



# Farren Lake State of the Lake Report

*2010 Update*

## Acknowledgements

**This report has been prepared by the Farren Lake Property Owners Association, with specific contributions from:**

- Lea Barker
- Branth Buckwell
- Ruth Buckwell
- Monte Doyle
- Bruce Easton
- John Ficner
- Eugenia Flett
- Greg Fox
- Gail Graser
- Martin Hiltz
- Jim Marshall
- Ian Peddie
- Jackie Stapledon
- Brian Stapledon
- Calvin Thompson
- Ann Williams

**Community Partners: FLPOA wish to thank their community partners for advice and assistance in preparing this report:**

- Anne Bendig, Ontario Ministry of Natural Resources
- Victor Castro, Ontario Ministry of the Environment
- Kathy Coulthart-Dewey, Tay Valley Township
- Susan Freeman, Tay Valley Township
- Laurel Grills, Ontario Ministry of the Environment
- Rick Hannah, Lanark County
- Karen Hunt, Otty Lake Association
- Barbara King, Community Stewardship Council of Lanark County
- Andrea Klymko, Rideau Valley Conservation Authority
- Jeff Kohl, Ontario Healthy Community Coalition
- Jennifer Lamoreux, Rideau Valley Conservation Authority
- Pat Larson, Rideau Valley Conservation Authority
- Dale McLenaghan, Ontario Ministry of Natural Resources
- Sarah Nugent, Ontario Ministry of Natural Resources
- Susan O'Brien MacTaggart, Greater Bobs and Crow Lakes Association
- Bart Poulter, Pike Lake Association
- Jamie Saunders, Mississippi-Rideau Septic Office

**Editing by:** Gord Rodgers, French Planning Services Inc. [www.lakeplan.com](http://www.lakeplan.com)

## Table of Contents

<i>Acknowledgements</i> .....	<i>i</i>
<i>Table of Contents</i> .....	<i>ii</i>

### State of the Lake Report

Chapter 1: Introduction .....	1
Chapter 2: Water Quality .....	2
Chapter 3: Natural Environment.....	10
Chapter 4: Fisheries and Fishing.....	12
Chapter 5: Water Quantity (levels and flows) .....	14
Chapter 6: Mining and Mineral Exploration .....	17
Chapter 7: Land Use and Development .....	18
Chapter 8: Emergency and Municipal Services.....	22
Chapter 9: Sense of Community .....	24
Next Steps .....	26

### Appendices

Appendix I – Flora and Fauna of Farren Lake Area .....	27
Appendix II – Data Gathering Tool for Creel Survey .....	31
Appendix III – Lakeshore Capacity Assessment .....	34

### List of Tables

Table 1 – Farren Lake Total Phosphorus Data .....	4
Table 2 – Farren Lake Secchi Data.....	5
Table 3 – Fall 2008 Temperature and Oxygen Profile.....	9
Table 4 – Splake Stocking in Farren Lake .....	13

### List of Figures

Figure 1 – Yearly Average Total Phosphorus Levels.....	4
Figure 2 – Yearly Average Secchi Depth (m).....	5
Figure 3 – Water Depths of Farren Lake .....	16

## Chapter 1: Introduction

Interest in, and commitment to, lake stewardship has been integral to Farren Lake cottagers for over a half century – since the lake was first developed. The Farren Lake Property Owners Association (FLPOA) was established in the early 1960s and incorporated in 1990 with a mandate to improve water quality, to protect and restore shoreline environment, to educate, and to advocate.

In 2006, FLPOA decided to begin a lake management planning process, and the 2007 survey and the 2008 conference with partners in the community set the stage for the current step in the planning process, a “State of the Lake” report. The purpose of the Farren Lake State of the Lake Report is to bring together information collected and reported over the years by the association and its community partners (municipality, conservation authority, and government scientists) on different aspects of the lake’s health and its surroundings. It represents an important step in the development of the Farren Lake Management Plan.

This “State of the Lake” report will serve as a tool for identifying concerns facing the lake and as a baseline for future monitoring and stewardship initiatives.

The 2007 survey of property owners revealed that the major concern was the conservation of the natural heritage of the lake, and, in particular, water quality. In addition, emphasis was given to the peaceful enjoyment of the lake and its surroundings. With these priorities in mind, this State of the Lake Report brings together current knowledge on the following areas:

- Water quality;

### The Lake Management Planning Process

- Step 1:** 2006 Endorsement at AGM
- Step 2:** 2007 Survey
- Step 3:** 2008 Conference with Community Partners
- Step 4:** 2009 State of the Lake Report
- Step 5:** 2009 Results & Visioning Workshop with Property Owners
- Step 6:** 2010 Informal Round-the- Lake Consultations: Desired Actions
- Step 7:** 2011 Final Lake Management Plan

- Water levels;
- Natural environment;
- Fisheries and fishing;
- Mining;
- Land Use and Development;
- Emergency and municipal services; and
- Sense of Community.

Included throughout the report are a series of “Actions for Consideration,” which represent some ideas from the Farren Lake Planning Team members and a starting point for the discussions with the Farren Lake community that will begin in 2009 and continue throughout the summer of 2010.

### The Lake and it’s Setting

Farren Lake is a relatively small lake (427 acres, and some 1.5 km. by 3.0 km), with an average depth of 27.3 ft., and a maximum depth of 70 ft. Development around the lake consists of 8 permanent residences, 122 seasonal structures and one commercial property. The lake is located in the Eastern Ontario, just west of the town of Perth, within the boundaries of Tay Valley Township, in Lanark County. It sits on the edge of the Frontenac Axis, a part of the Canadian Shield.

## Chapter 2: Water Quality

Thanks to the Rideau Valley Conservation Authority's "Watershed Watch" program, and the Ministry of the Environment's "Lake Partner Program", there is good information on the water quality of the lake. Farren Lake enjoys relatively good water quality as measured by the various sample results collected over the years. The key parameters measured, and the general water quality status of Farren Lake are:

### Total Phosphorous (TP)

Phosphorous is a nutrient that every lake needs to allow natural and normal growth of its aquatic plants. It's used as an important indicator of water quality, as it provides a good measure of the "trophic" state of the lake.

#### **Trophic State: "A lake's ability to support plants, fish, and wildlife".**

Scientists have devised a system to classify lakes according to their biological productivity. The items measured to determine status are: phosphorous levels; algae abundance; and water clarity.

**Oligotrophic lakes** have clear water, few aquatic plants, and few fish

**Mesotrophic lakes** have moderately clear water, a moderate amount of aquatic plants, and potential for lots of fish

**Eutrophic lakes** have poor water clarity, lots of aquatic plants, potential for lots of fish, and potential for regular and persistent algae blooms.

If too much phosphorous gets into the lake, the result can be a shift in the trophic level, accompanied by excessive weed growth and algae blooms. Phosphorous enters the lake naturally from the atmosphere and surface

runoff from within the lake's drainage area. The sources of phosphorous include:

- Household detergents;
- Fertilizers (household and agricultural);
- Animal waste, often from cattle if allowed to wade in streams; and
- Human waste, i.e., inadequate or poorly maintained septic systems.

It is difficult to classify Farren Lake in terms of nutrients because the phosphorous concentrations have fluctuated widely over the years (see Table 1, Figure 1). For example, in recent years, phosphorous concentrations were approximately 8.0 µg/L in 2005-06, which is similar to the recorded background (historical) phosphorous concentration of about 7.7 µg/L in 1996. This is a low nutrient, oligotrophic state. However, in recent years, the phosphorous concentrations have shown a modest increase, reaching mesotrophic (moderate nutrients) levels (above 10 µg/L). In 2008 the average total phosphorous concentration was 14 µg/L.

The variation in phosphorous may reflect the natural state of the lake as it receives nutrients from the surrounding watershed and its tributaries, various land use activities around the lake, and the rate at which water flushes through the lake system. Farren Lake's flushing rate (the time it takes the lake to undergo an exchange of its total water volume) is 0.3 times per year.

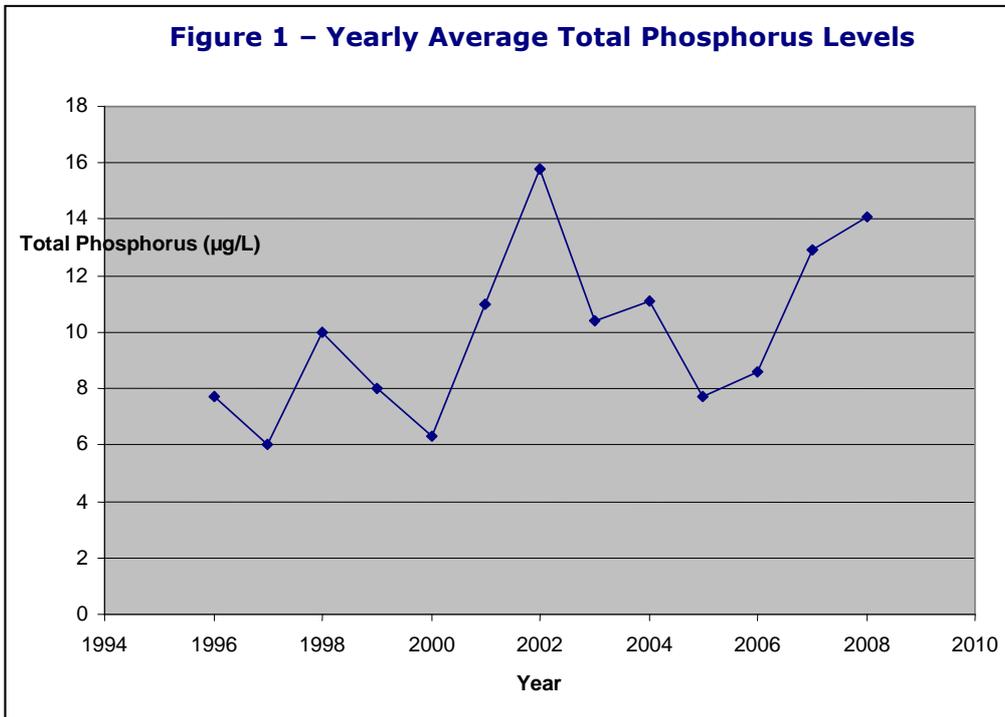
While broad comparisons are difficult because size, location, level of development and general ecosystems of the area all contribute to wide differences, a look at seven lakes within the Tay Valley Township shows that Farren Lake is below

average in spite of its small size. These data are taken from the Department of Environment tables for 2001 which is the most recent for this group of lakes:

<u>Lake</u>	<u>TP (uf/L)</u>
Adam's Lake	22
Black Lake	6
Davern Lake	16
FARREN LAKE	11
Little Silver Lake	20
Otty Lake	10
Pike Lake	10

**Table 1 – Farren Lake Total Phosphorus Data**

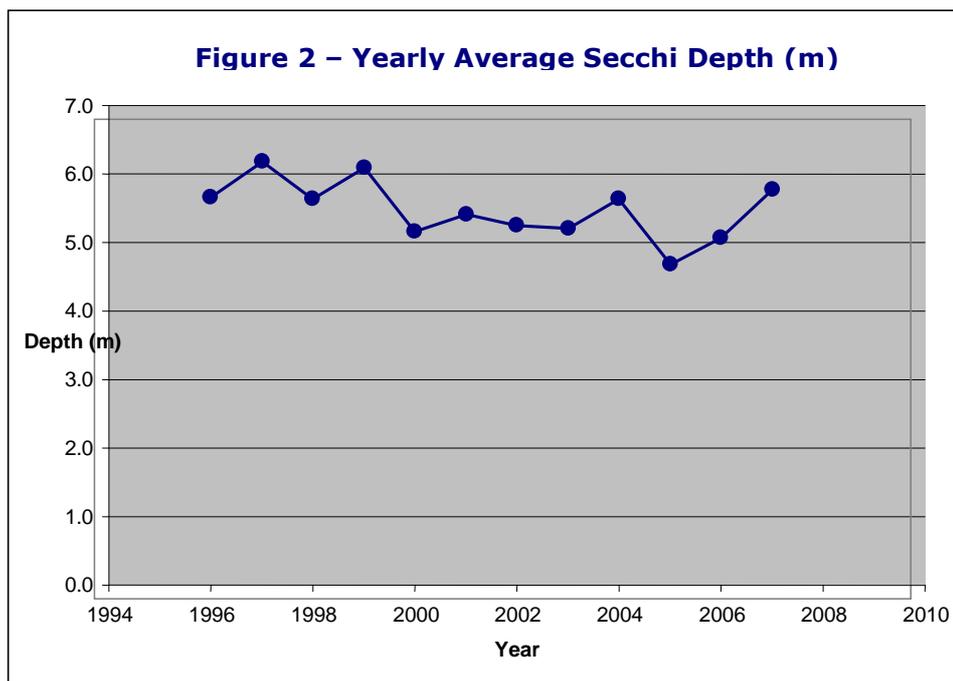
<b>Year</b>	<b>Average Total P (µg/l)</b>
1996	7.7
1997	6
1998	10
1999	8
2000	6.3
2001	11
2002	15.8
2003	10.4
2004	11.1
2005	7.7
2006	8.6
2007	12.9
2008	14.1



*Note: All samples were taken "mid-lake, deep spot" at Lat. 444533; Long. 76294.*

**Table 2 – Farren Lake Secchi Data**

<b>Year</b>	<b>Average Secchi Depth (m)</b>
1996	5.7
1997	6.2
1998	5.6
1999	6.1
2000	5.2
2001	5.4
2002	5.2
2003	5.2
2004	5.6
2005	4.7
2006	5.1
2007	5.8



*Note: All samples were taken "mid-lake, deep spot" at Lat. 444533; Long. 76294*

## Water Clarity

Since the last 2001 Lake Environment Report for Farren Lake, results from Secchi disk readings continue to be measured at greater than 5 meters depth (see Table 2, Figure 2). The Secchi depth readings have generally remained steady over time (1996-2007), showing that Farren Lake has good and consistent water clarity.

## Dissolved Oxygen (DO)/Temperature

Like terrestrial animals, fish and other aquatic organisms need oxygen to live. The measure of dissolved oxygen (DO) combined with water temperatures provides an important indicator of what kind of fish will live in a given lake, and how well they can be expected to survive. Trout, often referred to as "cold water fish," require higher oxygen levels and lower temperatures than do "warm water" species like bass. Average oxygen levels of about 7mg/l are necessary for the survival of trout, and about 4mg/l for bass.

The level of DO in Farren Lake water is reasonably good when compared to historical records. In 1947, measurements of DO were 7.4 mg/l (surface) and 5.4 mg/l (at 12 m depth), which compares well to 2001 levels of 8.2 mg/l and 4.2 mg/l. Results from 2008 (Table 3) suggest some deterioration of DO levels, but the 2008 sampling was not fully reliable because equipment failure only allowed one sample to be taken.

## Bacterial Counts

Part of the RVCA water quality monitoring includes regular sampling for bacteria. The level of Coliform bacteria in the water helps to indicate if there has been contamination of the water by animal or

### ***\*Dissolved Oxygen: Why Is It Important?***

*As water moves past the gills (or other breathing apparatus), microscopic bubbles of oxygen gas in the water, called dissolved oxygen (DO), are transferred from the water to the blood of the fish or other organism.*

*Like any other gas diffusion process, the transfer is efficient only above certain concentrations. In other words, oxygen can be present in the water, but at too low a concentration to sustain aquatic life.*

*Dissolved oxygen concentrations normally change dramatically with lake depth (see Table 3). Oxygen production occurs in the top portion of a lake, where sunlight drives the engines of photosynthesis.*

*Oxygen consumption is greatest near the bottom of a lake, where sunken organic matter accumulates and decomposes. In deeper, stratified, lakes, this difference may be dramatic - plenty of oxygen near the top but practically none near the bottom. If the lake is shallow and easily mixed by wind, the DO concentration may be fairly consistent throughout the water column as long as it is windy. When calm, a pronounced decline with depth may be observed.*

human waste. The average Coliform count continues to be about 2 cfu/100ml and has remained steady over the years. This would indicate there are very low levels of bacteria in the water in Farren Lake, and that waters do not pose a health concern for swimming and water contact recreational use.

## Invasive Species

The only known aquatic invasive species at this time is purple loosestrife, the commonly-found plant that invades shorelines and wetlands. Its spread has lessened over the years, and fear that it would have a profound impact on native

wetland plants may no longer be warranted.

However, two potential invaders of great concern are the zebra mussel and Eurasian watermilfoil (aquatic plant) known to be in some of the nearby waterbodies. Zebra mussels normally enter a lake from a contaminated lake by traveling on boat hulls, in bait buckets, or bilges. If they happen to be brought into Farren Lake, the conditions in the lake (notably calcium levels) are favourable for their survival. Experience from other locations tells us that, once they are in the lake, they will multiply quickly and there is no know way to get rid of them. Eurasian watermilfoil also enters lakes on boats hulls, in bait buckets, or bilges and like the zebra mussels, once introduced multiply very rapidly. The only way to deal with these invaders is to keep them out of the lake in the first place. Residents need to continue to take precautions to

### ***\*The Link Between "Pollution" and Oxygen:***

*To the degree that pollution contributes oxygen-demanding organic matter (like sewage, lawn clippings, soils from streambank and lakeshore erosion, and from agricultural runoff) or nutrients that stimulate growth of organic matter, pollution causes a decrease in average DO concentrations when the organic matter decays. If the organic matter is formed in the lake, for example by algal growth, at least some oxygen is produced during growth to offset the eventual loss of oxygen during decomposition. However, in lakes where a large portion of the organic matter is brought in from outside the lake, oxygen production and oxygen consumption are not balanced and low DO may become even more of a problem.*

*\*adapted from an article on the Water ON THE Web website.*

avoid bringing in invasive species and to ensure that access points to the lake have signs indicating what boaters can do to avoid infecting the lake.

FLPOA has been active in spreading the word about invasive species and how to deal with them. At the 2008 AGM, a pamphlet was given out that was prepared jointly by Ministry of Natural Resources and the Ontario Federation of Anglers and Hunters (OFAH), *Information for Boaters: Help Stop the Spread of Aquatic Invasive Species*. The 2008 President's Report dealt with this issue and the FLPOA newsletter provides ongoing education on how to recognize and avoid the movement of invasive species into Farren Lake. Detailed information on the subject is available on the website hosted by the OFAH, [www.invadingspecies.com](http://www.invadingspecies.com). In order to save Farren Lake from the scourge of aquatic invaders, it will take the vigilance of everyone on the lake or visiting the lake, and in particular:

- When bringing boats onto the lake clean your hulls (use hot water, pressure spraying, or 5 days out of the water) and empty you bilges;
- Anglers must take particular care that their bait buckets don't contain species like the round goby, or that their fishing gear is not contaminated by the spiny water flea.

### **Conclusion: The State of our Water Quality**

Overall, the water quality results show that Farren Lake's quality compares well with historic levels, and is generally well within the accepted Provincial Water Quality Objectives threshold values (specifically for bacteria and dissolved oxygen). However, there appears to be a slightly increasing phosphorous level from 1996 to 2008, with quite a bit of fluctuation year-to-year. In addition to

higher phosphorous levels in 2008, the limited results for dissolved oxygen show a lowering of the oxygen levels in the lake.

***Actions for Consideration:***

1. *Continue monitoring water quality but increase both sites and frequency;*
2. *Establish algae bloom monitoring for Farren Lake (type and frequency of appearance);*
- 3.a *Examine the readings for phosphorus for the years 2006-2011 to see if there is a clear upward or downward trend;*
- 3.b *Examine results for dissolved oxygen and corresponding water temperatures for the years 2006-2011 to identify any trends of concern;*
4. *Continue education and awareness programs about phosphorous and the importance of phosphate-free detergents, regular septic maintenance, and fertilizer-free properties;*

5. *Continue education and awareness programs about aquatic invasive species, especially zebra mussels and Eurasian watermilfoil; and*
6. *Continue to educate cottagers on the importance of well-constructed and maintained septic systems and other waste management systems. (See also the section on Land Use and Development for more strategies aimed at improving water quality).*



**Table 3 – Fall 2008 Temperature and Oxygen Profile**

<b>Farren Lake</b>				
<b>Depth (metres)</b>	<b>Temperature (deg. C.)</b>	<b>Dissolved Oxygen (mg/L)</b>	<b>October 3, 2008</b>	<b>Lake Stratification</b>
			<b>Saturation (%)</b>	
0.1	16.56	9.69	99.50	Epilimnion
1	16.61	9.62	98.75	
2	16.64	9.61	98.30	
3	16.65	9.59	98.50	
4	16.75	9.59	98.40	
5	16.64	9.57	99.00	
6	16.61	9.53	97.80	
7	16.53	9.51	77.05	
8	12.81	9.33	52.10	Metalimnion
9	10.57	3.35	3.20	
10	9.52	0.70	1.60	
11	8.65	0.44	1.30	Hypolimnion
12	7.99	0.22	1.10	
13	7.82	0.21	1.15	
14	7.77	0.17	1.15	
15	7.93	0.16	1.20	
16	7.95	0.15	1.15	
17	7.94	0.14	1.20	
18	7.96	0.14	1.25	
19	7.95	0.15	1.25	
20	7.94	0.15	1.30	
	Warm Water Fisheries Habitat (e.g. bass, walleye, pike) defined as Dissolved			
	Oxygen concentrations greater than 4mg/L at temperature less than 25 degrees Celsius.			

## Chapter 3: Natural Environment

### Geology

Farren Lake lies on the edge of the Frontenac Axis, a portion of the Canadian Shield that projects through this part of eastern Ontario to the St. Lawrence. As such, the lake is underlain by granite rock, as opposed to the limestone bedrock found just to the east. Thanks to the various glaciers that advanced and retreated through the area, the soils are quite shallow, and the landscape features many rock ridges (such as along the north shore of Farren Lake). The glaciers left a pattern of lakes with a decided northeast-southwest orientation to them.

### Forests

The forests in the watershed are mixed-wood of deciduous species (maple, birch, elm, white [American] elm, oak, aspen, alder, ironwood, ash, and willow) and coniferous species (pine, cedar, hemlock, balsam fir and spruce) (see tree species list in Appendix I). The age and quality of the forests reflect a history of active logging over the past 150 years until the mid- 20<sup>th</sup> Century. Since then, and with far fewer woodlots subjected to regular cattle grazing, the mixed forest cover provides a good diversity of habitat.



### Wetlands

There are small wetlands scattered across the watershed, and the lake contains larger shallow bays and swamps, especially at the east end. The wetlands add to the overall rich diversity of the area around Farren Lake.

### Flora and Fauna

The watershed of Farren Lake contains a broad spectrum of flora and fauna, typical of the rich mixed forests and wetlands that are present. No formal inventories have been done, but informal surveys have identified a variety of plants and animals in and around the lake, and these are listed in Appendix I. A few species are worthy of note:



- Osprey and great blue heron continue to thrive on the lake;
- Loons do not appear to be doing as well as no baby loons have been sighted in the last few years;
- Turkey vultures appear to be increasing in numbers;
- Wild turkeys, which were re-introduced to Ontario in the 1980s, are doing well in the Farren Lake area.

### Invasive Species

Although few aquatic invasive species have been found in the lake, the forests are threatened by several exotic menaces. Dutch Elm disease, which has been common in the area since the 1950's, continues to kill elm trees as soon as they reach a trunk size of about 12-20 inches in diameter. For several years now we

have been addressing the scourge of the Gypsy Moth with some success. A new insect scourge is the Emerald Ash Borer, an invasive insect that has been found in the Ottawa area; as it spreads, it is expected to devastate our ash trees over the next few decades. There is some evidence of ash die-off, on the north shore of Farren Lake, but it is not confirmed that it is a result of the emerald ash borer. The Asian Long-horned Beetle is also found in the watershed, an invader from Japan that attacks several species of hardwood trees.



species present or potentially present in the forests and the lake.

***Actions for Consideration:***

- 7. Begin a formal species listing of the plants and animals of the area;*
- 8. Consider joining province-wide or national monitoring programs, such as Frog Watch or Loon Watch;*
- 9. Confirm whether the emerald ash borer is present, and provide a general awareness campaign for the community;*
- 10. Monitor for the presence and spread of all exotic species, and continue to provide educational information to the community about exotic species.*
- 11. Identify "no wake" areas to protect loon nesting sites;*
- 12. Provide more illustrations of invasive species as part of the ongoing information and communication efforts towards all property owners (see also Actions 5, 6 and 10).*

## Chapter 4: Fisheries and Fishing

Farren Lake is predominately a bass lake, although trout have had a presence in the lake, as a result of stocking, for nearly 40 years. The lake also sustains populations of a wide variety of pan fish and coarse fish (see Appendix I for a list of species).

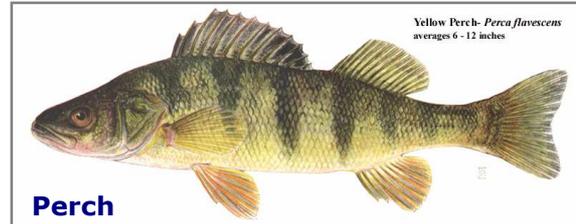
### What's in the Lake?

The first (and last) comprehensive netting survey was done by the Ministry of natural Resources in 1979. From that survey, the following picture emerged of the fish in Farren Lake 30 years' ago:

- Smallmouth bass are plentiful;
- Largemouth bass and rainbow trout are present, but in relatively low numbers (rainbow trout may no longer be present, as stocking ended in 1978);
- Perch and pumpkinseed are the most plentiful species in the lake;
- Blue gill, rock bass, cisco, white sucker, brown bullhead, and several species of shiner are also found.

J. Wayne Lashley, who undertook the 1979 survey, began his report by stating that Farren Lake is one of only two lakes in Lanark County in which rainbow trout have been successfully stocked. He goes on to say that management plans for the future include a significant intensification of stocking to meet recreational targets, and improvement of the inlet stream at the west-end of the lake to provide a natural spawning site for the trout.

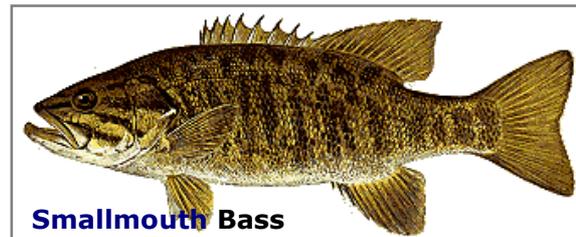
Lashley noted that the lake suffers from a summer oxygen deficit below a depth of 10 metres and states that, "due to the low oxygen levels in the deeper, cooler levels of the lake, the trout and one of their main prey, the cisco, have only 4 metres of water available to them to inhabit during summer".



Perch



Pumpkinseed



Smallmouth Bass



Splake

His report found that bass are at a competitive disadvantage due to a shortage of prime spawning facilities, and competition over spawning sites, with pan fish species (specifically pumpkin seed). As far as trout are concerned, he found conditions favourable. "Temperature conditions are cool enough to prevent stress; oxygen conditions are fine to at least 10 m throughout the summer... and there are no indications of severe oxygen

depletions in winter or summer; piscivorous habits (*meaning the habit of feeding on fish*) of larger fish could easily be satisfied by the large numbers of prey species (cisco being particularly available for predation in the rainbow trout's habitat)".

Another gill netting program was carried out by the Ministry of Natural Resources in 1998 and the results were in line with the 1979 findings. FLPOA has initiated a Creel Survey this summer (2009) to determine what people are currently catching in the lake. Appendix II contains the data gathering tool.

### Stocking the Lake

As was discussed in Chapter 2, Water Quality, Farren Lake's oxygen levels have been sufficient for the survival of trout species. Given this fact, stocking rainbow trout began on an occasional basis in 1957. Annual stocking by the Ministry of Natural resources began in 1972 and continued until 1987, and although the stocked trout survived, they did not have the conditions that allowed for them to reproduce naturally.

The MNR changed to stocking splake (a hybrid species that is more tolerant of lower oxygen levels than Rainbow trout) in 1988, and has continued that stocking program each year since then (see Table 4). Splake can live to ages of 16-20 years, and will grow over those years, but because they are a hybrid species, they very rarely spawn. The splake's continued survival here may be limited if it is confirmed that the lake's dissolved oxygen levels are going down (splake require dissolved oxygen levels of at least 5mg/l to survive.)

### Conclusion: The State of our Fish

Fisheries information is dated. The last comprehensive survey was in 1979, which showed that Farren Lake supports a variety of warm water fish, with high numbers (and good sizes) of perch and pumpkinseed. The lake also has conditions that have allowed stocked splake (in previous years, rainbow trout) to survive. As noted in Chapter 2, dissolved oxygen levels in the lake show a reduction, and if lower levels are confirmed and continue, they may be too low to support healthy trout populations.

**Table 4 – Splake Stocking in Farren Lake**

Year	# of Fish
1988	8000
1989	5900
1990	5500
1991	7933
1992	6500
1993	5500
1994	9120
1995	6500
1996	7500
1997	5500
1998	5500
1999	4500
2000	5000
2001	5000
2002	5000
2003	13750
2004	28500
2005	28500
2006	-
2007	19950
2008	28000
2009	28000

### Actions for Consideration:

13. Obtain updated data from the 2010 fisheries survey from MNR; and
14. Conduct voluntary catch survey in 2010.

## **Chapter 5: Water Quantity (levels and flows)**

---

Perhaps the single most important characteristic of Farren Lake is that the water level is largely controlled, meaning that the water levels we see are the result of human operation rather than purely natural phenomena. The lake levels are managed for the maintenance of the lake environment including sustaining the necessary depth (shallows) for fish and fowl breeding and for the maintenance of water levels for sports and enjoyment.

### **Water Inputs and Outputs**

Farren Lake receives water from three main sources:

- rainfall directly over the lake area;
- rainfall over the ground surrounding the lake; and
- drainage from O'Brien Lake via a creek at the east end of the lake.

There have been stories about the lake being spring fed but we have been unable to find that spring to confirm the stories.

Water is removed from the lake in four significant ways:

- the output drain at the control dam;
- the natural drain near the dam;
- evaporation; and
- withdrawals by lake residents.

### **Water Level Management**

The water level of Farren Lake is managed by the operation of a dam located at the end of the north-east bay. The dam consists of a concrete structure to contain the water and to hold the logs used to regulate the levels. Within the dam structure there is a slip which holds square logs stacked on top of one another. The number of logs stacked determines the level of the lake. When it is necessary to lower the lake level the

operator removes one or more of the logs by way of a hoist.

The dam is operated by the Ministry of Natural Resources, who has been doing well at maintaining appropriate water levels, especially since the logs were adjusted and replaced in the 1997-98 period.

The water level is manually adjusted each fall to lower the overall level in order to capture much of the spring runoff to relieve the pressure on the downstream bodies such as the Tay and Rideau Rivers. After that freshet the logs are re-set to try to maintain a July level of 0.92 on the new metric water gauge (which was about 3.0 on the old gauge). This is a target level that was agreed upon by a majority of cottage owners at an Annual General Meeting in the 1990's and in discussion with the MNR.

### **Water Level Monitoring**

The level of the lake is monitored by a depth gauge located near the dam. The gauge is monitored regularly by the MNR for adjustments to the dam. For many years our own Lea Barker has been recording the depths every week. Lea has also been coordinating the maintenance of the levels with the MNR personnel (currently Dale McLenaghan) and has been instrumental in achieving the success we have had in maintaining the water level necessary to support wildlife and our enjoyment.

### **Water Level Influences**

While the water level can largely be managed through adjusting the dam, nature has a major influence on the lake levels.

**Weather:** When we experience low precipitation (drought) there is no way for us to increase the depth of the lake water and so the water level will become lower via evaporation. This has been illustrated in recent years such as 2006 and then more so in 2007.

**Beavers:** Another factor is the presence of beaver dams at the entrance to the O'Brien Lake creek, which feeds into Farren Lake. Occasionally beavers build a dam which holds back water into O'Brien Lake and restricts the flow into Farren Lake. At other times people remove the beaver dam, which then lowers the water in O'Brien Lake and increases the flow into Farren Lake. There are mixed opinions on whether there should or should not be beaver dams, however, we should not arbitrarily remove these dams until we understand the current lake levels and therefore the impact on both Farren Lake and O'Brien Lake. There may be times when the onrush of water from the removal of the dam can actually damage both lakes.

There are also beaver dams being built around the area of the control dam, both at the natural outlet and sometimes at the dam grating itself. The culvert leading to the dam was removed in 2008, so that potential site for beaver damming no longer exists. Thus for the MNR, beaver debris is easier to remove when it is deposited at the dam grating.

### **Flow of Water**

From the control dam, the water flows through a culvert into an area called Mud Lake. Some of the water is stored in Mud Lake by virtue of a beaver dam holding it back. In spring while the freshet flows one can often see a waterfall where the water releases from Mud Lake into the outflow creek leading to the Tay River.

### **Water Depths**

The depth of the lake varies from the shore line to areas in excess of 65 feet deep. Map 3 illustrates the variety of depths in the lake. These readings are approximate and should not be taken to indicate safe boating or swimming. These readings will also vary based upon the time of year and the overall lake levels.

### **Conclusion: The State of Our Water Quantity**

It is the view of the FLPOA that the lake levels are managed very well given the competing interests and natural fluctuations with which the operators must contend. There may be improvements that could be made and their potential should be investigated. The impact of beaver dams and the effects of their removal need to be better understood.

### **Actions for Consideration:**

15. *Build a relationship and discussion with residents on O'Brien Lake to better understand the impacts of the beaver dams (on docks, shorelines, fish habitat), and to coordinate any removals;*
16. *Continue the excellent relationship that Lea Barker has built with the MNR related to the dam and water levels for the lake; and*
17. *Work with the MNR to establish protocols to deal with the beaver dams (research the potential for use of flow devices to counteract the beaver activity without removing the beaver), and educate everyone on those procedures and responsibilities.*

**Figure 3. Water Depths of Farren Lake**



## **Chapter 6: Mining and Mineral Exploration**

---

Although there is no current mining or active mining exploration taking place around Farren Lake, there has been evidence of uranium, iron, lead, mica and small amounts of gold and silver in the general area. The commercial viability of any of this is questionable, however.

### **Mineral Rights as an Issue**

Mining and mineral exploration has been an issue in eastern Ontario over the past several years. The issue arises from the way the *Ontario Mining Act* assigns mineral (or sub-surface) rights. The Act permits staking of mining claims and mineral exploration on private land without the permission of the landowner where the land owner owns only the "surface" rights. Since some landowners in this area do not own the sub-surface rights, their property could be subject to exploration activities that include tree removal, bulldozing, and digging of pits and trenches.

The *Mining Act* is in the process of amendment, and the bill that proposes changes to the act has received 1<sup>st</sup> and 2<sup>nd</sup> reading with the 3<sup>rd</sup> expected in the fall of 2009. Under the new legislation, all "surface rights only" land that is not currently staked is withdrawn from mining in southern Ontario (south of the French and Mattawa Rivers). The new legislation does not address the role of municipalities in land use planning related to mining lands, nor does it indicate how environmental impact will be minimized in future mineral exploration and mining. Mineral exploration and mining are exempt from the *Environmental Assessment Act*.

While the proposed legislation does remove some of the worry about mining claims and exploration happening on land without the owner's permission, it may not provide for permanent unification of surface and mining rights.

### **Conclusion: The State of Our Mining Rights**

There are no apparent activities in the immediate area of Farren Lake, although some exploration in the past has indicated mineral potential does exist. The proposed changes to the Mining Act may resolve the concerns of land owners in eastern Ontario, but the changes have not yet been passed as legislation, nor is it completely clear that the new legislation will actually tie surface and mineral rights together legally, once and for all.

### **Actions for Consideration:**

18. *Monitor the progress of the new bill (revision of the Mining Act) and watch to see that the issue of mining rights is effectively dealt with;*
19. *Keep the Farren Lake community aware of the issue.*

## Chapter 7: Land Use and Development

At the present time, most of the shoreline of Farren Lake has been developed. A large majority of the 130 developed properties contain seasonal cottages, with only 8 year-round residences, and one property that operates as a commercial venture (Cobblestones Resort Cottages).

The only crown owned lands at Farren Lake are the small islands and a small section towards Mud Lake.

### New Development

New development on the lake has been the subject of heated debate in the Farren Lake community, to the point in the early 1980s when FLPOA argued against zoning changes that would open the lake to additional development.

While some additional development was approved, this was only done within the parameters set out in the revised Tay Valley Township Official Plan and FLPOA had significant input to this revision.

At the time, the lake had 105 dwellings (130 today), and the arguments centred around the minimum size of allowable lots and minimum lengths of lakeshore

very good, and experts from the Ministry of Natural Resources and Ministry of Environment supported the FLPOA position of requiring a larger lot size and frontage requirement.

Since the debates of the 1980s, the municipality has revised its lot creation

### The Tay Valley Zoning Bylaw lot requirements for new lakeshore development (residential):

- 0.8 ha. (2 a.) minimum lot size;
- 60m (200 ft.) minimum lot frontage;
- 30m (100 ft.) building setback from shoreline

policies as a whole, and the current requirements are as noted in the box on this page.

There is still undeveloped land along the lakeshore of Farren Lake. The Crown land is not likely ever to be to be released to the public for development purposes. Existing single lots on the lake could be developed, and some of the larger lots could be divided up (by severance or subdivision) and subsequently developed.



frontages. Water quality at the time was very good. Photo taken before most cottages were built

Of the 24 vacant lots remaining on the lake, only 3 are large enough to subdivide:

- 89.09 acres, with 518 ft. of frontage
- 39.41 acres, with unspecified frontage;
- 4.07 acres with 610 ft. of frontage

### **Lakeshore Capacity Calculations**

The Lakeshore Capacity Assessment Model was used by a member of FLPOA to calculate the carrying capacity of Farren Lake based on potential phosphorous input. (the model used is contained in: "Lakeshore Capacity Assessment Handbook: Protecting Water Quality in Inland Lakes on Ontario's Precambrian Shield", Consultation Draft, December 2007, prepared by Ontario Ministries of the Environment, Natural Resources, and Municipal Affairs and Housing) The calculations are summarized in Appendix III. The total theoretical level of phosphorous in the lake based on full development of the remaining 24 vacant lots is 10.02 µg/L; the actual phosphorous count on the lake in 2007 and 2008 is in excess of this number). The conclusion drawn from this capacity calculation is that further development on Farren Lake will result in water quality impairment. This would arise as phosphorous levels currently exceed provincial water quality objectives (which is calculated as the estimated natural level of 3.93 ug/L plus 50%), and additional development would be expected to increase the current level of phosphorous in the lake.

### **Second Tier Development**

To date, there have been no proposals to develop "second tier" or backlot properties on the lake. Should such proposals come forward, there are no specific policies in the Official Plan or Zoning Bylaw to address this type of development. This

type of development may bring potential additional phosphorous as well as increased use of the lake by boaters.

### **Septic Systems**

Many of the cottages have been here since the 1960s. These older cottages are located close to the shore, and began with very rudimentary septic systems (metal tanks and small tile fields). Over the years, most septic systems have been upgraded, and recent development would have been subject to stringent requirements for septic treatment.

In 1995, a survey sponsored by the Ministry of the Environment was conducted and student surveyors gathered information from all but 7 owners around the lake. The results showed:

- It was found that at least 12 different types and combinations of sewage disposal systems were in use on the lake. In terms of major categories:
- 46% of properties relied on a septic system alone;
- 28% relied on a septic system in combination with a leeching pit (dry well), pit privy or cesspool;
- 14% relied on a pit privy alone or in combination with a leeching pit;
- 8% relied on a holding tank, either alone or in combination with a leeching Pit;
- 3% relied on a chemical or composting toilet in combination with a pit privy and leaching pit.

A voluntary septic re-inspection program was introduced in the Tay Valley Township in 2000. The program is operated by the Mississippi Valley Conservation Authority and Rideau Valley Conservation Authority through the Mississippi-Rideau Septic System Office. In 2007, a total of 27 Farren Lake properties were inspected. Along with the 24 re-inspections done

between 2002 and 2004 (prior to the current program), about half the properties on the lake have been inspected. Re-inspection of Farren Lake septic systems is slated again for 2010.



### **Shoreline improvement**

The thin line along the shore of a lake is thought of as the “Ribbon of Life,” because of the important role it plays in maintaining water quality, protecting against erosion, and providing valuable habitat for fish, birds, mammals, and other wildlife. If this area is maintained or restored to a reasonably natural state, it can greatly benefit the overall health of the lake. In the 1980s and 90s, Farren Lake worked with a group called MAPLE (Mutual Association for the Protection of Lake Environments) to restore shorelines to a more natural state. Some 25% of property owners around the lake took advantage of the MAPLE program, which encouraged shoreline restoration by providing seedlings, plants, assistance and advice from volunteers. The results of that work are clear when one travels around the lake today.

### **Conclusion: The State of Our Land Use and Development**

Farren Lake is primarily a cottage lake, with only eight permanent homes, and one commercial resort. Potential exists on

the lake for more development, but new development may have an adverse effect on the lake, given the results of the “Lakeshore Capacity Assessment” analysis that has been done.

### **Actions for Consideration:**

20. *Confirm the lake capacity calculations and conclusions with Ministry of the Environment, RVCA, and Tay Valley Township;*
21. *Convey to TVT our primary concern for the preservation of water quality when applications from property owners of Farren and O’Brien Lakes for severances, variances, conversions to permanent residences and site plan approvals;*
22. *Request TVT to include in their development decisions: consideration of water quality impacts (additional to phosphorous) such as dissolved oxygen; number of undeveloped lots; frequency of algae blooms; and other changes in lake health;*
23. *Request to TVT to introduce mandatory septic re-inspection program at a maximum of every five years to meet provincial standards for Farren Lake;*
24. *Continue to support Zoning By-laws on cottage and septic setbacks;*
25. *Support improved septic technologies (including tertiary treatment) for replacement systems and new development;*
26. *Request changes to the Zoning By-law that require restrictions on backlot development and restrictions on condominium or shared ownership developments;*
27. *Further explore the impact on water quality of cottage conversion to year round permanent homes;*
28. *Continue the awareness campaign about the importance of natural shorelines and vegetated buffer zones, and make land owners aware of the technical and financial assistance that is available from the RVCA for shoreline naturalization projects; and*

*29. Encourage landowners to participate in the septic re-inspection program, and provide awareness about the importance of well-constructed and maintained septic systems.*

## **Chapter 8: Emergency and Municipal Services**

---

### **Waste Management**

Tay Valley Township has a fairly comprehensive waste management plan and approach. The municipality is responsible under the Ministry of the Environment regulations and permits to operate its waste management program.

Tay Valley Township's dump sites are in Maberly, Glen Tay and Stanleyville.

The Township partners with Lanark Highlands to provide hazardous waste collection days at the Lanark Highlands Waste site throughout the summer for Tay Valley taxpayers; this site accepts controlled items that cannot be disposed at the three municipal waste sites, such as batteries, old paint, oil and other solvents. Tay Valley continually expands and encourages waste diversion through recycling efforts.

### **Road Maintenance**

The increasing number of cottages, new homes and other traffic in the area place a growing burden on the main county and township roads servicing Farren Lake. Every time a new building is built or an existing structure is renovated large trucks cause extra stress on this infrastructure.

Generally the county and township are good about addressing road repairs and maintenance within the constraints of their annual budgets.

The local roads that provide direct access to Farren Lake (most are indicated as Farren Lake Lane xx) are the responsibility of the various property owners who use that road. Most roads have some form of committee who address the needs for improvements and maintenance for their road. It should be

noted that the Fire Rescue Services do require that all roads are sufficiently wide and branches cleared so that fire trucks, etc. are able to navigate the road.

### **Emergency Services**

Police, fire and paramedic services are essential for the safety of our lake residents, especially in summer when the population swells dramatically.

**Fire Rescue** services are provided by Tay Valley Township with the closest station located in Maberly at the junction of highways 7 and 36. The Fire Rescue service provides both fire fighting and paramedic services. This is a volunteer service and it has always been actively supported by the FLPOA. Despite the best efforts of our emergency service providers, we live in a rural area that is not easily served. Although the fire crews arrive as quickly as they can, often they cannot get there in time to save structures, and are able to deal only with keeping the fire from spreading.

**Police:** Farren Lake and the surrounding area is policed by the Lanark County Ontario Provincial Police (OPP) detachment, with the main station on Highway 7 in Perth. The location is of little importance in response times as most officers are on the road when on duty. When there is a significant event the police response is good considering the location of the lake and distance from major centres. For minor events such as break and enter and thefts, once a report is made to the OPP they provide a reporting number to the victim who subsequently provides that number to their insurance company. There is normally no investigation of such minor events.

Tay Valley Township is a relatively crime-free community with declining trends in the incidence of “break and enters” and mischief, and a relatively static position in assaults and thefts. The OPP contract for Tay Valley is for 3.37 officers and 0.52 civilians for a total of 3.89 “positions”.

**Ambulance** services are provided by Lanark County. The station is located in Perth and response time to Tay Valley Township has been fairly consistent over the past years at an average of 22 to 23 minutes. In 2007 there were 142 ambulance calls to Tay Valley, out of a total for the county of 14,086. It should be noted that the Fire Rescue Service does have a paramedic service but their response times may or may not be any faster in their response time, depending on a variety of factors, such as time of day, season, and weather.

### **Conclusion: The State of Our Emergency and Municipal Services**

Farren lake residents, both permanent and seasonal, generally enjoy close cooperation and good services from the Township and the other emergency service providers (fire, police, and ambulance). As is common in cottage country in Ontario, our services are somewhat limited. Because lakefront properties are assessed at greater rates than non-lakefront properties, our taxes generally increase at greater rates than other residents.

### **Actions for Consideration:**

30. *Continue regular meetings with the OPP, Emergency Medical Services, and Fire Department to discuss FLPOA needs;*
31. *Continue to provide awareness and education to residents concerning all aspects of emergency services, including the need for 15-ft. road way clearance and need for vigilance (e.g., spreading of fires); and*
32. *Advocate on behalf of the property owners for holding tax increases to reasonable increases through continued participation with Federation of Ontario Cottage Owners (FOCA) and Waterfront Ratepayers After Fair Taxation (WRAFT).*

## Chapter 9: Sense of Community

Even before the Farren Lake Association - the forerunner of the present day Farren Lake Property Owner's Association - was formed, a sense of community already existed among the cottagers of the day. Numbers were small, but cottagers were learning from each other. Of course, it helped that the most convenient place to get groceries and gasoline was at the end of the lake. All it took was a trip down the lake, either by canoe or by motor boat, mooring at the store dock, and then hiking up the hill to Herdman's store. Once inside, you were greeted by Rose or Bill, or both. Sometimes their daughter Janet was on hand to chat with you too. Rose seemed to have a handle on just about everything that was going on around the local area. More often than not, there were other cottagers at the store too; offering a time to catch up on what each other was doing at their place. It would also help that the municipality was actively promoting the application for cottage building permits, and the township clerk, Shirley Deacon, lived close by. Shirley was very helpful when it came to seeking information from the municipality, and she keenly supported construction applications and activity.

The formation of the initial "Farren Lake Association" gave cottagers a valid reason to get together several times over the summer months. The Annual Meeting and Dinner in May was a time for reunion after the winter had passed. People would tell each other of how their place fared over the winter, and what their plans were for the upcoming summer. At first, the annual meetings were held at the Tweedsmuir Hotel (now the Cove) in Westport where they drew a good crowd. Subsequently, the venue for the annual meetings was



moved to the Althorpe Bolingbroke Community Hall in Bolingbroke, with the dinners, for a while, catered by cottagers Debbie Ficner and Jane Venables - with recruited family members for help. BBQ strip loin steaks were the main entree at the dinner. In later years, the dinner was changed to Afternoon Tea which was catered by the local Ladies' Auxiliary.

When August came, it was usually time for the annual Farren Lake Fun Day. A flag led flotilla usually preceded this event which was primarily held at Hanna's Beach. On occasion, it was held at two other larger beaches at different locations around the lake. Participants enjoyed the



annual fishing derby, sand castle building

competitions, swimming races, canoe races, gunwale races, and other fun and sometimes challenging activities. Rene St. Amour always provided the candy floss machine. As one can imagine, it was a huge hit every year.

The many cottages with active sailors usually provided a crew for the annual Sailing Regatta. Some crews of passive sailors also were encouraged to participate, but were not expected to finish the races.

Over many summers, other community events such as Fish Frys and Pancake Breakfasts were sponsored by the Bellangers from Rochester, N.Y. at their cottage on the south shore. Many cottagers enjoyed these wonderful summer experiences. What will it take to rekindle this sense of community? A willingness of two or three cottagers to champion the benefits of community

spirit, and the dedication of these individuals to successfully plan and conduct similar events in future cottaging seasons.

***Actions for Consideration:***

- 33. Encourage and support property owners to champion and organize community building activities and projects of interest, e.g., nature orientation activities, walks, barbeques, fishing derbies, community picnics/meals, bio-blitz etc.;*
- 34. Build on the sense of community that has been developing on individual Farren Lake roads; and*
- 35. Property owners can arrange and hold various community events as in the past when it is understood that all individuals are responsible for their own welfare thus negating the issue of corporate insurance and the threat of litigation.*

## ***Next Steps***

---

The State of the Lake Report will be the subject of discussion at the Residents' Workshop on August 15<sup>th</sup>, 2009. Following that workshop, the Lake Planning Committee will conduct informal consultations around the lake to confirm the vision for the lake and the actions that are proposed in the report and at the workshop.

The State of the Lake Report provides a vital step in the production of a management plan for the lake. In 2010, the committee will start to draft the Farren Lake Management Plan, and will provide another workshop-style meeting to find a consensus on the contents of the draft plan. The final plan is expected in 2011.

## **Appendix I:**

### **Flora and Fauna of the Farren Lake Area**

NOTE: In the following list of flora and fauna, a few species are listed on Ontario's "Species at Risk" and these are shown in **bold font**.

## Trees:

An informal survey of the lakeshore, done for the Lake Management Planning exercise, shows the following major species of trees, in a littoral zone about 200 meters back from the shore. The list is compiled in approximate order of magnitude of occurrence.

Cedar (primarily shore-line)	<i>Thuja accidentalis</i>
Maple (sugar)	<i>Acer saccharum</i>
Oak (white)	<i>Quercus rubra</i>
Hop hornbeam (iron-wood)	<i>Ostrya virginiana</i>
Birch (paper)	<i>Betula papyrifera</i>
Pine (white)	<i>Pinus strobus</i>
Ash	<i>Fraxinus americana</i>
Spruce (white)	<i>Picea Glauca</i>
Aspen	<i>Populus tremuloides</i>
Balsam	<i>Abies balsamea</i>
Basswood	<i>Tilia americana</i>
Tamarack (larch)	<i>Larix laricina</i>
Hemlock	<i>Tsuga canadensis</i>
Willow	<i>Salix bebbiana</i>
Slippery elm	<i>Ulmus rubra</i>
Sumach, staghorn	<i>Rhus typhina</i>
Juniper	<i>Juniperus communis</i>
Prickly ash	<i>Zanthoxylum americanum</i>
Hawthorn (cockspur)	<i>Fagus grandifolia</i>
Dogwood (red osier)	<i>Cornus stolonifera</i>
Alder (speckled)	<i>Alnus incana</i>
American (white)elm	<i>Ulmus Americana</i>
American Beech	<i>Fagus grandifolia</i>
Shagbark Hickory	<i>Carya ovata</i>
Bitternut Hickory	<i>Carya cordiformis</i>
Poison Ivy	<i>Toxicodendron radicans</i>
Poison-Sumac	<i>Toxicodendron verni</i> . (Sometimes called Poison-Eldeberry.)

## Water plants:

The same survey shows the following water and close-shore plants, though not in order of occurrence. These plants are generally found in shallow sheltered coves and bays where the water is relatively undisturbed by wave action. Their occurrence also indicates a lake- bottom rich in sediments.

White water lily	<i>Lilium philadelphicum</i>
Cat-tails	<i>Typha latifolia</i>
Marsh grass	
Leafy three-square	<i>Scirpus robustus</i>
Arum	<i>Calla palustris</i>

Blue flag	<i>Iris versicolor</i>
Closed gentian	<i>Gentiana andrewsii</i>
Swamp milkweed	<i>Asclepias incarnata</i>
Milfoil	<i>Myriophyllum aquaticum</i>
Swamp pink	<i>Helonius bullata</i> (rare)

## Land plants in littoral zone:

These plants are types noted on shore from the high-water mark (where ice does not generally destroy their habitat) to a distance of approximately 200 feet from the shore. The data represent an informal survey over several years of observation and photography of the plants listed. It is a representative list, but no doubt incomplete.

Wood Lily	<i>Lilium philadelphicum</i>
Purple-flowering raspberry	<i>Rubus odoratus</i>
Wild Columbine	<i>Aquilegia canadensis</i>
Herb Robert	<i>Geranium robertianum</i>
False Solomon's Seal	<i>Smilacina racemosa</i>
Wild asters	Several varieties
Wild strawberry	<i>Fragaria vesca</i>
Pea vine	<i>Desmodium canadense</i>
Moneywort	<i>Lysimachia nummularia</i>
Milkweed, common	<i>Asclepias syriaca</i>
Stiff Aster	<i>Aster linariifolius</i>
Bittersweet Nightshade	<i>Solanum dulcamara</i>
Catnip	<i>Nepeta cataria</i>
Touch-me-not	<i>Impatiens pallida</i>
Round-lobed Hepatica	<i>Hepatica Americana</i>
Trillium	<i>Trillium grandiflorum</i>
Wild grape	<i>Vitis riparia</i>
Yellow Goatsbeard	<i>Tragopogon dubius</i>
Queen Anne's Lace	(Wild carrot) <i>Daucus carota</i>
Water Lilly	<i>Nymphaea odorata</i>
Northern Honeysuckle	<i>Diervilla Ionicera</i>
Mitrewort	<i>Mitella diphylla</i>
Early Meadow Rue	<i>Thalictrum dioicum</i>
Wild Sarsaparilla	<i>Aralia nudicaulis</i>
New jersey Tea	<i>Caenothus americanus</i>
Common burdock	<i>Arctium minus</i>
Goldenrod	<i>Solidago rugosa</i>
Common mullein	<i>Verbascum thapsus</i>
Dutchman's breeches	<i>Dicentra cucullaria</i>
Hedge bindweed	<i>Convolvulus sepium</i>
Purple loosestrife	<i>Lythrum salicaria</i> (invasive species)
Live-forever	<i>Sedum purpureum</i>
Common buttercup	<i>Ranunculus acris</i>
Viper's bugloss	<i>Echium vulgare</i>
Daisy fleabane	<i>Erigeron annuus</i>
Black-eyed susan	<i>Rudbeckia hirta</i>
Oxeye daisy	<i>Chrysanthemum leucanthemum</i>
Poison ivy	<i>Rhus radicans</i>

## Amphibians, reptiles and fish:

### Snakes

Common Garter snake	<i>Thamnophis sirtalis</i>
Northern Water Snake	<i>Nerodia sipedon sipedon</i>
Smooth Green Snake	<i>Opheodrys vernalis</i>
<b>Eastern Rat Snake</b>	<b><i>Elaphe obsoleta obsoleta</i> (Threatened)</b>

### Frogs and Toads

Grey Tree Toad	<i>Hyla versicolour</i>
American Bullfrog	<i>Rana catesbeiana</i>
American Toad	<i>Bufo americanus</i>
Spring Peeper	<i>Pseudacris crucifer</i>
Wood Frog	<i>Rana sylvatica</i>
Green Frog	<i>Rana clamitans</i>
Crayfish	<i>Orconectes virilis</i>

### Turtles

Common Snapping Turtles	<i>Chelydra serpentina</i>
Painted Turtle	<i>Chrysemys picta</i>
<b>Northern Map turtle</b>	<b><i>Graptemys geographica</i> (Special Concern)</b>

### Other

Crayfish	<i>Orconectes virilis</i>
----------	---------------------------

### Fish

Smallmouth Bass	<i>Micropterus dolomieu</i>
Largemouth Bass	<i>Micropterus salmoides</i>
Splake	<i>Salvelinus fontinalis</i> X <i>Salvenius namaycush</i>
Yellow Perch	<i>Perca flavescens</i>
Pumpkinseed	<i>Lepomis gibbosus</i>
Bluegill	<i>Lepomis macrochirus</i>
Rock Bass	<i>Ambloplites rupestris</i>
White Sucker	<i>Catostomus commersoni</i>
Cisco	<i>Coregonus artedii</i>
Brown Bullhead	<i>Ameiurus nebulosus</i>
Yellow Bullhead	<i>Ameiurus natalis</i>
Golden Shiner	<i>Notemigonus crysoleucas</i>
<b>Bridled Shiner</b>	<b><i>Notropis bifrenatus</i>(Special Concern)</b>
Spottail Shiner	<i>Notrois hudsonius</i>
Blackchin Shiner	<i>Notropis heterodon</i>
Blacknose Shiner	<i>Nptropis heterolepis</i>
Common Shiner	<i>Luxilus cornutus</i>
Banded Killifish	<i>Fundulus diaphanus</i>

There may also be a few Rainbow Trout (*Oncorhynchus mykiss*) still surviving in the lake, as they used to be stocked.

## **Appendix II**

### **Data Gathering Tool for Creel Survey**

## Creel Census

In the summer of 2009, a creel census is being conducted on Farren Lake through the cooperation of anglers on the lake. The creel census will ask anglers to fill out a fishing diary. Anglers have been given the following instructions to follow when keeping their diaries, along with a form to fill out (see following page).

### Farren Lake Angler's creel census/diary

Your cooperation in completing this fish survey will help us evaluate fisheries management and research efforts in Farren Lake.

Please follow the instructions on this page carefully.

#### ***As an active angler, you can help protect and improve your sport by:***

1. Recording accurately your fishing effort and catches on this sheet and return it to your road representative or email / mail to Martin Hiltz (see sheet).
2. Reporting infractions of the fishing regulations to the nearest MNR office as soon as possible.
3. Protecting fish habitat.
4. Practicing good resource stewardship, e.g., never release live baitfish, or transfer fish from one water body to another
5. Using barbless hooks.
6. Try fishing for some often underutilized fish species such as rock bass, sunfish, yellow perch, and suckers. It provides a better balance to the harvest, and you will likely be pleasantly surprised by the quality and taste.

#### ***How to fill the Farren Lake fishing census /diary:***

***Note: if you did not catch any fish please indicate this on the form.***

- 1.) The date you went fishing – i.e., 2009-05-15 or May 15 09
- 2.) The species of fish caught. i.e., Smallmouth Bass (**SB**), Largemouth Bass (**LB**), Splake (**S**) or other please specify.
- 3.) **Approx. length** in cm or inches – just make sure it is indicated – no need to handle the fish if releasing!
- 4.) **Approx. weight** in gm or lbs– just make sure it is indicated – no need to handle the fish if releasing!
- 5.) Did you keep / kill the fish (**K**)? or live release the fish (**R**)?
- 6.) Total time fishing – please indicate the total time spent fishing.
- 7.) Species sought – Please indicate what fish(s) your were trying for.
- 8.) Other information – anything interesting, special note or observation



## **Appendix III**

### **Lakeshore Capacity Assessment**

## Application of the Lakeshore Capacity Assessment Handbook to Farren Lake: May, 2009

A Ministry of Natural Resources survey dated August 14, 1974 shows the following physical data for Farren Lake:

SURFACE AREA:	427 acres
VOLUME:	11,607 acre-feet
HEIGHT ABOVE SEA LEVEL:	576 feet
PERIMETER:	5.9 miles
MAXIMUM DEPTH:	70 feet
MEAN DEPTH:	27.3 feet

A volume of 11,607 acre-feet is equal to 14,317,000 cubic metres or  $14,317 \times 10^6$  litres.

The Lakeshore Capacity Assessment Handbook, prepared by the Ministry of Environment in partnership with the Ministries of Natural Resources and Municipal Affairs and Housing, enables one to use a formula to calculate what the "natural undeveloped state of a lake" was, in terms of total phosphorous present, before there was any cottage development. The 2007 Consultation Draft of the handbook was used for these calculations.

The formula assumes 0.66 kilograms of phosphorus per capita per year is contributed by each septic system. It also assumes usage rates for shoreline residences as follows: 0.69 capita-years per year for seasonal residences, 1.27 capita-years per year for extended seasonal residences, and 2.56 capita-years per year for permanent year-round residences. In addition, an overland runoff rate = 0.04 kg/lot/year is assumed.

The current Lakeshore Capacity Model includes a provision for attenuation of phosphorus from septic systems based on the distance of the septic system from the lake. It assumes that:

- 100% of the phosphorus (P) from septic systems within 100 metres of the shoreline or a permanently flowing stream enters the lake
- 67% of the P from septic systems between 100 and 200 metres of the shoreline or a permanently flowing stream enters the lake
- 33% of the P from septic systems between 200 and 300 metres of the shoreline or a permanently flowing stream enters the lake
- None of the P from septic systems over 300 metres from the shoreline or a permanently flowing stream enters the lake

In 1979 there were reportedly 101 cottages on the lake. Two of these would have been permanent, year around residences.

Therefore, 99 X 0.66 X 0.69	= 45.08 kg
2 X 0.66 X 2.56	= 3.38 kg
Overland runoff	= <u>4.04 kg</u>
Total phosphorus (TP)	= 52.50 kg

The Rideau Valley Watershed Watch Program reports a Total Phosphorus (TP) surface sample reading of 0.0076 mg/L for 1980 or 7.6 µg/L. (No measurement is available for 1979).

Total Phosphorus present in the lake in 1980 was indicated to be  $14,317 \times 7.6 = 108,809$  g or 108.8 kg.

From these data, the "natural undeveloped state of the lake" is calculated to be the state in which,

$108.8 \text{ kg} - 52.50 \text{ kg} = 56.3 \text{ kg}$  or 56,300 grams of phosphorus is present.

$56,300 \text{ g} / 14,317 \times 10^6 \text{ litres} = 3.93 \text{ µg/L}$  of total phosphorus.

Since the Provincial Water Quality Objective (PWQO) for total phosphorus allows for only a 50% increase in phosphorus concentration from a modeled baseline of water quality in the absence of human influence, it seems that Farren Lake's development capacity was exceeded once total phosphorus readings surpassed 5.9 µg/L.

However, the annual measured total phosphorus recorded in Table 3 of the State of the Lake Environment Report – 2001 Rideau Valley Watershed Watch Program shows considerable variation from year to year. In 1997 it was measured to be 6.0 µg/L, while a year later, in 1998, it was 10.0 µg/L. More difficult to explain was 1975, when it was measured to be 17.1 µg/L.

The Secchi Disk reading of turbidity was also low in 1975 at 4.7 metres but not nearly as low as the 3.90 metres reported in 1947 by J.R. Vallentyne in a report on fishing conditions in Farren Lake.

Vallentyne did not measure the total phosphorus reading in his investigation, but he did measure dissolved oxygen. On August 5-6, 1947, he reported surface readings of 5.2 c.c./L and a bottom reading (40 feet or 12 metres) of 3.8 c.c./L. These readings convert to 7.4 mg/L and 5.4 mg/L respectively.

By comparison, Rideau Valley's figures for Aug. 2, 2001, were 8.2 mg/L at the surface and 4.2 mg/L at 12 metres.

There is evidence to suggest, therefore, that there may have been adverse conditions that negatively affected water quality prior to the cottage shoreline development that began on Farren Lake in the early 1960's.

One factor that may have accounted for this was the presence of livestock. Farmers, with lands adjoining the lake, frequently moved their cattle to summer range close to the lake, where they could readily drink. The cattle, naturally, defecated along the shoreline and in the water. This practice ended about 1980.

Tay Valley Township provided a wealth of information on the cottage development on Farren Lake. The printout lists properties by road location and pin numbers, and provides lot areas, frontages, legal descriptions and property codes.

Eight different property codes are applicable to the lots on Farren Lake. They are as follows:

Code	Description	Number of Lots
110	Vacant residential/recreational land on water	24
111	Island under single ownership	1
200	Farm property without any buildings/structures	1
240	Managed forest property, vacant land not on water	1
262	Land owned by a farmer improved with a non-farm residence with a portion being farmed.	1
301	Single family detached (not on water)	1
313	Single family detached on water – year round residence	8
391	Seasonal/recreational dwelling – first tier on water	<u>106</u>
		143

The number of seasonal/recreational dwellings – first tier on water, shown to be 106, understates the actual number of 122, because the computer only recorded cottages 15 metres or less from the lake. A count obtained from the FLOPA Road Reps confirms that there are 130 dwellings in total on Farren Lake.

The number of cottages classified as year round residences has increased recently from 3 to 8.

If all 24 remaining vacant lots were built upon as seasonal properties, one could project the phosphorous readings in Farren Lake for 148 seasonal and 8 year round residences to register as follows:

146 X 0.66 X 0.69	= 66.49 kg
8 X 0.66 X 2.56	= 13.52 kg
156 X 0.04	= <u>6.16 kg</u>
	86.17 kg
	+ <u>56.30 kg</u>
	142.47 kg

$$142.47\text{g} / 14,317 \times 10^6 \text{ L} = 9.95 \mu\text{g/L}$$

Current readings are much higher than this figure, with 24 fewer cottages.

The Handbook states that, “the extended seasonal rate of 1.27 capita years per year should be used for non-permanent developments that have reliable year-round access”. TVT has not yet assigned a code for “extended seasonal” to any lots on Farren Lake. Whether or not a trend toward extended seasonal behavior might explain the recent spike in phosphate readings is unclear, but it would bear monitoring.

Of the 24 remaining vacant lots on Farren Lake (code 110), only 2 are large acreages. One is 89.09 acres with 518 feet of frontage; the other is 39.41 acres with unspecified frontage. Only one other lot is large enough to subdivide (4.07 acres with 610 feet of frontage).

The only other land with lake frontage is the large island (code 111). It is 13 acres in size.

Four other large properties with no lake frontage might have the potential for back-lot development.