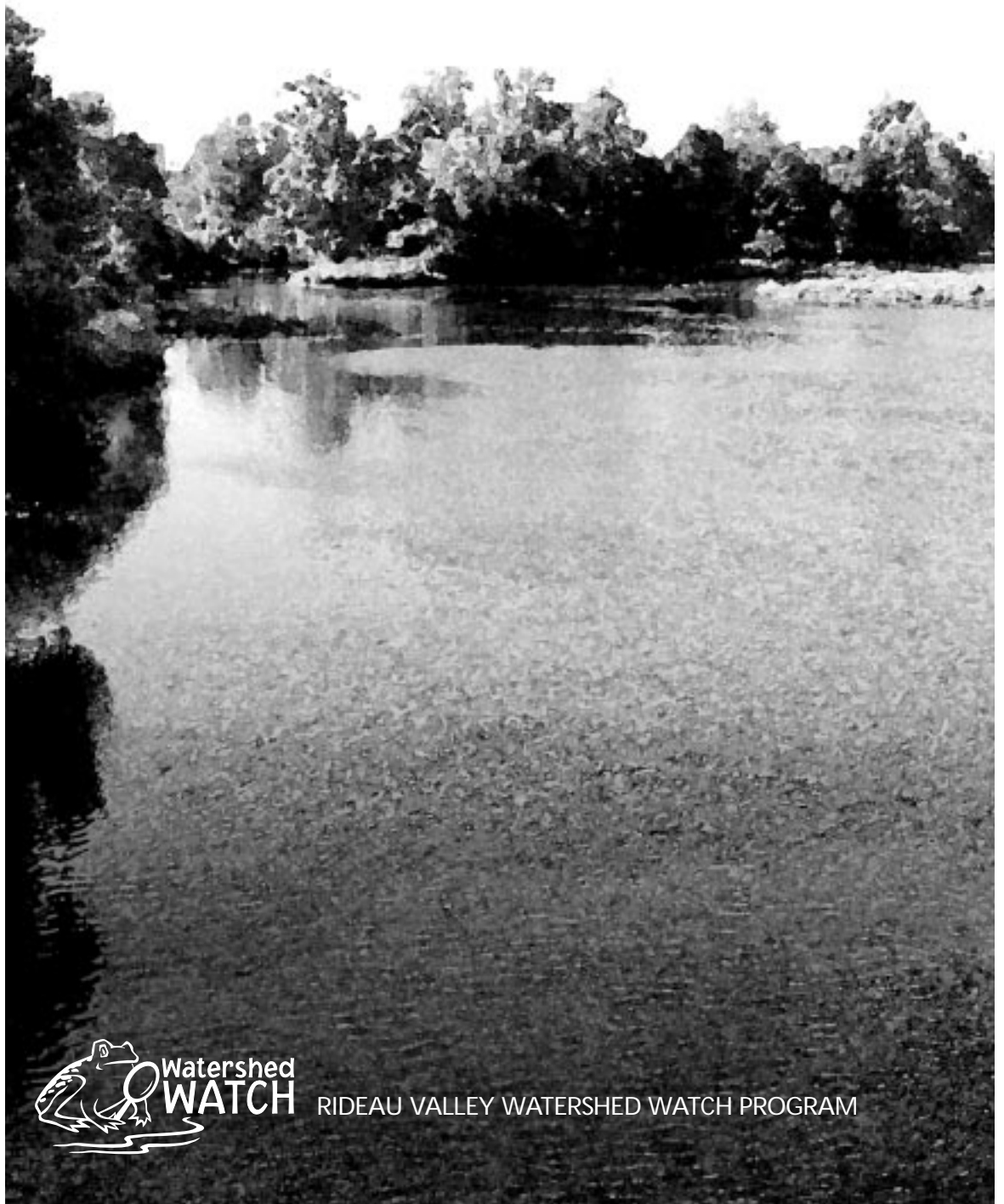


STATE OF THE
**LAKE
ENVIRONMENT
REPORT-2001**



Watershed
WATCH

RIDEAU VALLEY WATERSHED WATCH PROGRAM



THE ONTARIO TRILLIUM FOUNDATION
LA FONDATION TRILLIUM DE L'ONTARIO

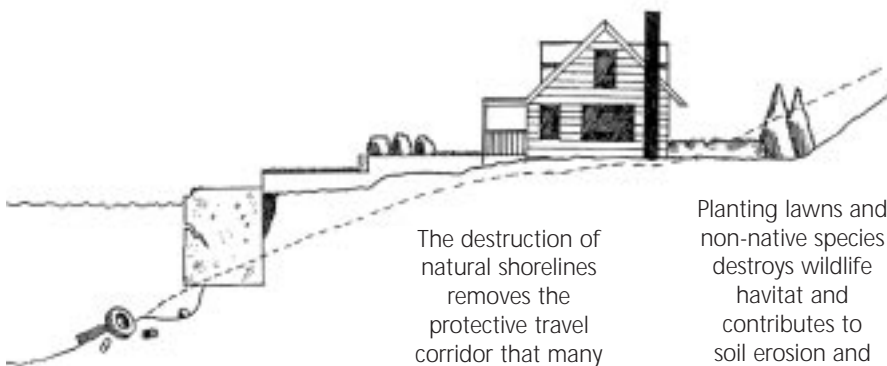
FENDOCK



- ▶ Alliance of Rideau Lakes Associations
 - ▶ Big Rideau Lake Association
 - ▶ Farren Lake Property Owners Association
 - ▶ Rideau Valley Conservation Foundation and its many donors
 - ▶ Township of Bathurst Burgess Sherbrooke
-

"The Ribbon of Life" Where the Land Meets the Water

Water quality is affected by many things: natural processes of erosion and runoff accelerated by clearing of shorelines, the use of artificial fertilizers and leachate from sewage disposal systems. All result in too many nutrients reaching the lake.



Retaining walls destroy littoral zones. Waves deflected off retaining walls, stir up contaminated sediments and destroy vegetation.

The destruction of natural shorelines removes the protective travel corridor that many species rely on in their journeys between land and water.

Planting lawns and non-native species destroys wildlife habitat and contributes to soil erosion and a reduction in water quality.

Too many nutrients causes profuse weed and algae growth which affects the aquatic animal species makeup by altering habitat and food sources and by reducing oxygen and light penetration.

The shallow waters and first ten metres of shoreland area form a "Ribbon of Life" around lakes. This ribbon- where the land meets the water - is where much of the lake life is born, raised and fed. Many landowners, unaware of the importance of this area, have cleared the shorelines of native vegetation and replaced it with lawns, non-native ornamental vegetation, retaining walls and boathouses. This has a negative effect on fish and wildlife habitat and water quality. Natural vegetation retained or restored along the shoreline helps prevent erosion and improves water quality by binding nutrients before they can enter the lake.

The Rideau Valley Conservation Authority has long recognized the recreational and aesthetic value of lakes within the watershed and is committed to maintaining and protecting water quality and fish habitat. The Conservation Authority has joined together with volunteer Lake Stewards throughout the watershed to take steps to protect and restore water quality by launching the Watershed Watch program. Watershed Watch is an environmental monitoring and awareness program. The objectives of the program are to collect reliable environmental data to document current water quality conditions and use the data as an essential educational tool to encourage shoreline residents, both seasonal and permanent, to become personal stewards of their lake and to adopt sound stewardship practices aimed at preserving and protecting water quality. By taking an active role in restoring and enhancing their shoreline, they can help to maintain water quality and a healthy lake environment.

Recreational water quality can be expressed in terms of how clear the water appears. Water clarity is influenced by the amount of soil sediment and phytoplankton, or microscopic algae, present in the water. Clarity is measured by a simple visual test using a **Secchi Disk**, a 20 centimetre black and white disk attached to a measured line that is lowered into the lake until it is no longer visible. Analysis of water samples for **chlorophyll a**, which provides the green pigment in phytoplankton, gives a more specific measure of the abundance of small creatures in the water. Another perspective is gained through analysis of samples for nutrients, particularly **phosphorus** but also **nitrogen**, which tells how much food is available for the algae and aquatic plants. In the late summer when the algae drops to the bottom of the lake, its decomposition uses oxygen so, to find out how much oxygen is available for fish and other aquatic animals, **dissolved oxygen and temperature** profiles are done.

These tests combine to give an indication of the Age@ of a lake and what can be expected. An Aold@ or **eutrophic** lake will have profuse plant growth and relatively few fish species

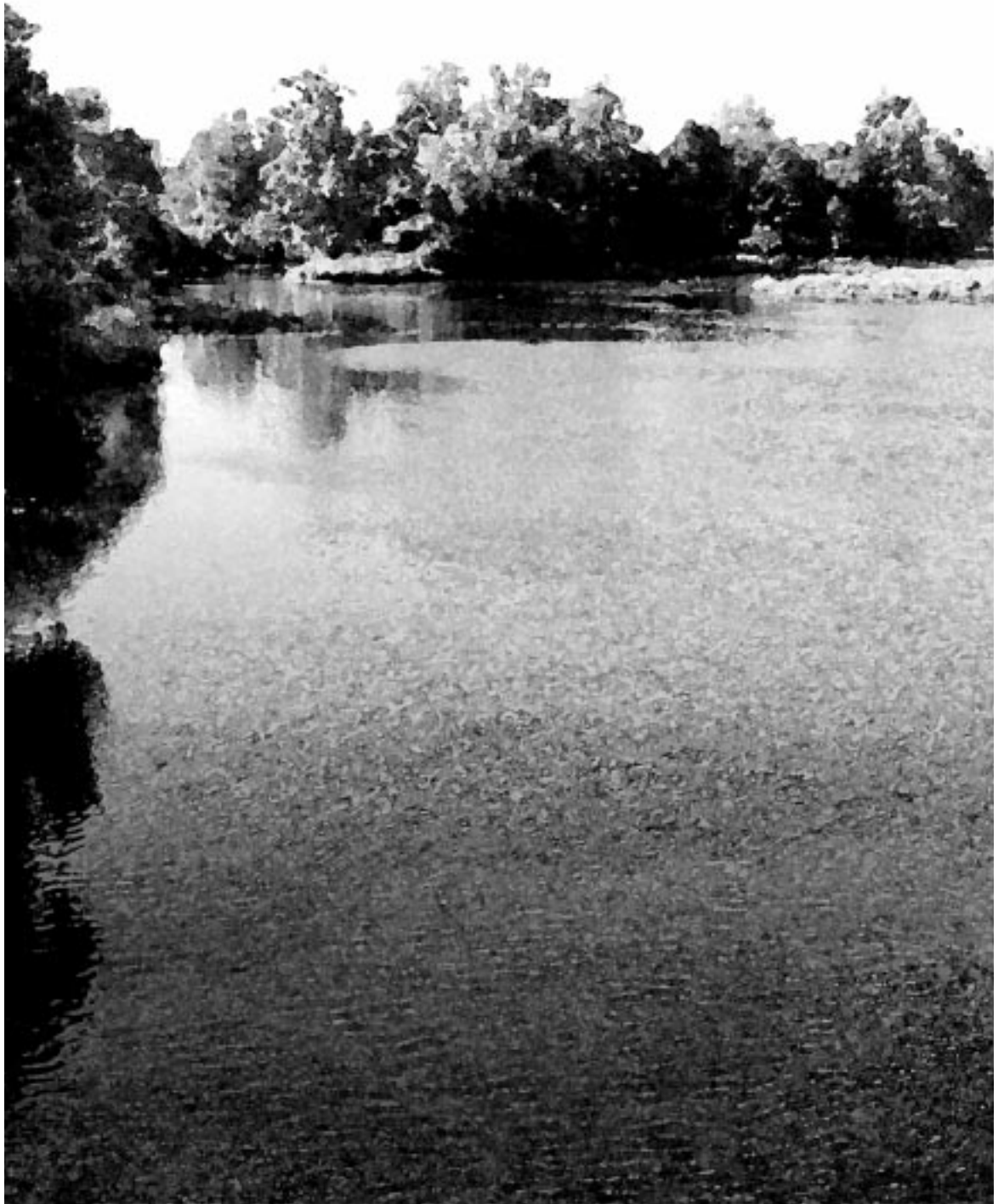
because of the lack of open water and the competition for oxygen. A middle-aged or mesotrophic lake will support the greatest diversity of fish species with a variety of habitats and sufficient oxygen available. A young or **oligotrophic** lakes have very little or no vegetation and are usually well oxygenated but will have relatively few fish species.

While lake users are interested in how weedy a lake is and what kind of fishing stories they can experience, they also want to know if the water is safe for drinking and swimming. *Escherichia coli* (**E.coli.**) are in a family of fecal coliform bacteria common to warm-blooded mammals. A few members of the family are harmful themselves but *E.coli.* are also a good

indicator of the presence of pathogenic or other hazardous bacteria because where there is *E.coli.*, the others will usually be present. Analysis of water samples for *E.coli.*, which is relatively more abundant and easier to count than the other organisms, gives an indication of problems with leaking septic systems or other sources of contamination.

Through WATERSHED WATCH, lakes in the watershed will be monitored for these key water quality indicators. Knowing what is in the water will assist the lake stewards when devising a strategy to protect the Ribbon of Life which will reduce the human impact on the aging process and ensure that our lakes will endure for future generations to enjoy.

Rainbow Lake



RAINBOW LAKE - 2001

LOCATION:	Township of Bathurst Burgess Sherbrooke – drains to the Tay River upstream of Christie Lake through Little Silver Lake
ELEVATION:	lake surface approximately 182 metres above mean sea level
DIMENSIONS:	perimeter: 3.24 kilometres; maximum depth: 5 metres.; area: 21.04 hectares
LAKE WATERSHED:	drainage area (Little Silver): 1068.5 hectares
FISHERY:	warm water fishery – species unknown.
DEVELOPMENT LEVEL:	13 cottages
BACKGROUND DATA:	Lake Association (1998-2000) - total phosphorus, secchi disk

The sampling component of the Watershed Watch program consisted of the following:

SITES:	one site at deepest point of lake, two around shoreline adjacent to cottage groupings; sites at access points (see map)
TOTAL PHOSPHORUS (TP):	samples from deepest point at the surface and one metre above the bottom; at two shoreline sites at approximately half metre depth in one metre of water
TOTAL KJELDAHL NITROGEN (TKN):	samples from deepest point at the surface and one metre above the bottom; at two shoreline sites at half metre depth in one metre of water
SECCHI DISK:	at deepest point – measurement is depth where disk can no longer be seen
DISSOLVED OXYGEN/TEMPERATURE (DO/Temp):	at deepest point readings taken at intervals from surface to bottom and back up
CHLOROPHYLL <u>a</u> (Chl):	a composite sample taken in the euphotic zone (layer which light penetrates – twice the secchi disk depth) at deepest point
ESCHERICHIA COLI (E.Coli):	at two shoreline sites at approximately half metre depth in one metre of water
INVASIVE SPECIES (IS):	at the deep point; samples for zebra mussel veligers and spiny water flea

How Rainbow Lake measured up in 2001:

Table 1: Grading Scheme:

TP	TKN	Secchi	DO	Chl	E.Coli	IS	Score
.005 - .009	.1 - .2	> 5	> 5	0.001 - 0.00175	0 - 10	No	4
.009 - .013	.2 - .3	4 - 5	4 - 5	0.00175 - 0.0025	10 - 40		3
.013 - .017	.3 - .4	3 - 4	3 - 4	0.0025 - 0.00325	40 - 70		2
.017 - 0.02	.4 - .5	2 - 3	2 - 3	0.00325 - 0.004	70 - 100		1
> 0.02	< .1, > .5	< 2	< 2	> 0.004	> 100	Yes	0

Overall Grading	
Score Range	Grade
> 3.5	A
2.6 - 3.5	B
1.6 - 2.5	C
0.5 - 1.5	D
< 0.5	F

The scores in Table 2 below come from Table 1: Grading Scheme, above. The result or average value of sample results for 2001 for a particular parameter is compared to the range under that parameter. Once the range is found, move in that row horizontally to the score column. For example, a value for TKN of .36 is in the range .3 - .4 for which the score is 2. The overall grading in the two right hand columns of Table 1 comes from the average of the scores for all of the parameters in Table 2 e.g. an average score of 2.75 is in the range 2.6 - 3.5 which yields a grade of B.

This scoring/grading is not a scientifically rigorous scheme. It is based on schemes used by others but was derived specifically for this report to provide an indication of the overall status of the lake based on all the aspects included in the Rideau Valley Watershed Watch sampling program in 2001. The elements being compared here are not all

directly related e.g. the presence of spiny flea has no direct bearing on the amount of TP in the lake and vice versa. Most of the scores are related to an accepted benchmark. The failing score of zero is given for anything above or below the benchmark, depending on the particular parameter, such as 0.02 for TP which is the concentration, expressed in milligrams per litre, used as the Provincial Water Quality Objective (PWQO) above which a marked impact can be expected. In the case of Invasive Species, IS, the presence or absence is what is important and only two scores are needed.

Table 2: Scoring

Parameter	Result	Score	Table 2: Scoring
TP (milligrams/ Litre (mg/L))	0.017	2	Phosphorus comes from soaps, detergents, fertilizers and pesticides and is the main nutrient contributing to the growth of algae. The PWQO for lakes is to keep total phosphorus levels below 0.02 mg per litre of water to avoid excess algae and aquatic plant growth
TKN (mg/L)	0.58	0	Nitrogen contributes to the growth of algae and aquatic plants. Some of its forms can be toxic to aquatic animals in excess quantity and/or when an imbalance occurs. Nitrogen comes from fertilizers, pesticides and human and animal waste. There is no PWQO for Total Kjeldahl Nitrogen but a generally accepted guideline is that TKN levels less than 0.1 and greater than 0.5 mg/L can have harmful effects on the aquatic environment (some nitrogen is required hence the lower limit of the range)
Secchi (metres (m))	3.6	2	The secchi disk reading is a measurement of water clarity. The greater the depth that the disk remains visible indicates correspondingly lower quantities of suspended soil, debris and micro-organisms and greater light penetration.
DO/Temp (mg/L)	8.3	4	Result is the average of the DO >4 mg/L at <25 and >10 degrees Celsius multiplied by the percentage of the depth of the lake with those conditions e.g. a lake 30 metres deep has oxygen concentrations that meet the conditions in 10 metres or 30% of the total depth.
Chl a (mg/L)	0.0025	3	Chlorophyll a is the green pigment in microscopic algae that live in water. More than 0.005 milligrams of Chl a in a litre of lake water indicates an excessive quantity of algae is present which will negatively affect the clarity and oxygen content of the lake.
E.coli (coliform units/ 100 millilitres (CFU/100 mL))	3.42	4	E.coli bacteria is used to indicate the presence of harmful disease-causing organisms (bacteria, pathogens). It is present in human and animal waste. The PWQO for drinking water is 0 CFU/100 mL which means that using untreated lake water as a drinking water source is not recommended. The PWQO for swimming is 100 CFU/100 mL
Invasive Species	No	4	Invasive species can significantly alter the lake character. They are typically very aggressive and tend to overwhelm native species in various ways reducing the biodiversity throughout the food chain.
average score		3.14	Overall Grade: B

Rainbow Lake differs from the other lakes included in the Watershed Watch program in 2001 being only about five metres at the deepest point. The score for dissolved oxygen/temperature is misleading because while the entire depth has a good concentration of oxygen, it was only in five metres as opposed to more than six metres in other lakes. Because the whole lake warms more or less uniformly over the summer, the fish population can be severely stressed in a prolonged hot period as was the case in 2001 where the water temperature exceeded 25 degrees in August. Total phosphorus concentrations were fair but nitrogen concentrations were poor with all but two samples over the summer exceeding the guideline. Chlorophyll a concentrations were relatively good. Secchi disk measurements were fair except for a measurement in early May at 2.2 metres done for the Lake Partners Program. That may have been due to spring runoff inflow bearing sediment to the lake. The Secchi disk readings were fairly consistent over the summer so it is possible that the lake has a natural colour that reduces light penetration. While the grade for Rainbow Lake was a B, there are issues most notable being the concentration of nitrogen. Being relatively small and shallow, Rainbow Lake is readily susceptible to increased nutrient loading. Two good notes are

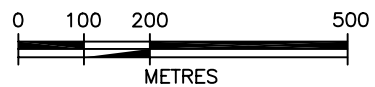
that there does not appear to be any bacterial pollution and there was no sign of zebra mussels or spiny flea. The scoring gives Rainbow Lake a grade of B but it must be understood that significant qualifiers apply. All users need to continue to make every effort to minimize their impact on the lake. Reduction of human source nutrient loading through conscientious property use (e.g. natural versus groomed shorelines) will help to slow the aging of Rainbow Lake.

A special thank-you to Walter Downs who volunteered his time and boat to the Watershed Watch crew for the 2001 sampling season. Also thank-you to Jim Humphrey who provided us with the data he has collected for both Little Silver and Rainbow Lakes.

- IS-A invasive species sample site
- DP deep point
- R01-07A sample site



Little Silver and Rainbow Lakes Watershed Watch 2001



RAINBOW LAKE – 2001

Looking a little deeper:

The basic characteristics of a lake depend on the physical properties (dimensions and geology) and climate. Six processes or actions further define an individual lake:

- Precipitation directly onto the lake surface deposits phosphorus and other chemicals and runoff from the lake watershed carry bacteria and pathogens, plant debris and soil particles, which bear phosphorus and other chemical elements, into the water ;
- Use by aquatic plants of the nutrients (phosphorus, etc.) has two impacts:
 - plant communities develop in the lake becoming profuse over time which limits the development and diversity of other plants and aquatic animals, and
 - along with plant debris and sediment from the shoreline, dead phytoplankton and other plants settle to the lake bottom where it decomposes using up oxygen and releasing nutrients;
- Each spring and fall temperature changes in the lake cause a mixing or turnover of the waters which can bring phosphorus from bottom waters to the surface to be available for aquatic plant and microorganism growth;
- A “sink” of phosphorus is created by settling of phosphorus-bearing sediment and the decay process at the bottom of all lakes with the phosphorus either held adsorbed to the lake bed soil particles when dissolved oxygen levels are high or in solution when the dissolved oxygen levels decline.
- After the spring turnover, the lake warms and stratification occurs creating a warmer surface layer (epilimnion), a transition zone (metalimnion) and colder deep waters (hypolimnion). As water warms, the ability to hold dissolved oxygen decreases. While the warm waters of the epilimnion can hold less the air/water contact and wave action ensures that there is a constant supply. As the deep waters of the hypolimnion warm, there is no mechanism to get new oxygen. The demand for oxygen for the decay process can cause the hypolimnion to become anoxic (no dissolved oxygen);
- Lakeshore development affects the shoreline runoff/erosion characteristics which usually leads to increased sediment, bacterial and nutrient loading of lake waters by changes to the vegetation composition, hardening the surface (buildings, roads, retaining walls, etc.) and installation and sometimes poor maintenance of septic facilities;

There are several methods of measuring the impacts of these processes or actions. The common ones are:

- measurement of water clarity using a Secchi disk,
- dissolved oxygen (DO)/Temperature profiles to show what the extents of the aquatic habitat are (most fish species inhabit the warmer, oxygenated surface waters),
- analysis of samples for nutrients: Total Phosphorus (TP) - the limiting nutrient for plant and microorganism growth, and/or
- presence or concentration of phytoplankton indicated by the amount of chlorophyll a, a pigment in phytoplankton

Added for the Watershed Watch program were:

- Total Kjeldahl Nitrogen (TKN), a secondary nutrient, to see if the high counts found elsewhere in the watershed occur in the lakes, and
- Eschericia Coliform (E.Coli) sampling around the lake nearshore to check for bacterial pollution problems.

An obstacle to assessing the condition of lakes is the length of the historical data record. There is a limited data for Rainbow Lake (Table 1, below). The lack of data and the general nature of the parameters does not allow a detailed analysis of Rainbow Lake so what follows is a set of observations about the available data which should be of assistance in setting goals for future lake management.

Table 1: 1998 - 2001, Deep Point of Lake

Sample Year	Secchi Disk [Metres]	Total Phosphorus Surface Sample [mg/L]	Total Phosphorus Bottom Sample [mg/L]	Chlorophyll a [mg/L]
1998	3.10	0.0060		
1999	3.10	0.0156		
2000	2.13	0.0208		
2001	3.50	0.0148	0.0165	0.00252
N	4	4	1	1
Minimum	2.13	0.0060		
Maximum	3.50	0.0208		
Mean	2.96	0.0143	0.0165	0.00252

Chlorophyll a was used as the primary indicator of lake trophic state (age or nutrient level) until 1994 when it was replaced by total phosphorus because sampling and analysis for **Total Phosphorus** has been shown to be more reliable and more economical. Chlorophyll a is one of the pigments found in phytoplankton so that it is an indication of the actual concentration of plant material in the water. Total Phosphorus is the primary nutrient affecting the proliferation of phytoplankton and measurement of TP concentrations is a measurement of the potential phytoplankton growth in a waterbody. Analysis for chlorophyll a was included in the Watershed Watch sampling in 2001 for comparison with historical data. Since there is no historical chlorophyll a data for Rainbow Lake with which to compare, it can be noted that the concentration of chlorophyll a is in the moderate range suggesting a mesotrophic or middle-aged state. Note that the reference concentration of chlorophyll a to designate the degree of eutrophication of a lake varied depending on the geographic area and particular lake. The concentration of 0.006 milligrams per litre was used in the early 1990s for the Muskoka lakes. 0.004 has been used in the Mississippi Valley Watershed Watch program. In at least one case in the Rideau Watershed, 0.005 mg/L was judged to be the maximum tolerable concentration. No specific concentration has been found in reference material for Rainbow Lake so 0.005 mg/L is used here.

In 2001, the water clarity, as measured with a **Secchi disk**, chlorophyll a and TP, both at the surface and the bottom, for Rainbow Lake are in relatively close concurrence (Table 1, above). Table 2, below, shows the results for all of the sample dates in 2001 and it is only the October sample where an elevated concentration of any parameter occurs – chlorophyll a rose to 0.0045 suggesting that there was a late season algae bloom. However, it was not of particular significance because the Secchi disk measurement was actually better than at the previous sample date (Figure 1). The data for the previous three years indicates that conditions were fairly similar. The decreased water clarity measurement and elevated TP concentration in 2000 appears to demonstrate how quickly the lake responds to an increased nutrient load.

Table 2: Rainbow Lake, 2001 - Deep Point

	TP DP-S (mg/L)	TP DP-B (mg/L)	Chl a (mg/L)	Secchi (metres)
25-Jun	0.014	0.014	0.0016	-3.5
3-Jul	0.014	0.016	0.0025	-3.5
24-Jul	0.010	0.018	0.0019	-3.2
7-Aug	0.018	0.018	0.0030	-3.0
11-Sep	0.017		0.0016	-4.0
23-Oct	0.016		0.0045	-4.5
average	0.0148	0.0165	0.0025	-3.6

Note: TP DP-S and TP DP-B refer to the total phosphorus sample at the surface (S) and bottom (B) taken at the deep point (DP)

Figure 1

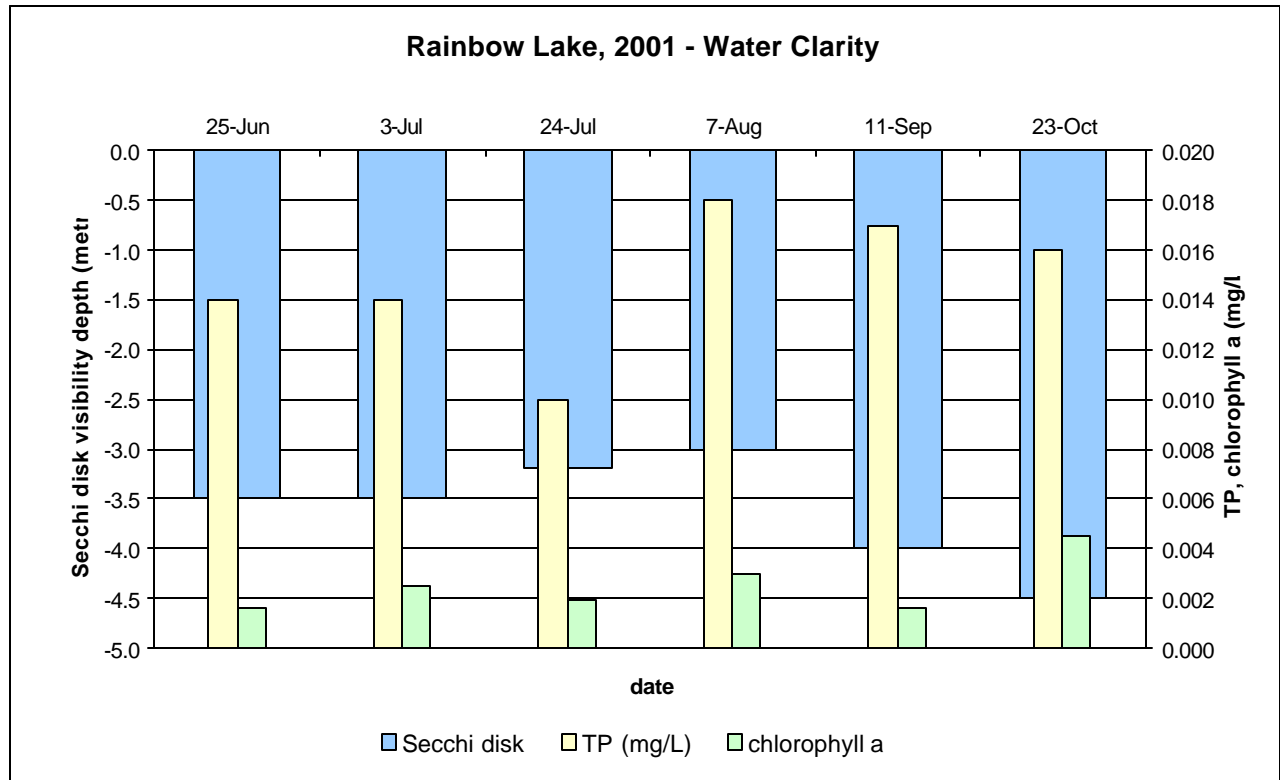
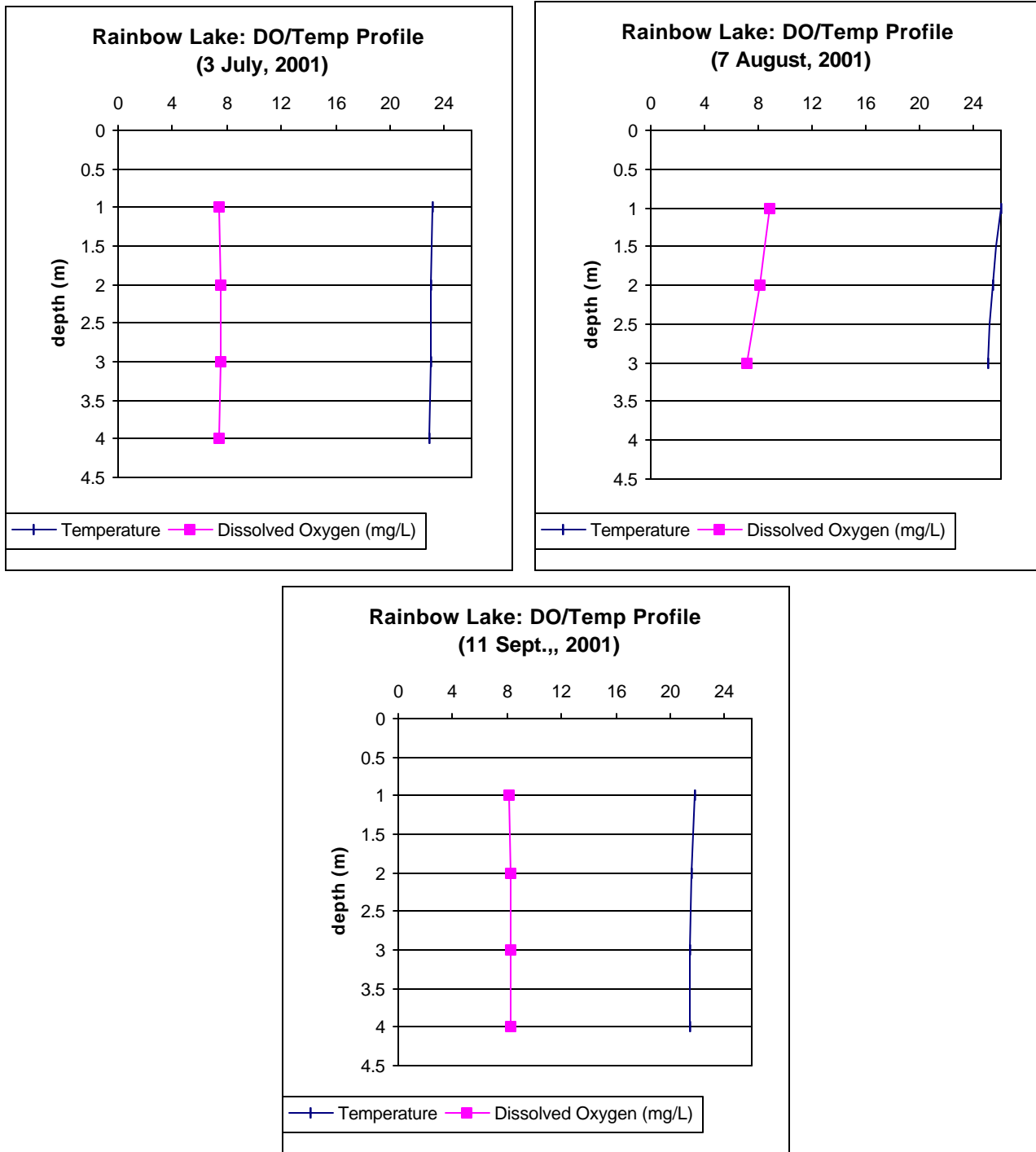


Table 3: Rainbow Lake, 2001 – Deep Point, Dissolved Oxygen/Temperature – 11 September

Depth [Metres]	Temperature [Degrees Celsius]	Dissolved Oxygen [mg/L]	Percent Saturation [%]	Lake Stratification
1	21.8	8.1	90	Epilimnion
2	21.6	8.3	94	
3	21.5	8.3	94	
4	21.5	8.3	94	

Dissolved oxygen and temperature profiling is important for all lakes because both parameters affect all aquatic organisms and the chemistry of the lake environment. As oxygen levels are lowered, phosphorus in the bottom sediments are more readily soluble adding to the loading available for plant growth. In deeper lakes the top six metres, more or less, warms and cools at about the same rate. Below that is a marked transition at the thermocline. Rainbow Lake is a shallow lake with a maximum depth of about five metres and the temperature is relatively uniform throughout as shown in the graphs above (Figures 2 to 4). This means there is no thermal stratification so that there is a good supply of oxygen to assist in the decay of plant material and the phosphorus that is released is readily adsorbed to the bottom sediments. There does not appear to be an opportunity for the phosphorus to go back into solution because the oxygen concentration does not decrease to the appropriate level. The line on the graphs marked with the diamond symbol shows the temperature. In early July, the temperature was about 23 degrees throughout the water column. By August 7th, the temperature had risen to 25 degrees which is the upper tolerance limit for fish. It is likely that the temperature would have continued to rise through August causing significant stress to the fish population. It may be that the fish population of Rainbow Lake will become a victim of climate change if, as expected, dry, hot conditions as occurred in 2001 become commonplace.

Figure 2, 3, 4



Near the shore:

In addition to sampling at the deep point in the lake, the Watershed Watch program included sampling at a number of sites near the shore. The objectives were:

- a) to look at the phosphorus and nitrogen distribution around the lake.

- b) to do general sampling for bacterial pollution (E.Coli) in proximity to the larger groupings of cottages to see if there was a problem with septic and grey water entering the lake.

Table 4: TP - Rainbow Lake, 2001

SITE	25-Jun-01	3-Jul-01	24-Jul-01	7-Aug-01	11-Sep-01	23-Oct-01	average
DP-B	0.014	0.016	0.018	0.018			0.017
DP-S	0.014	0.014	0.010	0.018	0.017	0.016	0.015
A	0.020	0.047	0.013	0.015	0.012	0.014	0.020
B	0.015	0.016	0.011	0.015	0.015	0.028	0.017
average							0.017

TP was fairly evenly distributed around the lake during the sampling period. Statistically, only 2 of 18 of the surface samples were within one standard deviation above the average. Both of the elevated concentrations were at nearshore sites, one at site A and the other at site B and both were accompanied by relatively elevated nitrogen concentrations but not high bacteria counts. Since it occurred on the last sample date of the season, it is not known if the elevated concentrations at site B persisted. The concentration at site A had declined to similar levels as at the other sites by the next sample date. It is possible that the higher concentrations was from a source that was far enough away that the bacteria had died-off in the time it took to reach the sample site but since the concentration was not repeated, no specific further action needs to be taken.

Table 5: TKN – Rainbow Lake, 2001

SITE	25-Jun-01	3-Jul-01	24-Jul-01	7-Aug-01	11-Sep-01	23-Oct-01	average
DP-B	0.58	0.47	0.54	0.53			0.53
DP-S	0.53	0.46	0.49	0.55	0.53	0.54	0.52
A	0.63	0.95	0.61	0.50	0.52	0.50	0.62
B	0.83	0.51	0.50	0.51	0.57	0.65	0.60
average							0.58

The upper end of the range of the provincial guideline for concentration of **Total Kjeldahl Nitrogen** is 0.50 mg/L above which a significant increase in phytoplankton growth would be expected. Elevated TKN concentrations have been found throughout the Tay River Watershed system which suggests that there is a naturally occurring background level. However, 20 of 22 of the surface and bottom nitrogen samples from Rainbow Lake were well above both the background levels and the provincial guideline. Fortunately, it appears from the chlorophyll a data that the impact was not as severe as it could have been in 2001. The nitrogen concentrations may be due entirely to natural sources but residents need to ensure that they do not add to inputs that could lead to a dramatic increase in phytoplankton growth as well as an increased risk of nitrogen toxicity for aquatic animals

Table 6: E.Coli – Rainbow Lake, 2001

SITE	25-Jun-01	3-Jul-01	24-Jul-01	7-Aug-01	11-Sep-01	23-Oct-01	average
A	4	2	7	2	2	2	3.17
B	4	2	8	4	2	2	3.67
average							3.42

Escherichia coliform (E.Coli) is used as an indicator of the potential presence of other harmful bacteria and pathogens in water. The main sources of bacteria are animal (decay of dead animals, defecation near and in the water) and human waste (septic systems, grey water). Levels above the PWQO of 100 counts/100 mL can mean that the water is unsafe for swimming. As a general precaution, lakes should not be used as the primary drinking water source and use for washing and cooking should be limited.

The results for Rainbow Lake indicate that there are very low levels of E.Coli bacteria in the water. While all parts of the lake were not sampled, the E.Coli results can be considered to reasonably indicate that the waters of Rainbow Lake did not pose a health concern for cottagers and residents for swimming and other water contact recreational use in 2001.

(Note: Not all bacteria are harmful. Some can be a food source for macroscopic aquatic invertebrates. Also, what is commonly referred to as blue-green algae, is a bacteria which shares many characteristics with algae and can be toxic to aquatic species as well as cause reactions in humans).

Rainbow Lake was also tested for **invasive species** in 2001, in particular, for zebra mussels and spiny water flea, in partnership with the Ontario Federation of Anglers and Hunters. Neither species was found in Rainbow Lake or upstream in Rainbow or Little Rainbow Lakes. Residents need to take precautions to avoid bringing in invasive species as well as to ensure that all access points to the lake have posted signs indicating what boaters can do to avoid infesting the lake. (<http://www.invadingspecies.com/> for more information)

In conclusion:

The results of Watershed Watch sampling through the summer of 2001 indicate that nitrogen loading of Rainbow Lake is the most pressing issue. Nitrogen in all forms (fertilizers, septic system effluent, pesticides) should be controlled as much as possible. Specific sampling might be done to determine what the proportions of the forms of nitrogen (ammonia, nitrites, nitrates) are.

Of the six things in the list on the first page of this section of processes and actions that affect the character of a lake, the first point has to be addressed by society as a whole. The amount of phosphorus reaching lakes by airborne deposition can be reduced by controlling the amount that gets into the air from industrial and other emissions. It is the last point in that list which is entirely the responsibility of those who own property around the lake to act on. The objectives should be to limit the human impact on lake aging and to maintain the present degree of biodiversity which means no net increase in loading of any kind (nutrients, bacteria, invasive species).

FIVE EASY STEPS TO IMPROVE WATER QUALITY

1. Build at least 30 metres away from the shoreline.
2. Keep your lot well treed and preserve or replant native vegetation along the shoreline.
3. Pump out your septic tank every three to five years and have the tank and tile field inspected periodically.
4. Reduce water use and use phosphate free soaps and detergents.
5. Keep the size of your lawn to a minimum; do not use fertilizers, herbicides or pesticides.

LOW PHOSPHORUS LIFESTYLE		HIGH PHOSPHORUS LIFESTYLE	
HUMAN WASTE	535 g	HUMAN WASTE	535 g
NO DISHWASHER	0 g	DISHWASHER USING POWDERED DETERGENT ONCE PER DAY	650 g
NO FERTILIZER	0 g	LAWN FERTILIZED ONCE/YEAR	1,960 g
TREES NOT CUT DOWN	20 g	LOT CLEARED OF TREES	30 g
USES PHOSPHATE-FREE PRODUCTS	20 g	USES PRODUCTS WITH PHOSPHATES	180 g
TOTAL	575 g		3,355 g

For more information regarding *Watershed Watch* or for free advice on how you can help protect or enhance your lake environment, contact the Landowner Resource Centre at (613) 692-2390 or Lrc@rideauvalley.on.ca