

# Ecology of submersed macrophytes in the Kawartha's



## Where do they grow?

- limited to waters that have appropriate temperature, pressure, and light.
- minimal turbulent motion – availability rooting substrate
- biotic factors
  - herbivores
  - plant – plant competition
  - Epiphytes and other attached algae
  - phytoplankton

## Role of macrophytes in lakes “+”

- fish and wildlife habitat/forage
- dissipate the energy of wind and wave action which reduces the potential for shoreline erosion
- roots reduce the amount of bottom sediment resuspension
- Taller macrophytes create a “settling” environment for suspended particles.
  - These particles often contain important plant nutrients and thus the macrophytes are actually creating a more fertile rooting substrate for themselves and are reducing the availability of nutrients to phytoplankton

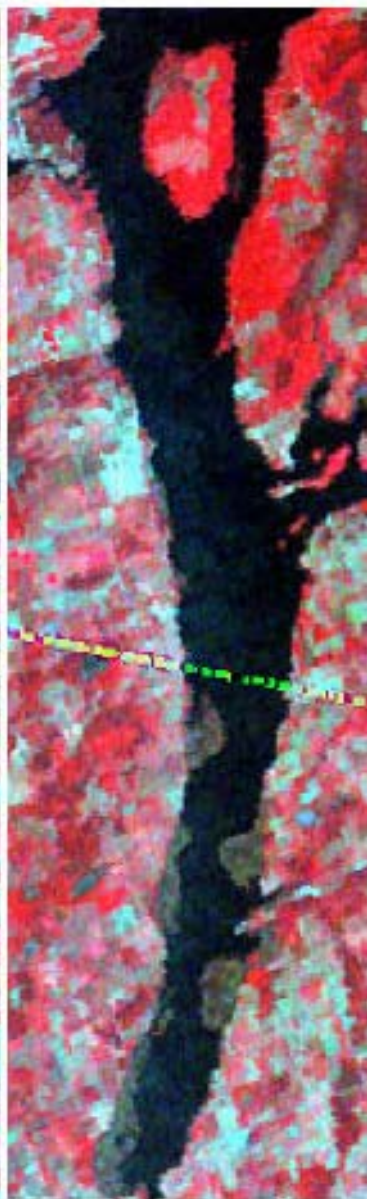
# Eutrophication “-”

- Increased light levels due to non-native mussel filtering activity
- excessive nutrient inputs accumulate in the sediments where they are available for plant growth
  - Perhaps enhanced by zebra mussel pseudo-feces?
- often combined with introductions of non-native species which are able to exploit these nutrient-enriched conditions
  - i.e. Eurasian milfoil
  
- with the excessive growth of non-natives, many of the benefits provided by the native macrophyte species are lost and replaced by:
  - temporal (diurnal or seasonal) reductions in dissolved oxygen (DO) owing to plant respiratory demands for oxygen and decay of dead organic matter by aerobic bacteria,
  - changes in benthic habitat for fish and invertebrates,

- Question: Do we see temporal changes in aquatic plant communities?
- ..yes – both increases and decreases...



1976



1979



1993



2002

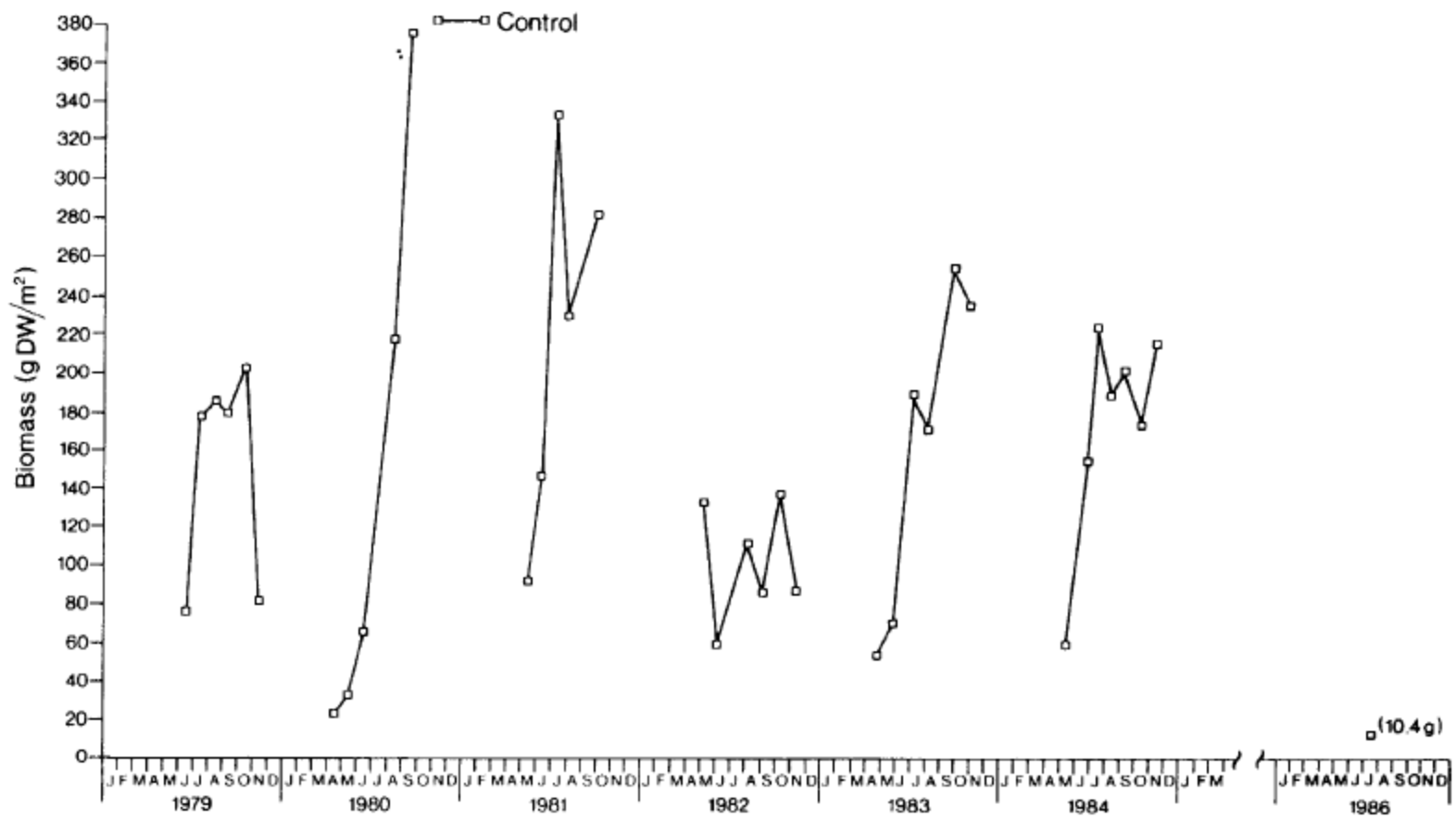
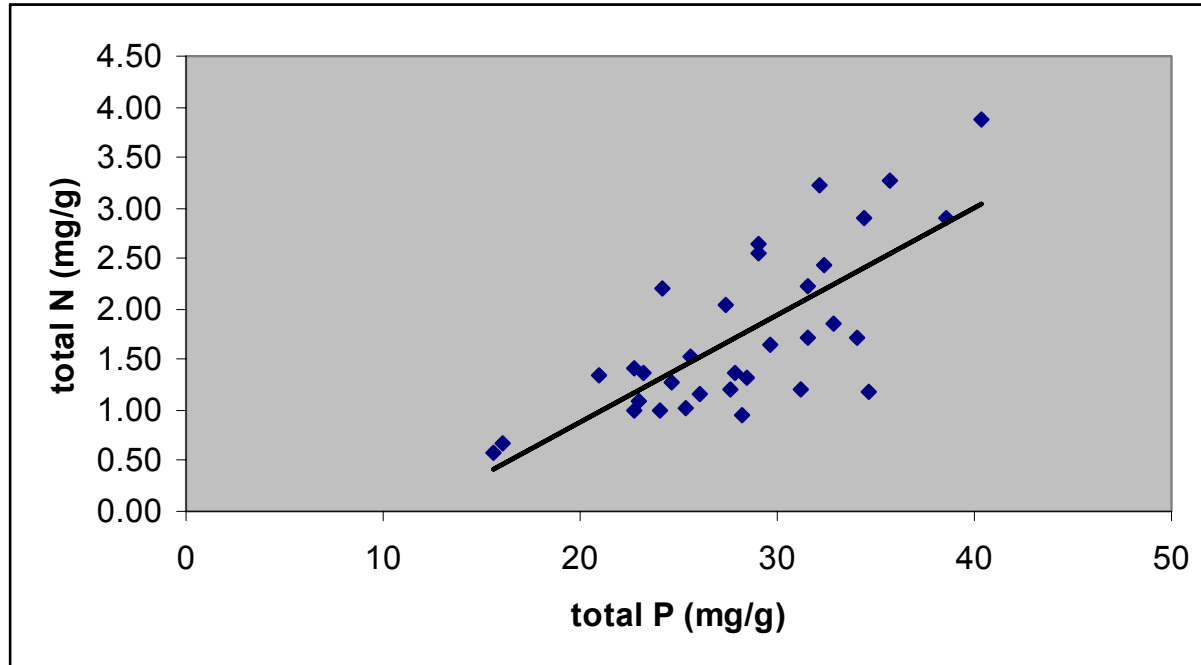


Figure 1. Milfoil biomass (g DW/m<sup>2</sup>) at a Buckhorn Lake site from 1979 to 1986. 1 standard error = 23% of the mean.



Is nutrient loading into the nearshore areas responsible for increases in aquatic plant growth....or...



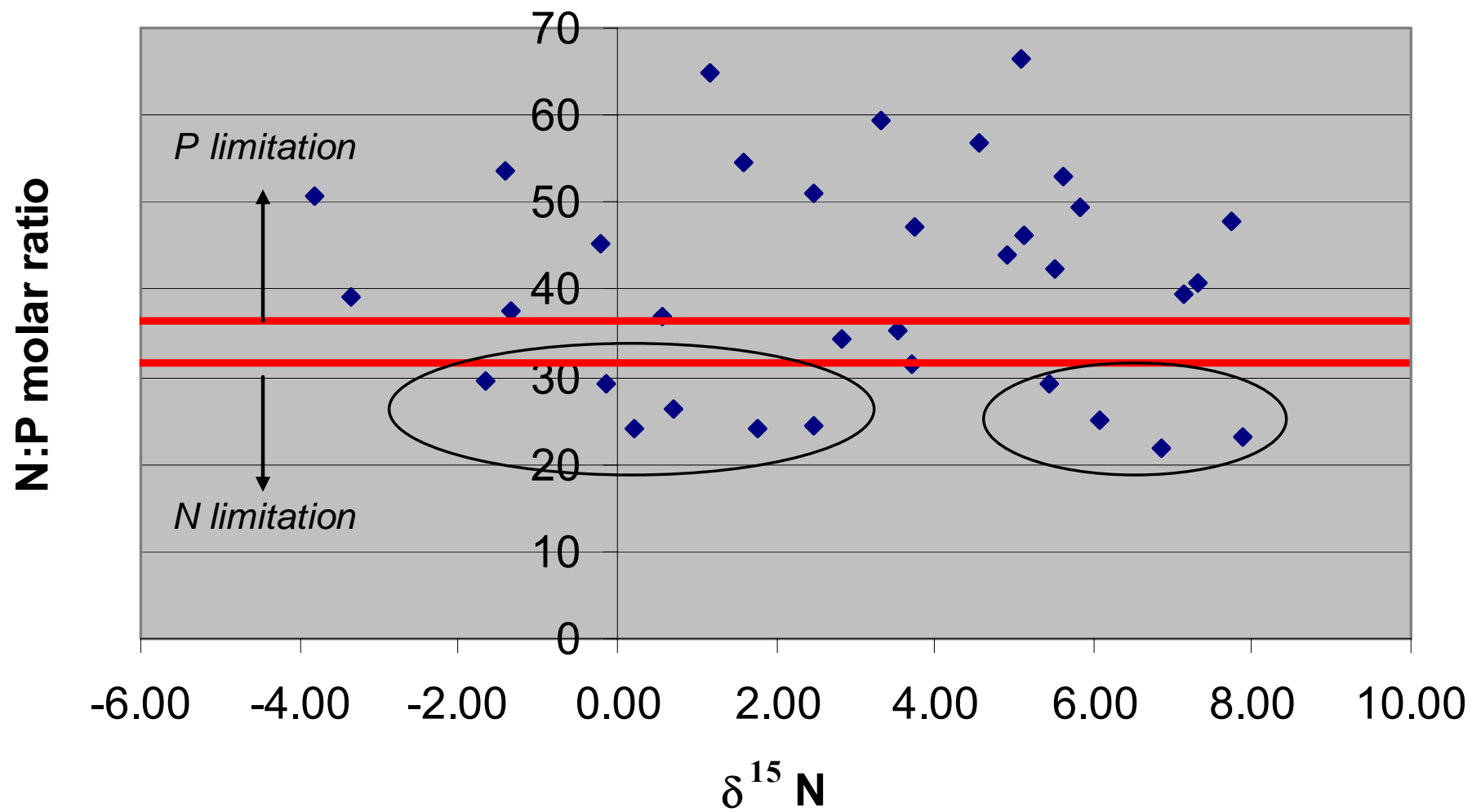
Important nutrients to aquatic plant growth:  
Phosphorous (P) and Nitrogen (N)

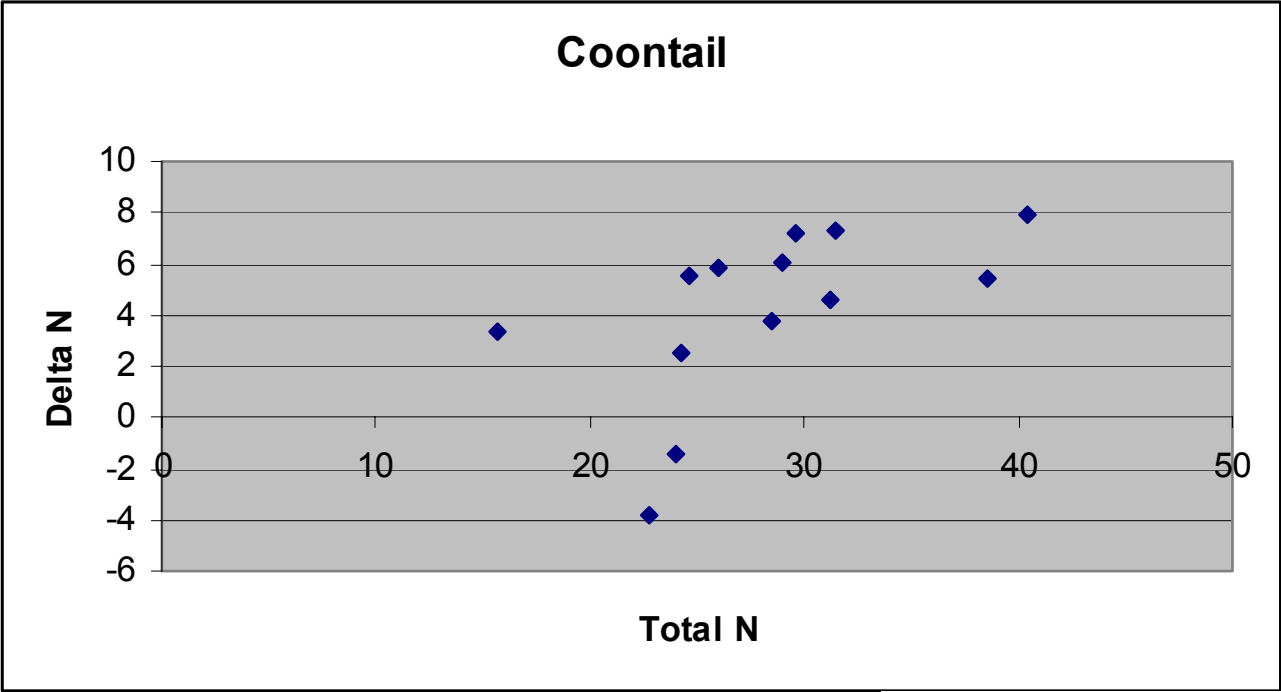
| Lake        | Total N (mg·g <sup>-1</sup> ) | Total P (mg·g <sup>-1</sup> ) | δ <sup>15</sup> N         |
|-------------|-------------------------------|-------------------------------|---------------------------|
| Sturgeon    | 29.3<br>(25.4 – 34.4)         | 1.9<br>(0.9 – 2.7)            | 2.3<br>(0.7 – 5.1)        |
| Chemung     | 30.0<br>(24.0 – 35.7)         | 1.8<br>(1.0 – 3.3)            | -0.45<br>(-1.7 – 3.8)     |
| Pigeon      | 29.5<br>(23.2 – 40.4)         | 2.0<br>(1.2 – 3.9)            | 2.5<br>(-1.4 – 7.9)       |
| Big Bald    | 27.2<br>(22.7 – 32.8)         | 1.3<br>(1.0 -1.9)             | -0.45<br>(-3.8 – 5.8)     |
| Little Bald | 22.7<br>(15.6 – 27.9)         | 1.2<br>(0.6 – 1.4)            | 3.0<br>(-0.2 – 5.5)       |
| Lovesick    | <b>33.2</b><br>(29.7 – 38.6)  | <b>2.1</b><br>(1.7 – 2.9)     | <b>6.6</b><br>(5.5 – 7.3) |
| Stoney      | 27.9<br>(20.9 – 34.1)         | 2.0<br>(1.1 – 3.2)            | 5.2<br>(2.8 – 6.9)        |
| Brighton    | 51.4                          | 0.6                           | 6.2                       |

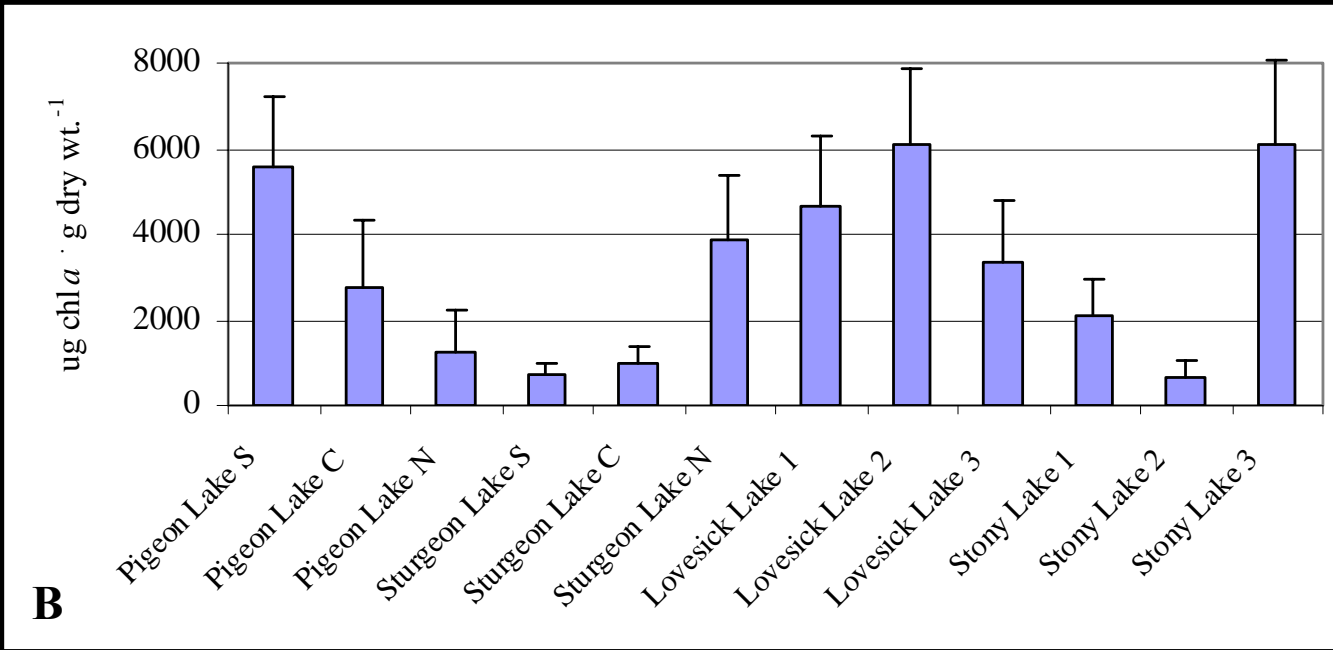
Atmospheric deposition: (δ<sup>15</sup>N of +2‰ to +8‰)

Commercial Inorganic fertilizers: (δ<sup>15</sup>N of -3‰ to +3‰)

Human wastewater and livestock: (δ<sup>15</sup>N of +10‰ to +22‰)









Are plant community changes related to natural successional processes?



...in some cases

- Question: So where are we now???

Before



After 30  
minutes



Answer: all of the above.....



**Aquatic Plant Monitoring Program**  
**Kawartha Lake Stewards Association – Summer 2008**  
**Oliver Ecological Centre**

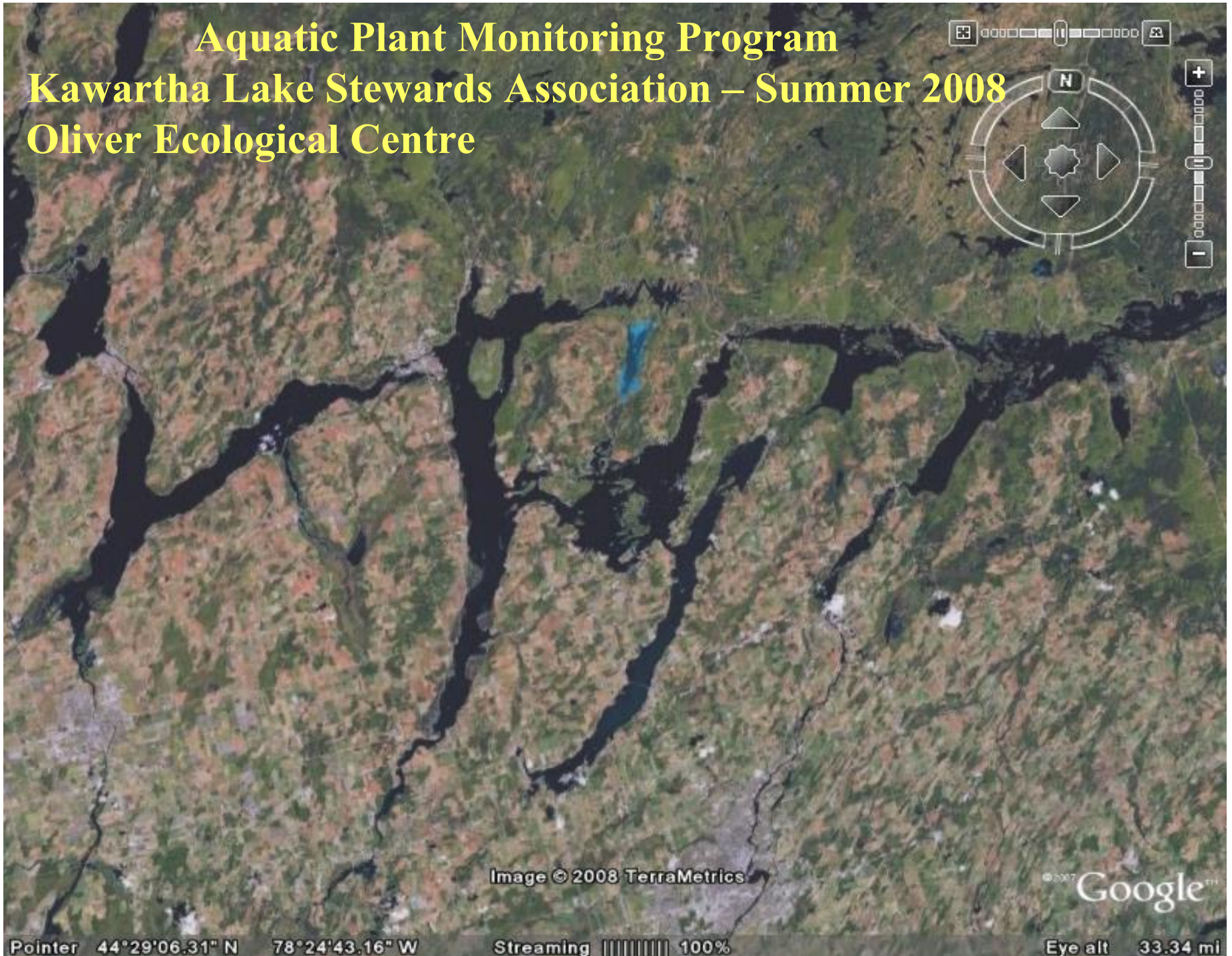


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Pointer 44°29'06.31" N 78°24'43.16" W

Streaming 100%

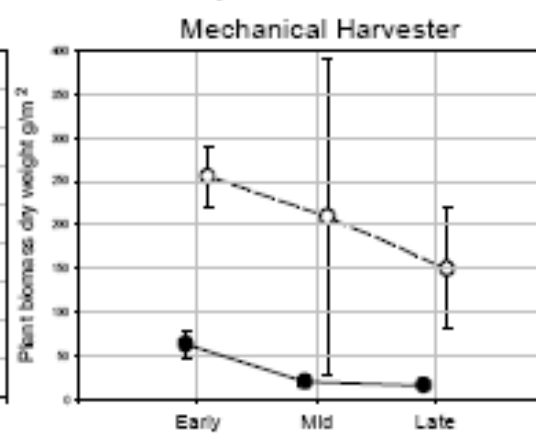
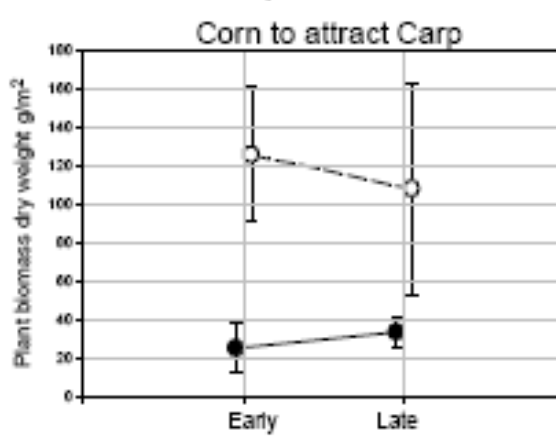
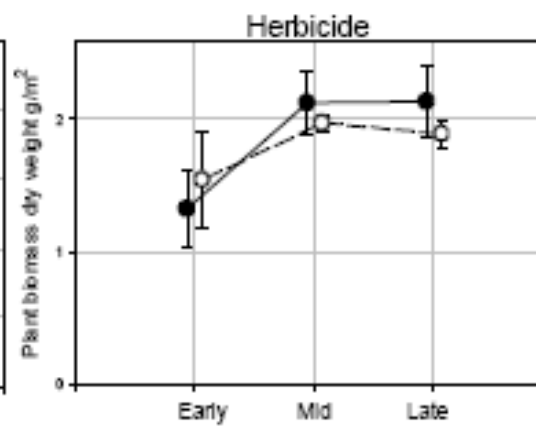
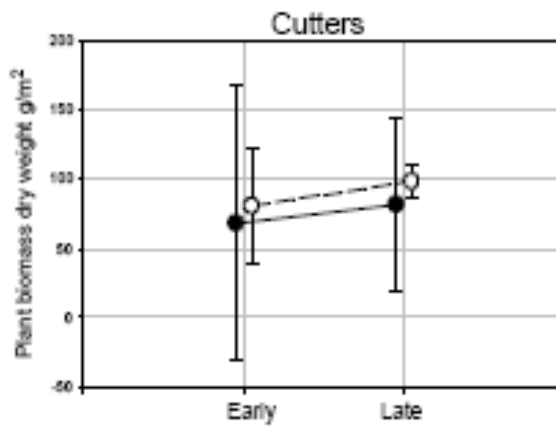
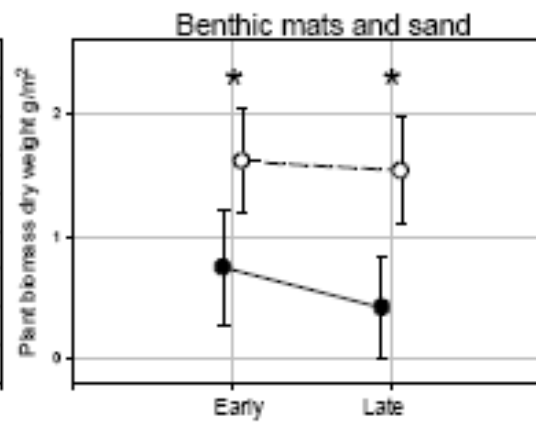
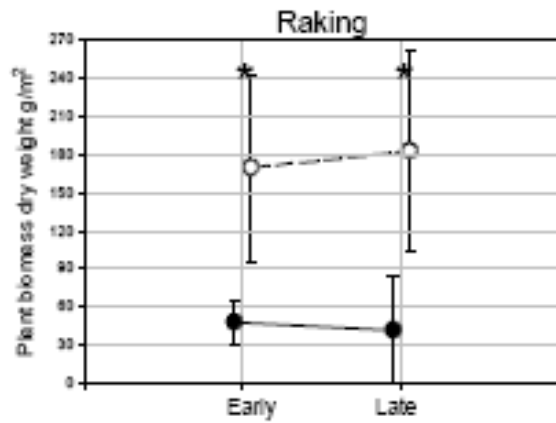
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# Aquatic Plant Management Approaches

- Biological
  - Augmenting native and introducing non-native herbivorous species
- Mechanical/Physical
  - Harvesters, diver assisted dredging
- Chemical
- Cultural
  - Prevention, education, Lake BMP

*Little information available that documents the effectiveness of these measures in the Kawartha or the impacts that they have on other components of the lake ecosystems.....*







....questions??