Environment Information Session

Lac Bernard

Agenda

- Jane Barton
- Marion Duflos – Director General, ABV des 7
- Kevin Radford
- Paul Saunders
- Jeff Stubbins

1. Water Quality Testing – 10-15 mins

Presenter: Jane Barton

Topics: Why the results were good, why milfoil does not seem to be impacting results, rising levels of Phosphorous

2. Outlet/Inlet issues - 10-15 mins

Presenter: Jeff Stubbins

Topics: What to do about low water levels? Is it a ecological problem the lake must address?

3. Milfoil at Lac Bernard – 10-15 mins

Presenter: Paul Saunders

Topics: What is the status today? What are some of the possible solutions?

4. Moving Forward -10-15 mins

Presenter: Kevin Radford

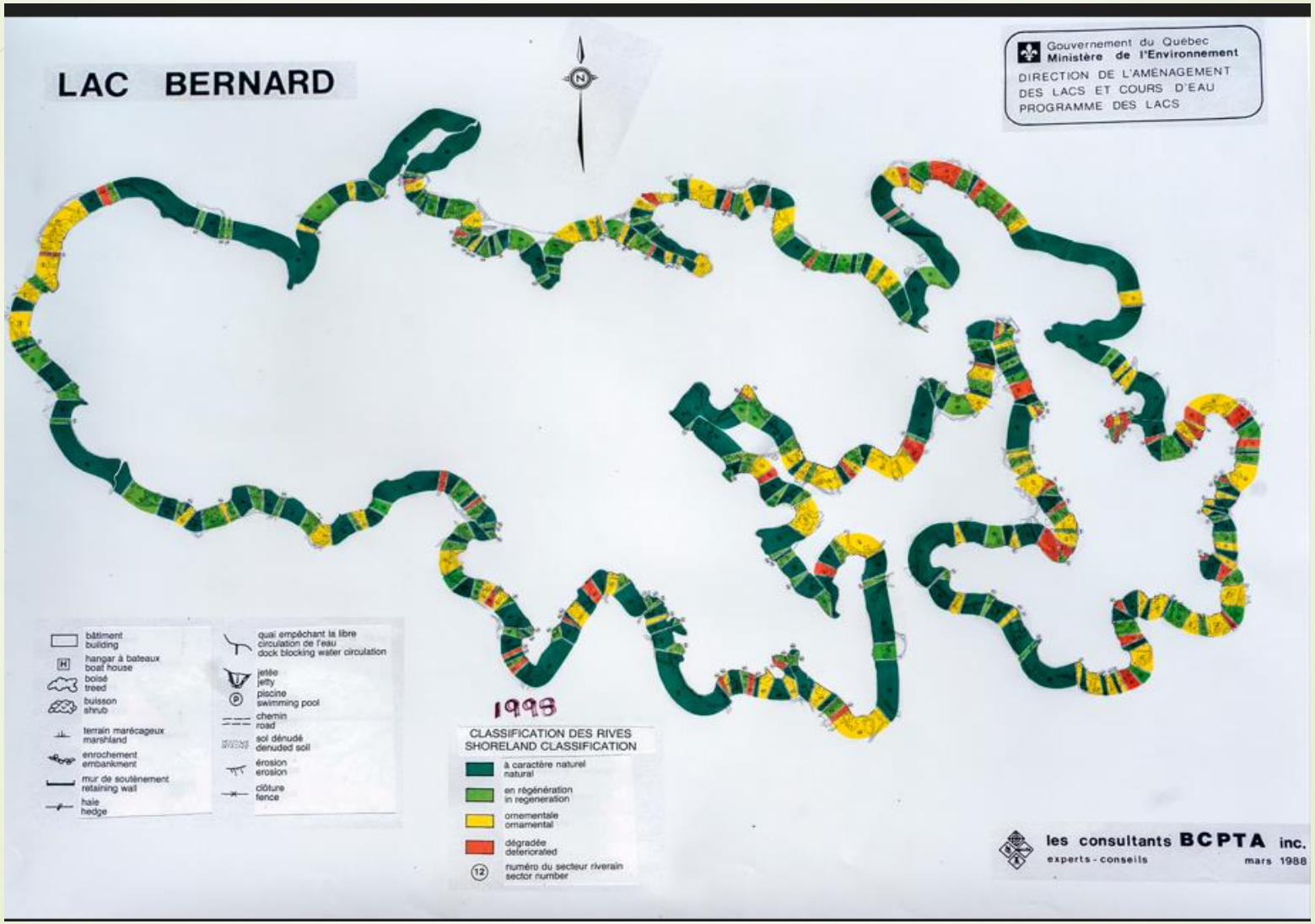
Topics: Application for Funding, what would we do with the funding if we were successful?

5. Q&A – 10 mins maximum

Context for water sampling results

- As context for the water sampling report, the next two slides are important.
- The 1998 shoreline classification was done by the Quebec government – take note of the amount of green you see around the lake. The green reflects either natural or regenerating shoreline.
- The 2012 snapshot report was completed through contract to the Association and is on the association website. Just 15 years after the Quebec government's report, less than 50% of the shoreline is characterized as undisturbed within the first 15 metres of the water.
- Since 2012, there has been further development around the lake and we now have over 400 cottages around the lake.

1998 shoreline classification by Quebec Government



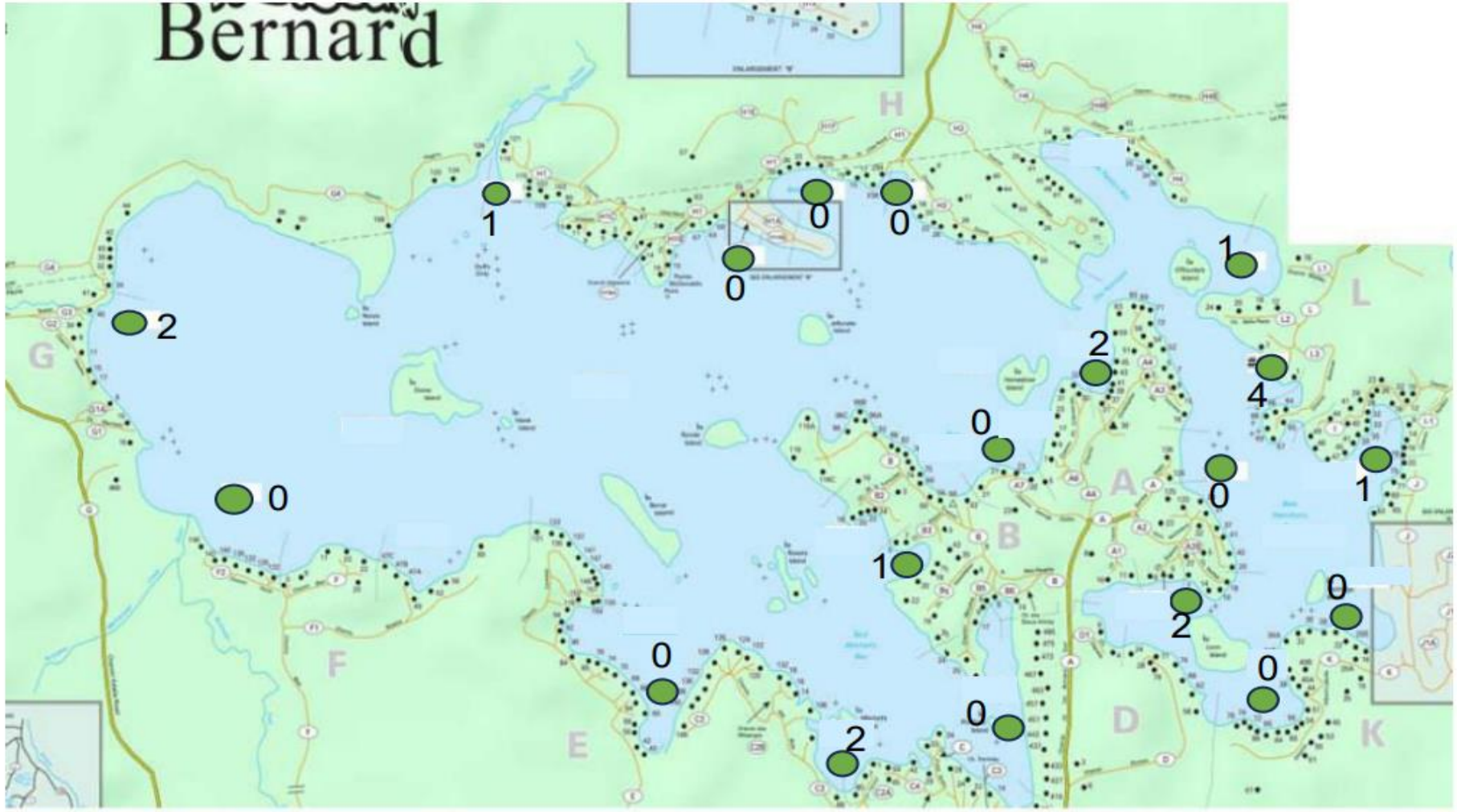
SNAPSHOT OF THE SHORELINE FOR WATER QUALITY 2012

Lac Bernard, Quebec, Canada

Figure 4. Approximation of shoreline status for Lac Bernard.

Category	Description	Total %
	Full 15 m undisturbed	48.3
	First 5 m undisturbed then varying disturbance	11.5
	First 5m of shoreline disturbed	40.2

August 23 Water Sampling 2023 Results: E. Coli in CFU/100mL

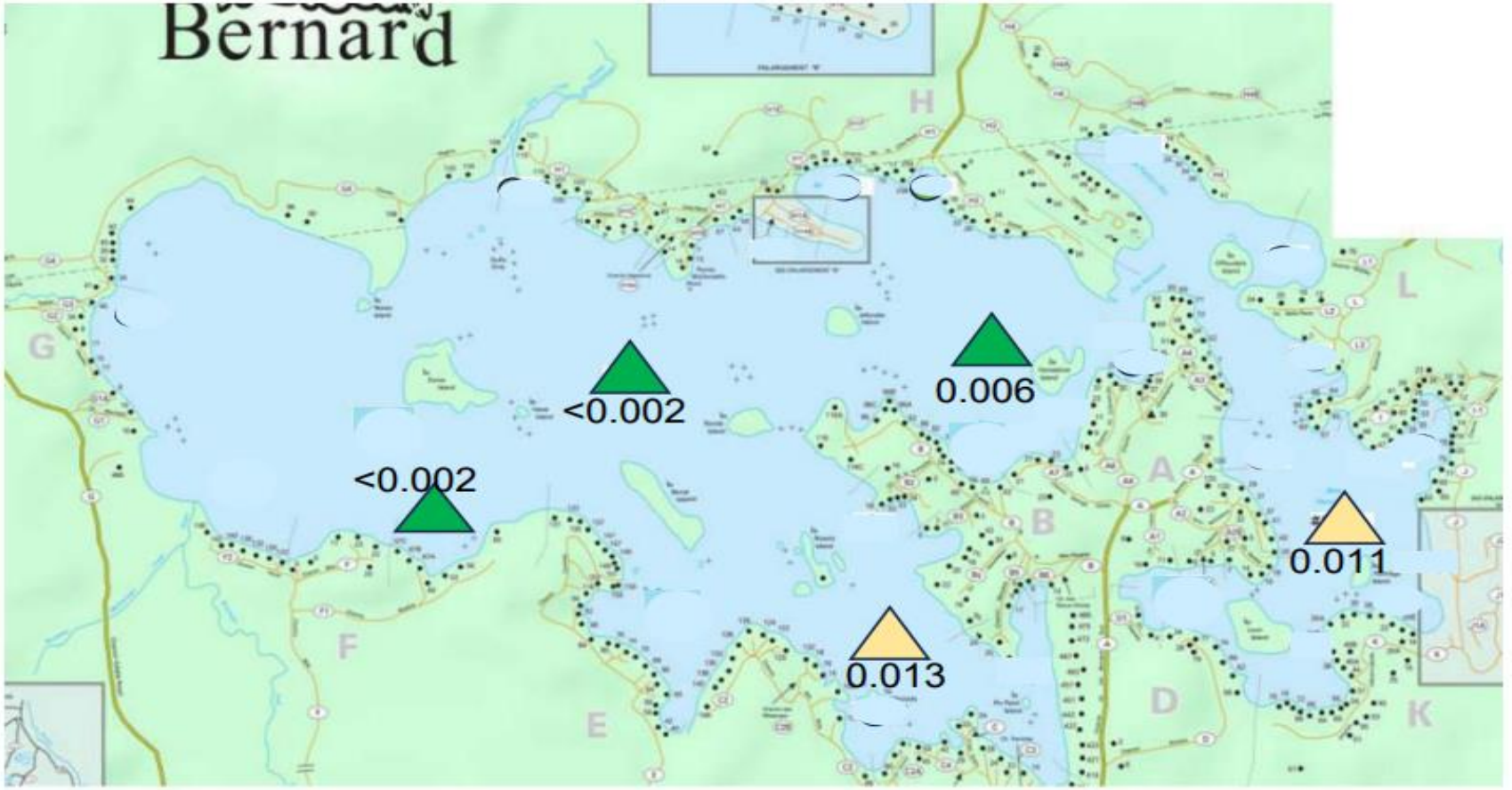


E.Coli is monitored for swimming and not for drinking water quality. Quebec classifies water quality as excellent when the levels of E.Coli are 0-20 and all recreational activities are permitted.

E. Coli results

- In 2023, one water sampling was completed on August 23. Nineteen samples were taken for bacteria – and you can see from the map that the E.Coli levels were either nonexistent or extremely low everywhere we sampled. Quebec classifies water quality as excellent where E.Coli results are between 0 and 20 and all recreational activities are permitted.
- Considering that water quality results for a study by the Quebec government in 1986 showed that the lake had "mediocre" water – 80% of 346 samples taken had E. Coli between 500 and 1000 – we have make great progress with our septic systems since then.

August 23 Water Sampling 2023 results: Total Phosphorus in mg/L



Total Phosphorus at Lac Bernard should be between 0.00 -0.010 milligrams per litre (mg/L). At 0.015 mg/L and over, problems are likely including algae blooms and faster weed growth.

Phosphorus is naturally in soils and also comes from fertilizers and septic systems - even well functioning septic systems and erosion. Shoreline plants and trees are key to keeping phosphorus from moving from the land into the lake.

Phosphorous results

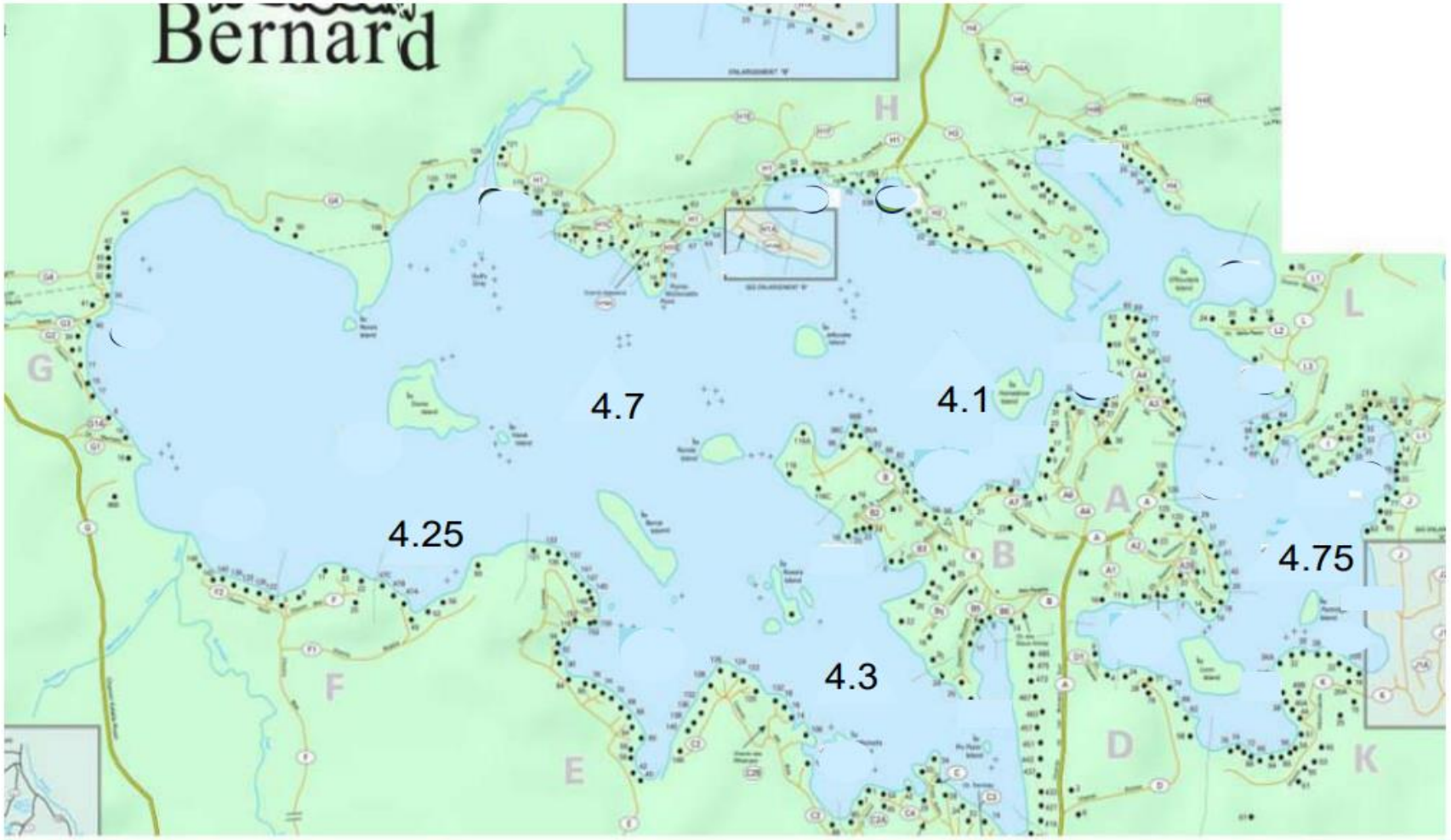
- Phosphorus in lakes is naturally very low but as human activity increases around lakes, levels increase. Phosphorus levels are a key indicator of the health of the lake. The higher the phosphorus in the lake, the more weed and algae growth there will be.

- Total Phosphorus was sampled at 5 of the deepest spots on the lake. The levels of phosphorous in Lac Bernard should be between 0 and 0.010 milligrams per litre – and when they reach 0.015 mg/L, we can expect to see problems like algae blooms and certainly faster weed growth.

- You can see that there were levels in Mitchell's Bay and in Hamilton Bay – the little lake – that were higher than in other sampled spots. While these levels are still within the ok limits, these two sample sites also correspond to the more densely settled parts of the lake – and also where there may be less water flow – important in a year of such low water levels.

- How to keep phosphorus out of the lake – its easy – never use fertilizer, within 15 metres of the lake leave any shoreline plants, shrubs, trees you can, avoid lawns – not because they aren't great looking but because they have shallow roots that are no good at taking up phosphorus - and try to avoid causing more erosion to the shorelines with your boat wakes.

August 23 sampling results 2023: Transparency in metres



Transparency is an indicator for assessing the health of lakes. Generally, the more transparent the water, the better its quality. Suspended algae and particles reduce transparency.

Transparency results

- Transparency is a cheap way to monitor lake health. Using a black and white disk, you drop it into the lake and measure how far down it goes before you can't see it.
- Generally speaking the farther down in the water it falls before disappearing, the clearer the water and the better the lake water quality since there are fewer algae and suspended particles in the water. Watching transparency over a number of years allows you to see changes that can provide alerts to issues to be addressed. For instance, if the water in Lac Bernard started to become much clearer so you could see farther down into the lake, one reason might be zebra mussels.
- In 2008, the Association started to participate in a Quebec government program that required transparency readings 10 times each summer and these readings continued for several years thanks to volunteers. The readings we got on August 23 are similar to the ones we averaged in 2008 and these transparency numbers classify the lake as "clear".

3 Key messages on water quality

- There are now over 400 cottages at the lake and well over 50% of the shoreline is disturbed. This puts stress on lake water quality.
- Phosphorus is our biggest concern - every cottage is a source of phosphorus into the lake
- The best ways to prevent phosphorus from our cottages are:
  - Maintain our septic systems – get tanks pumped every 2-4 years
  - Keep as many plants and trees within 15 metres of the shore as you can – replant, don’t cut trees, never fertilize, watch boat wakes to prevent shore erosion

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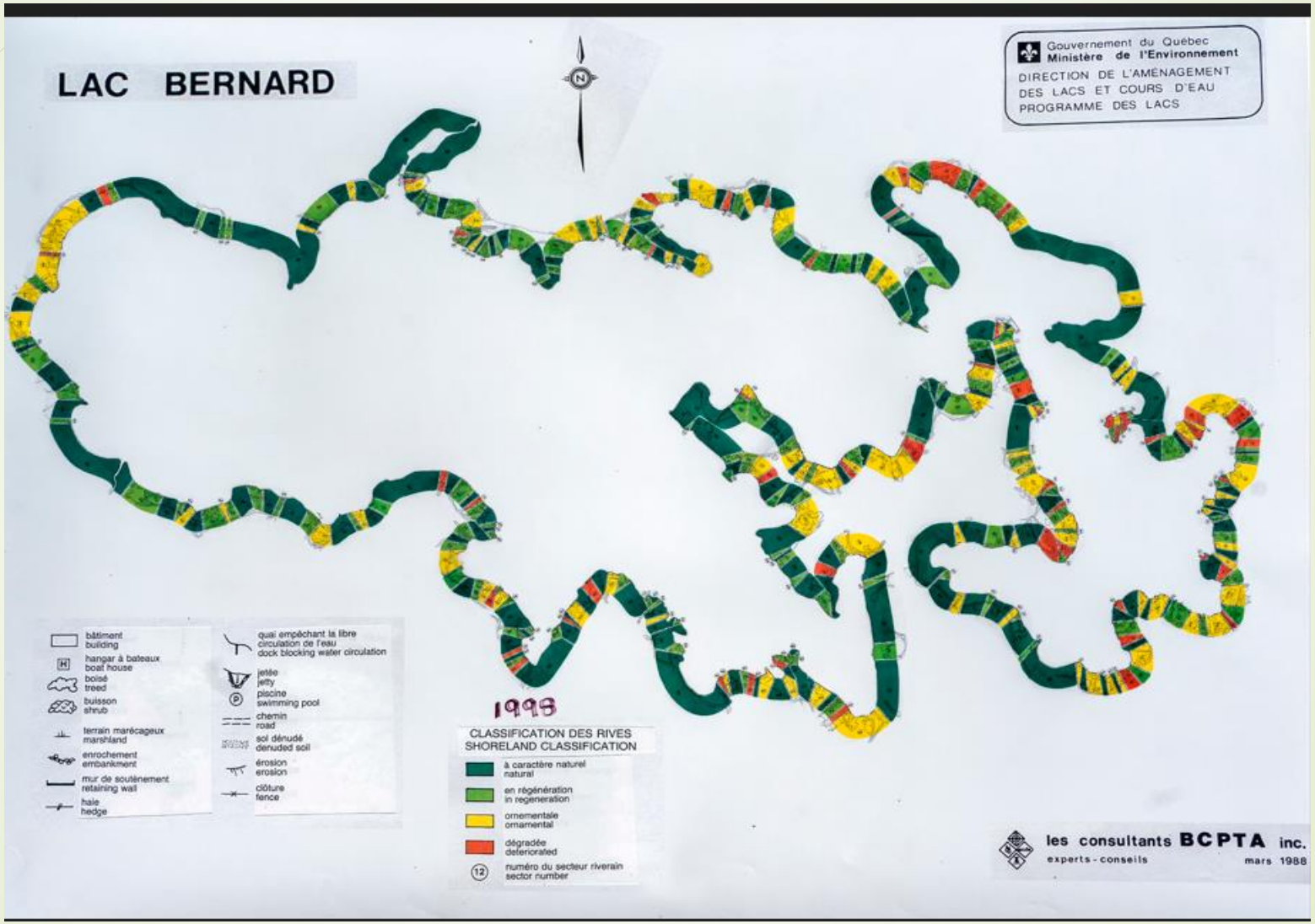

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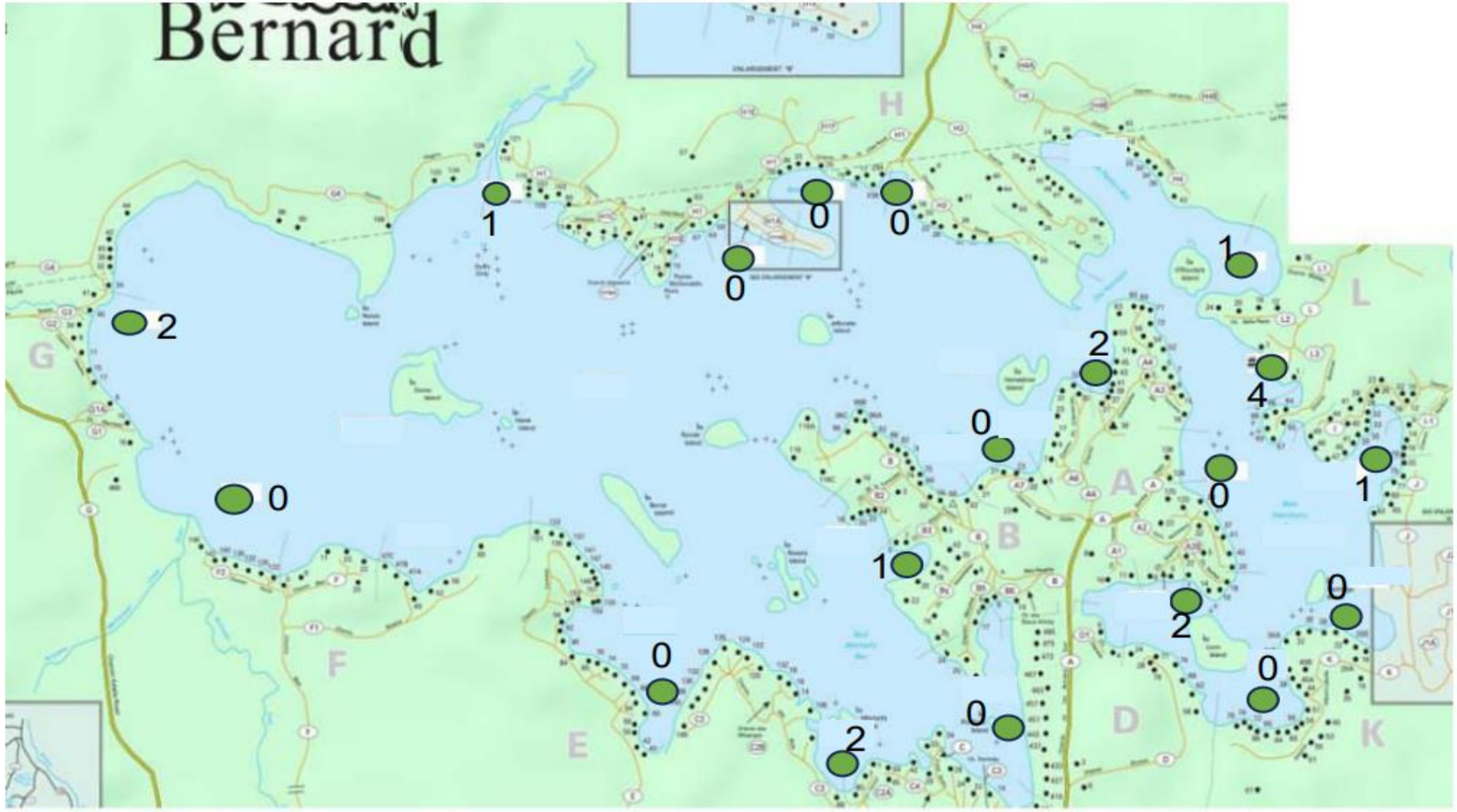

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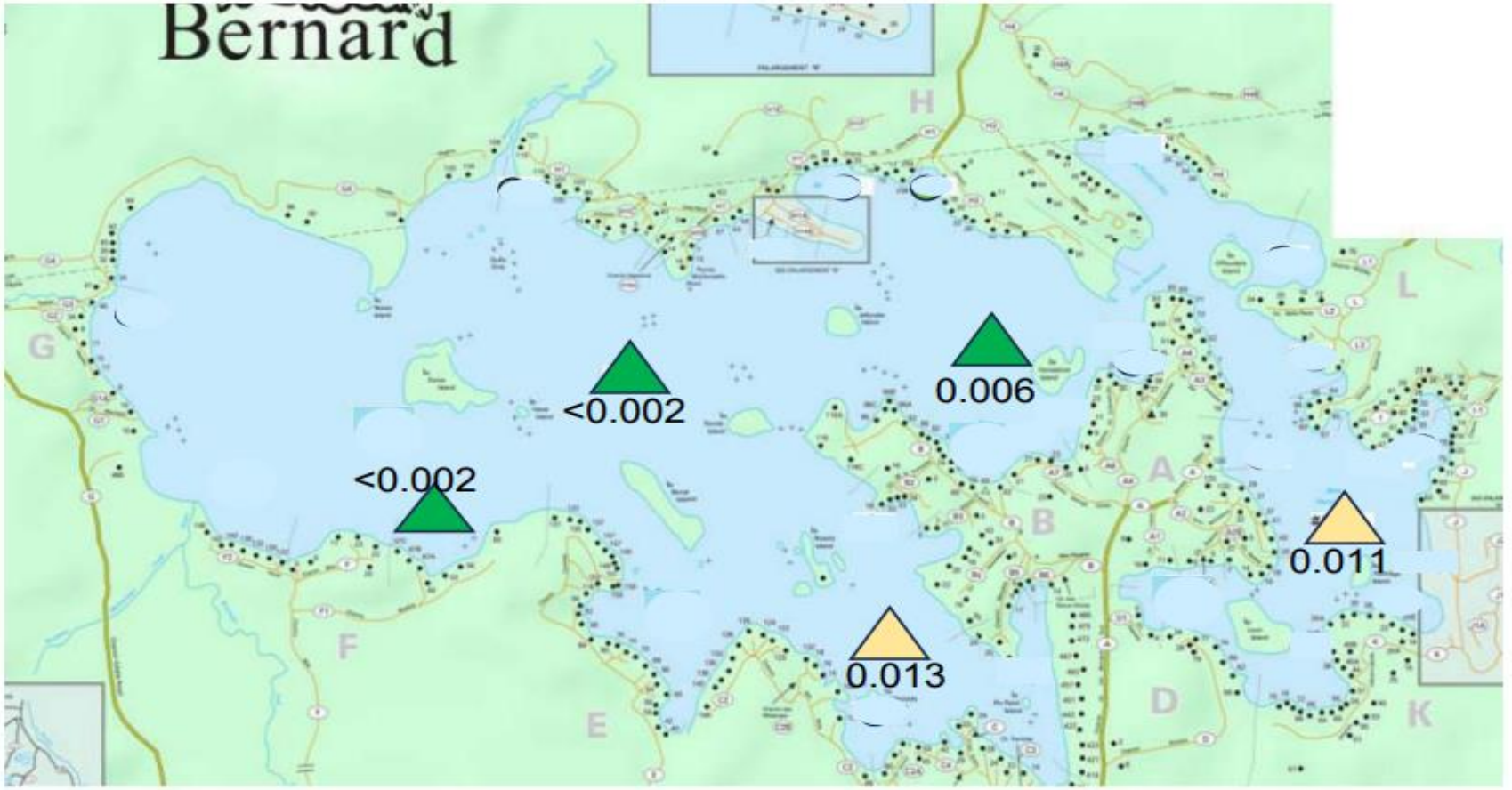

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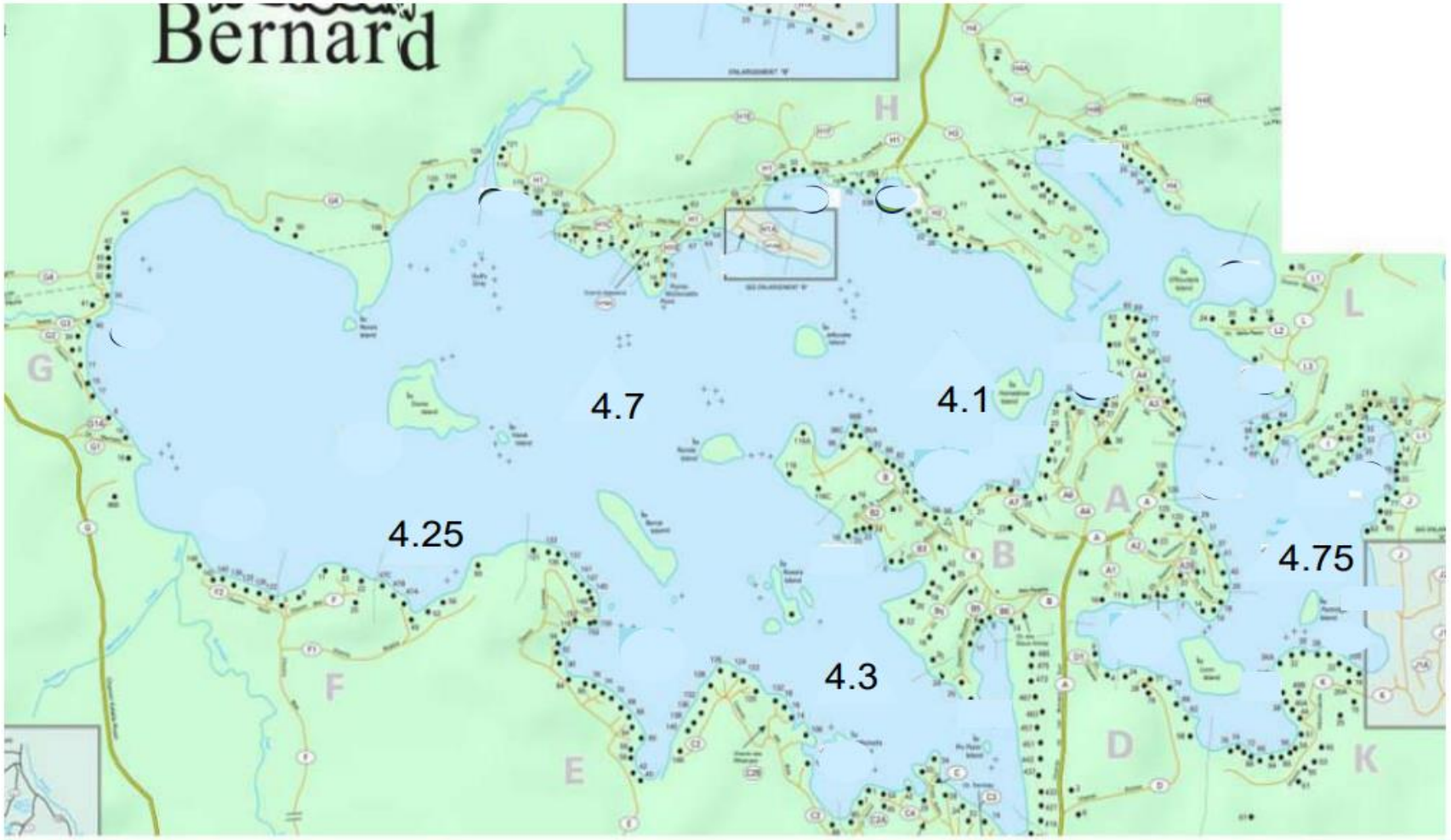

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The Low Down on Water Levels

The Ins and Outs of Life on Lac Bernard

Jeff Stubbins

The Out's…our Outlet

The Outlet is located at the north end of the lake and is on private property.

The outlet is heavily contaminated with milfoil. The shallow water and low levels this summer have caused the milfoil to amass on the surface. Milfoil cuttings that make their way to the Outlet from our lake are settling in this pond.

Typically, during the ice breakup and Springtime snow melt…the Outlet becomes entangled with debris that slows the flow of water from our lake.

This year, we noticed that all the debris is being removed ensuring a steady 'outflow' from our lake

It is consistently being 'cleared' despite the low water levels.

The Out's…our Outlet…

These pictures illustrate the bank along the 'Outlet' just before the 'falls' where water escapes Lac Bernard and moves downstream.

You can clearly see the bank and if you look closely at the rocks, the high- water mark is about 2 feet above the water levels.

The lower picture shows the Outlet itself, where water departs our lake and heads downstream. You can see it is quite narrow, maybe 10-12 feet across, and is easily blocked with debris.

These pictures were taken in August. The water level is much lower now and dropping.

The Out's…our Outlet…

This picture shows the debris that has been removed on the north side and south side of the Outlet 'exit' to where the water literally is free flowing from Lac Bernard.

These pictures were taken in August and you can see the water is flowing quickly, despite the low water levels on the lake proper. The water level continues to free flow from our lake, and will only stop or slow when the water level drops about another 12 inches.

Some debris had accumulated and was slowing the flow, yet again the debris was removed. This was verified in September.

The Out's…our Outlet…

This picture shows the debris that has been removed all the way down the outlet elevation drop – and clearly shows the debris on both sides of the 'river' that has been removed.

This picture was taken in September.

The In's…our Inlet…

Our lake is fed from Lac Notre Dame, which is a considerable distance from our lake. The Inlet is challenging to traverse on foot or in a vehicle. The Inlet is comprised of mainly two creek systems.

It is not uncommon for obstructions, typically from beavers, to restrict the inflow of new water to our lake.

Despite heavy rains, even deluges, in July…our lake is at the lowest level in recent memory and, until very recently, the inlet was completely blocked.

Lac Notre Dame levels are also low.

The In's…our Inlet…

These pictures illustrate some of the challenges to enter and traverse the Inlet system.

Hip-waders are a must,

While volunteers and owners of the properties along the Inlet have helped remove obstructions, perhaps there are ways to help 'nature' allow the free-flow of water into our lake.

Considerations:

The Inlet and Outlet are on private property.

Water levels are very low in the broader region of the Outaouais this year.

Low levels of water allow the sun to reach ‘deeper’ areas of the lake, and therefore milfoil to spread into these deeper regions.

The heavy rains in June/July did not increase the water level in our lake, because the Outlet is free flowing and the Inlet was blocked. Normal water levels could not be maintained. In fact, we experienced a steady decrease in water levels to unprecedented lows at this time of year.

Culverts could be introduced under beaver dams to allow water to continue to pass even when nature is trying to ‘block’ the flow at the inlet.

Outlet landowners could be approached for access to ensure ORALB and volunteers could monitor outflow and debris removal.

The Milfoil Problem

Paul Saunders

The Milfoil Problem

- We engaged ABV des 7 (Biologists focussed on aquatic wildlife) in 2011 to study Eurasian milfoil growing in Lac Bernard
- ABV des 7 research revealed that milfoil seagrass was present in 185,000 M^2 of the lake
- In 2015 we commissioned a second study that showed milfoil was now present in 525,000 M^2 of the lake
- Again in 2021 we commissioned a third study that showed that milfoil had now spread to more than 1.1 million M^2 of the lake
- This represents a 580% increase in just 10 short years!

Milfoil in Lac Bernard

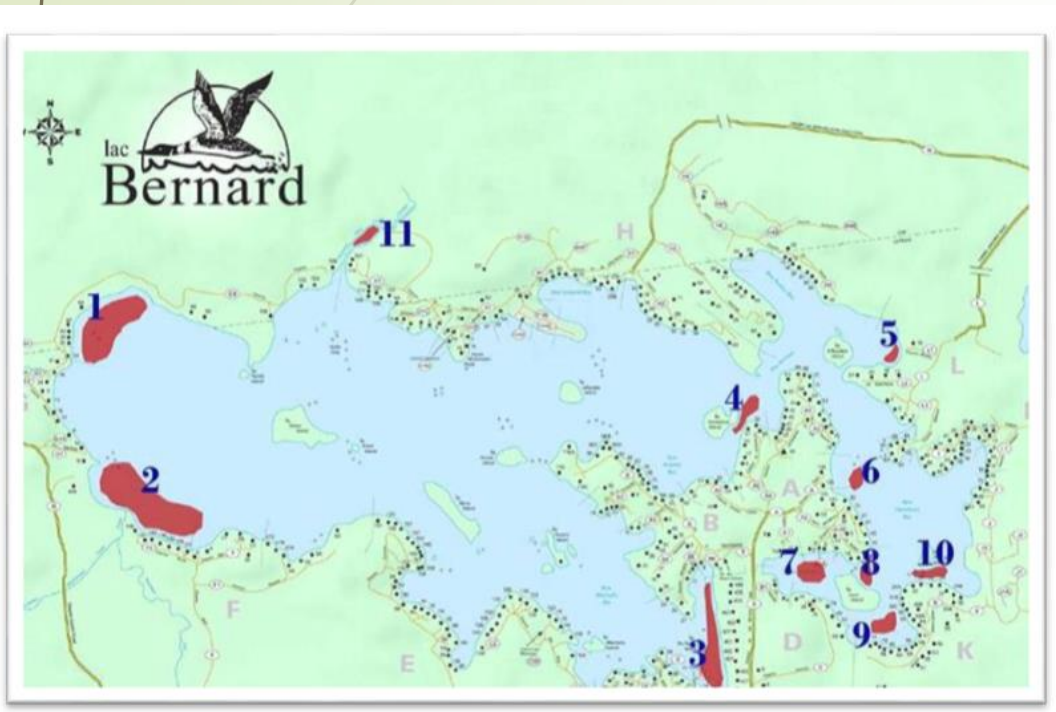
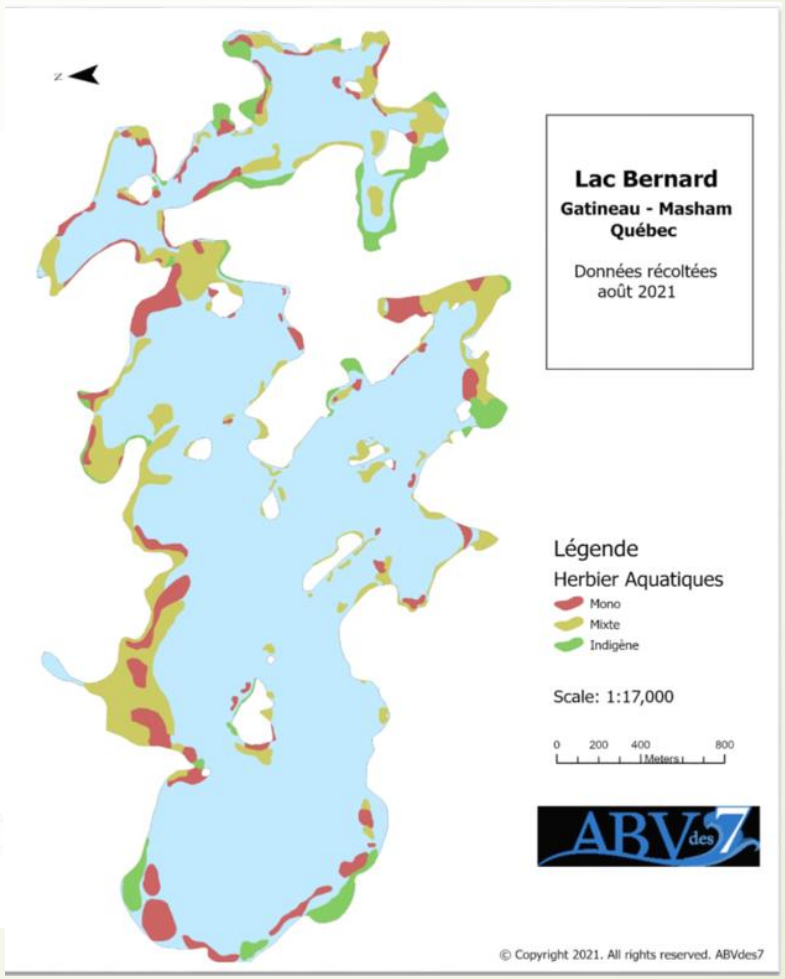
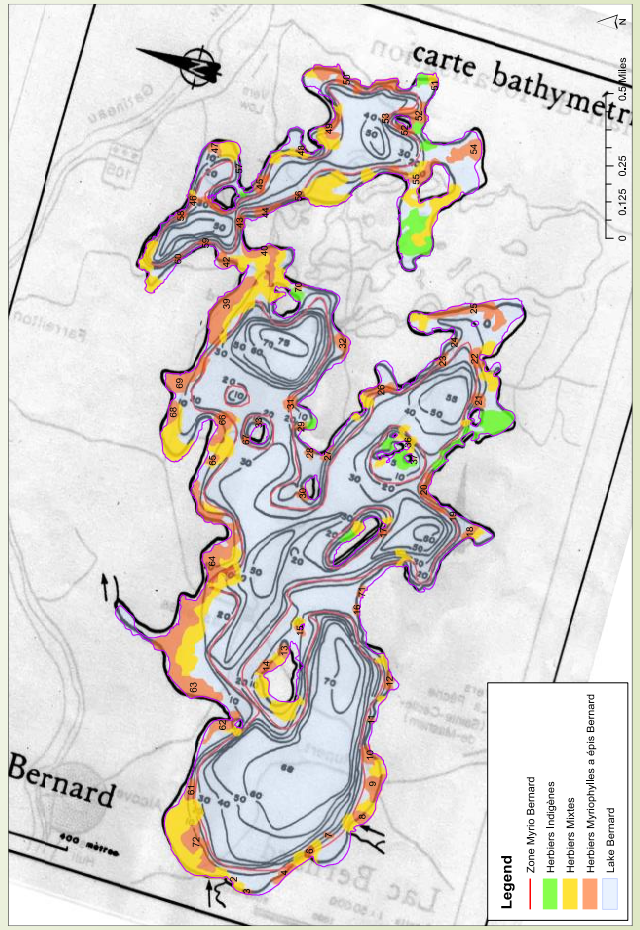


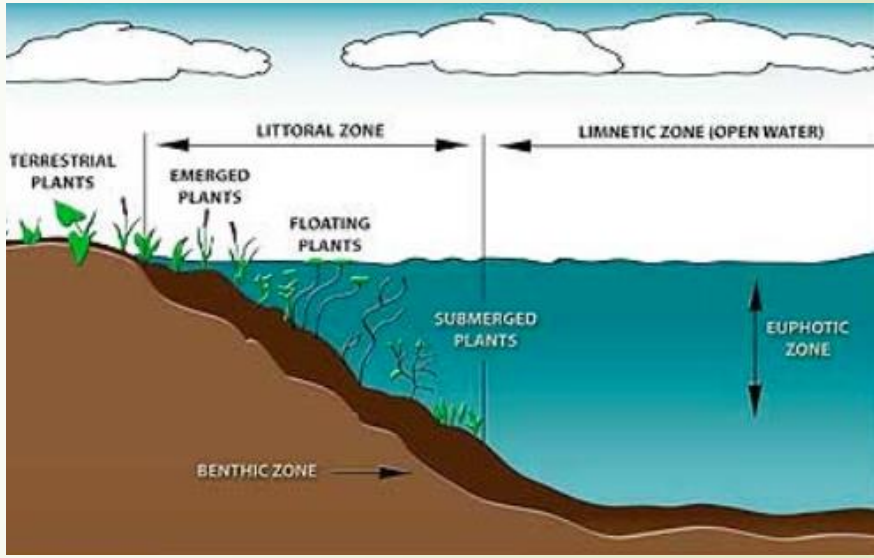
FIGURE 4: ZONES D'HERBIERS AQUATIQUES DENSES AU LAC BERNARD (MCCLELLAND, 2012)





Eurasian Milfoil

- Eurasian milfoil now dominates the littoral zones of Lac Bernard with up to 100 plants per m^2.
- The littoral zones are the most productive areas of a lake i.e. the water depths down to 4m.
- It can take over a lake eg. Lac-a-la-Tortue, near Shawinigan is now 80% covered with milfoil. Lac des Loups is 50% covered.
- Eurasian milfoil will destroy fish habitats and biodiversity.
- Milfoil will pump phosphates from the lake's benthic layer (sediment surface) back into the lake
- Phosphates can contribute to the growth of blue-green algae.



Aquatic Harvesting

Divers Using Water Suction Solutions

Weevils

- Weevils are small beetles (less than 6mm in length
- They are indigenous to Lac Bernard as well as most lakes in Ontario and Quebec

Herbicides

- 2-4-D, Furidone (Sonar), Procella (Sepro) or triclopyr will all kill milfoil in the water

Federal Funding Submission: Invasive Species (Eurasion Milfoil)

Kevin Radford – President ORALB

The Opportunity: Reducing the spread of Eurasion Milfoil on Lac Bernard, QC and knowledge mobilization on controlling this invasive plant and the restoration of indigenous plant and fish habitats in Canada.

$250000/year x 3 years (federal funding) beginning in 2024/25, 25/26 and 27/28.

Submitted 31 Aug 2023 with acknowledgement received from national and regional leaders.

ORALB would be the receiving ‘institution’ of funding.

Needed to credentialize leaders (Project Management experience, research, technical acumen etc.)

Research provided by ABV des 7.

Production by Block-Aid (commercial application of burlap).

Content: our work to date (3 studies, signs (education), buoys (avoidance), 75m2 burlap program)…and despite efforts, challenging to control spread.

580% increase in spread/space where milfoil has heavy concentration from 2010 initial study.

Methodology

Commercial application of burlap in high density zones with a particular emphasis on heavy boat traffic areas.

Research to study effectiveness of the commercial application of burlap.

Commitment to share information/research with Kitigan Zibi and two universities

Carleton/Sherbrooke – one each in ON and QC

Request to seek additional funding from province and municipality ($750K each – total $2.25M).

Considerations:

ORALB Environment Committee has good data with 3 studies performed in 2010, 2015 and 2019.

The Association membership embraced the ORALB 75m2 burlap program with over 200 cottagers participating.

The application of burlap in deep water is challenging and unsafe in deeper water.

Using rocks to weigh down the burlap caused burlap to ‘float’ and got caught in boat propellers particularly in boat launch areas and near docks impeding our ORALB investment in mitigation method.

We (cottagers) may need to ‘invest’ in the remediation program to get milfoil spread under control.

Eurasian Milfoil is an invasive species and we will be challenged to remove it/eradicate it completely from Lac Bernard.

There is an opportunity to share our research with other lakes.

Q&A