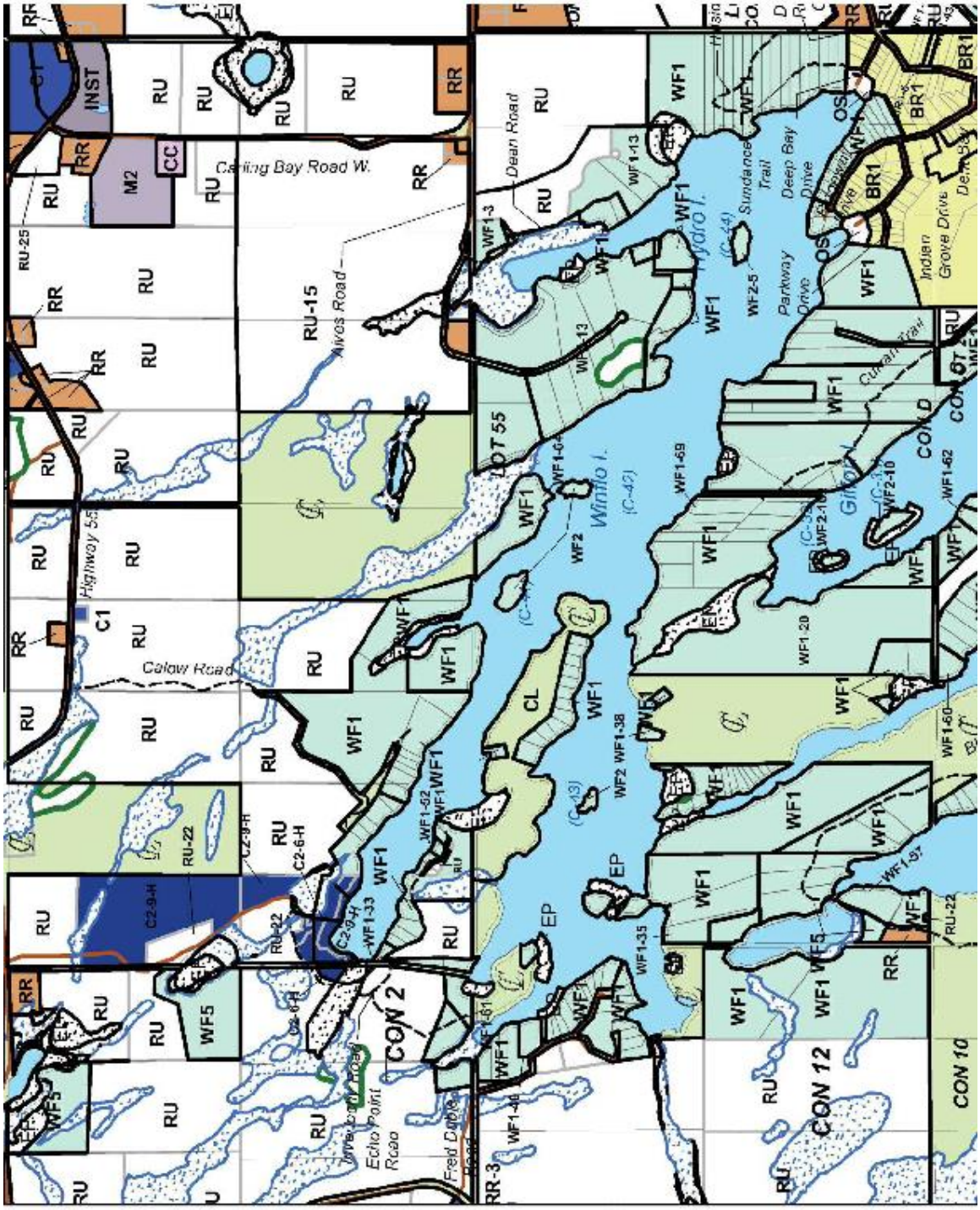
NOTE: For a more exhaustive glossary of terms please refer to the North American Lake Management Society http://www.nalms.org/glossary/glossary.htm

9.4 REFERENCES/BIBLIOGRAPH

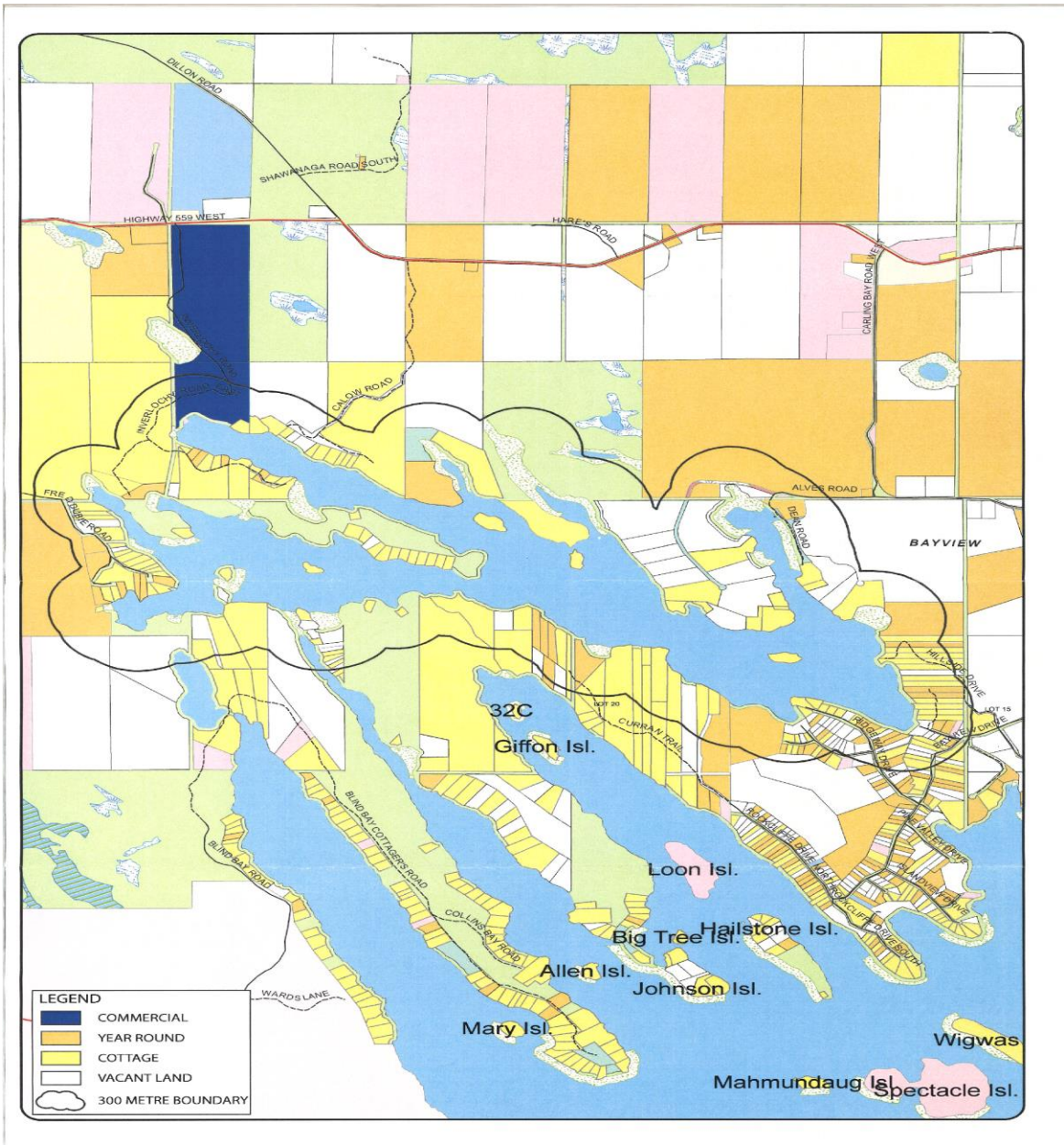
9.4.1 Deep Bay Maps (see attached maps)



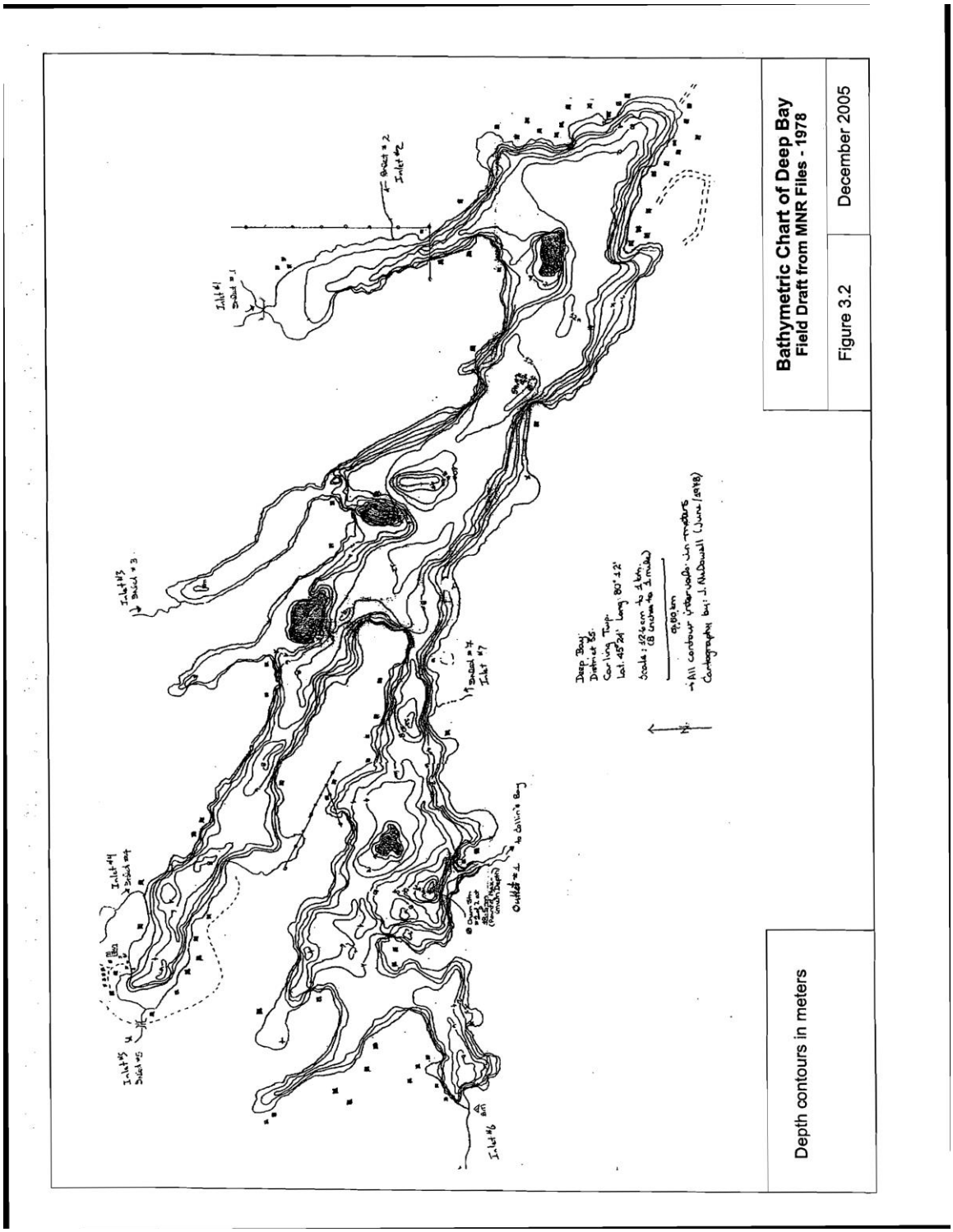
Deep Bay Watershed – Map 3.1
Schiefer 2005



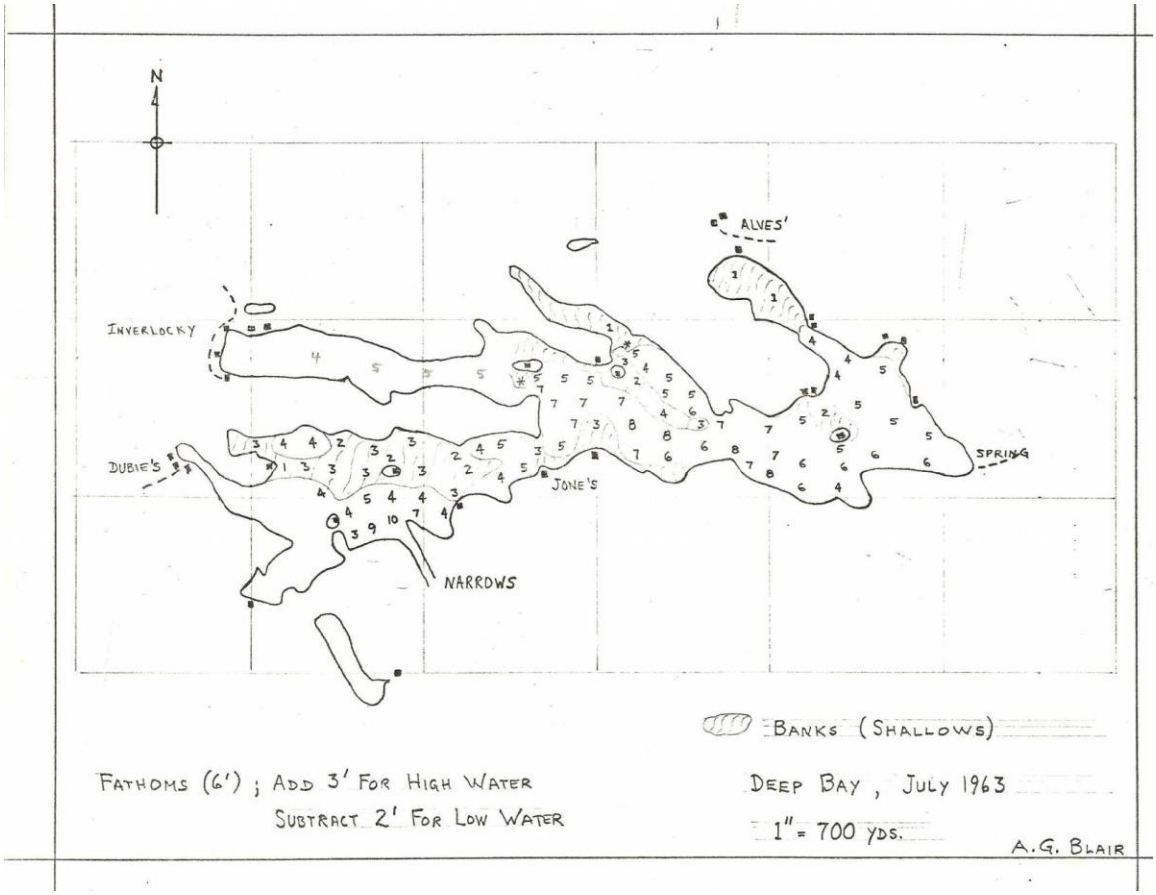
Deep Bay Area – Map 3.2
Carling Township OP 2011



Deep Bay Land Use Chart – Map 3.3
John Jackson - 2009



Deep Bay Bathymetric Chart 1978 – Map 3.4



Deep Bay Water Depth Chart – Map 3.5
AG. Blair 1963