

# Lake wide temporal and spatial trends in the water chemistry of Lake of the Woods

Lake of the Woods  
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*Protecting our environment*



Ontario



**Unresolved questions:**

Are the algal blooms worse (in the north end of the lake) than they used to be?

Has the water quality changed?

i.e. have total phosphorus (TP) concentrations increased?

These questions involve lake wide processes and must be answered with lake wide monitoring programs



Figure 1. Lake of the Woods Rainy River (inflow) to Kenora (outflow).

Sample effort:

Ministry of Natural  
Resources – Kenora

Ministry of the  
Environment – Dorset

Lake Partner Program  
- volunteers

Many data gaps:

- Not continuous at any one station
- Samples not seasonal

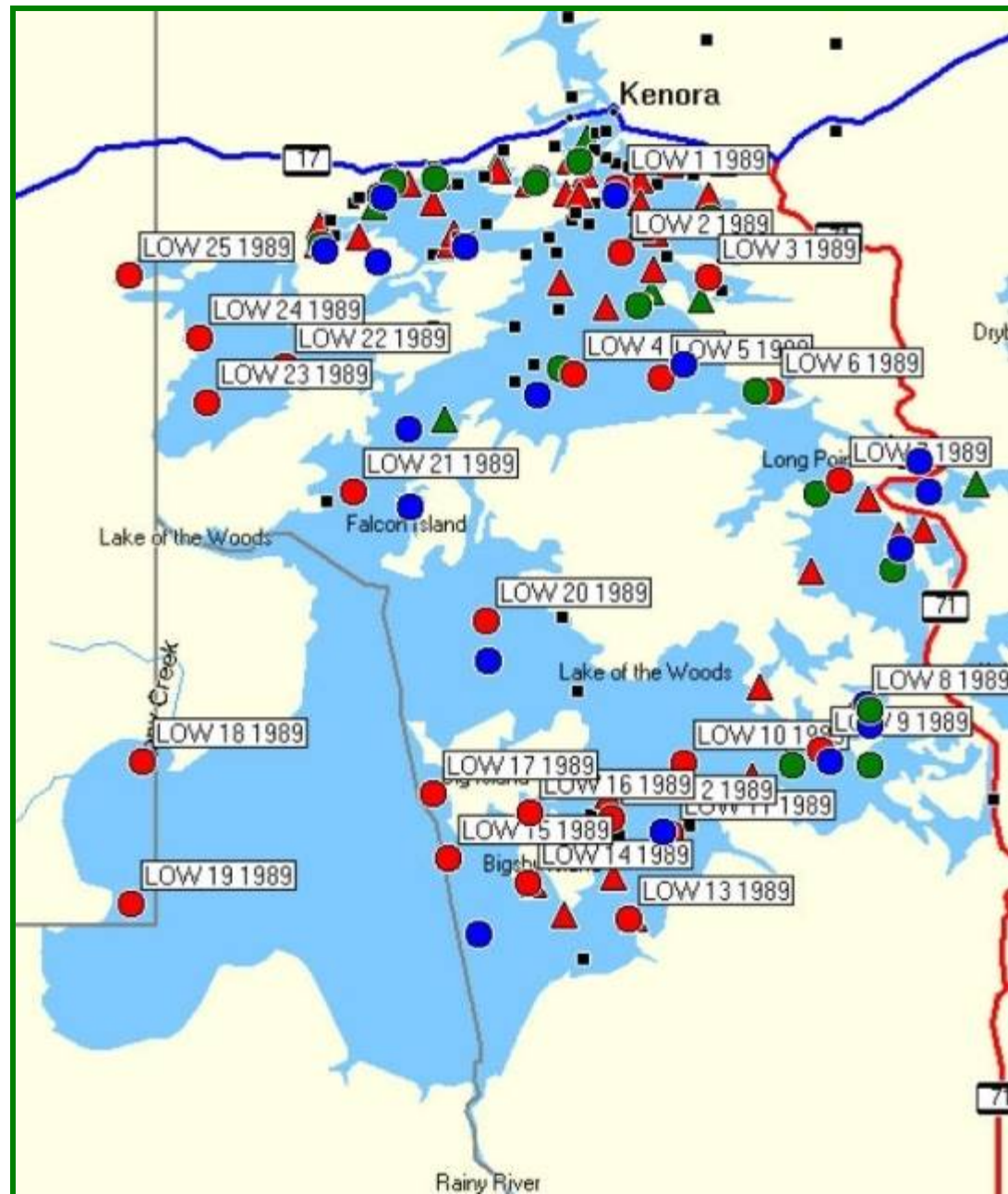


Figure 2. Sample locations in Lake of the Woods.

**Seasonal TP fluctuations at all locations are tremendous.  
This complicates the question; have the nutrients increased?**

### Andrews Bay

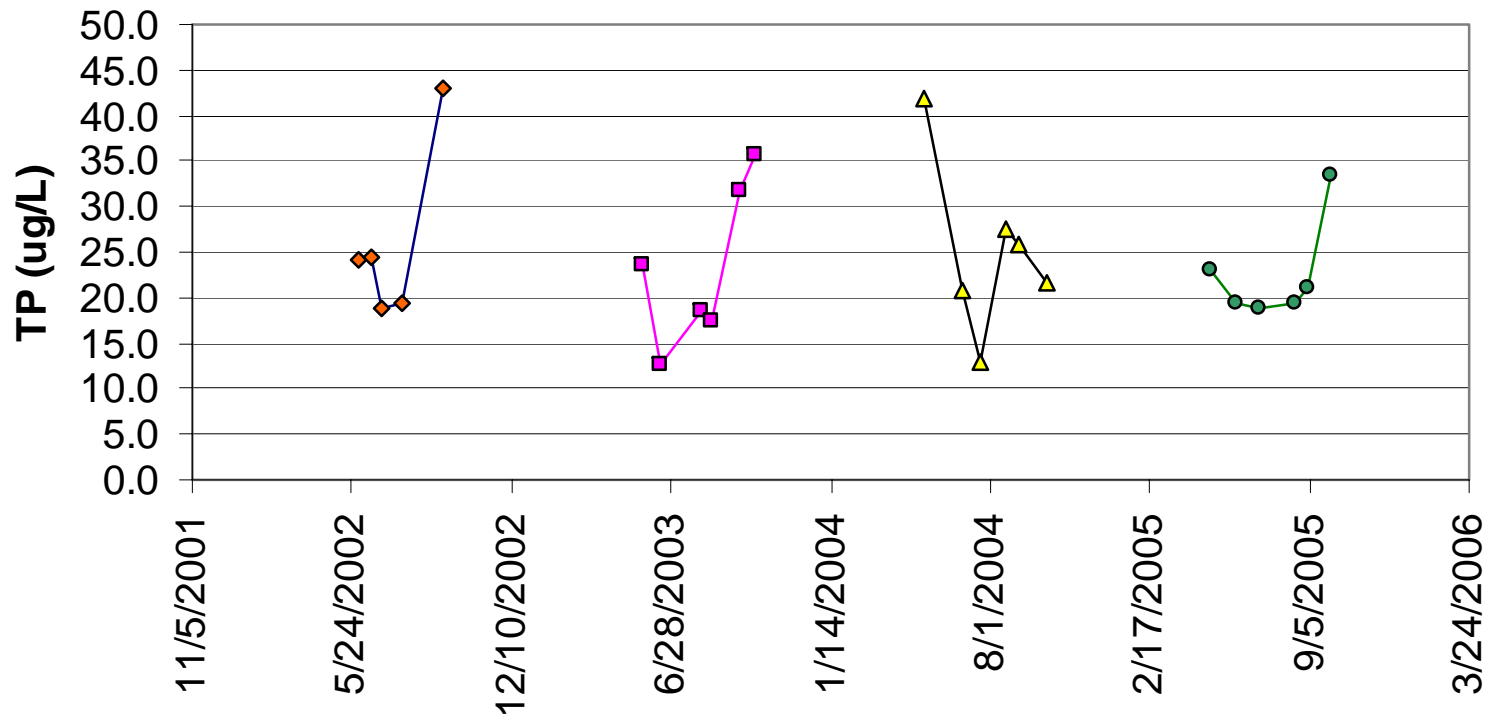


Figure 3. Phosphorus concentrations in Andrews Bay.

# Seasonal patterns are similar between years and differ with location

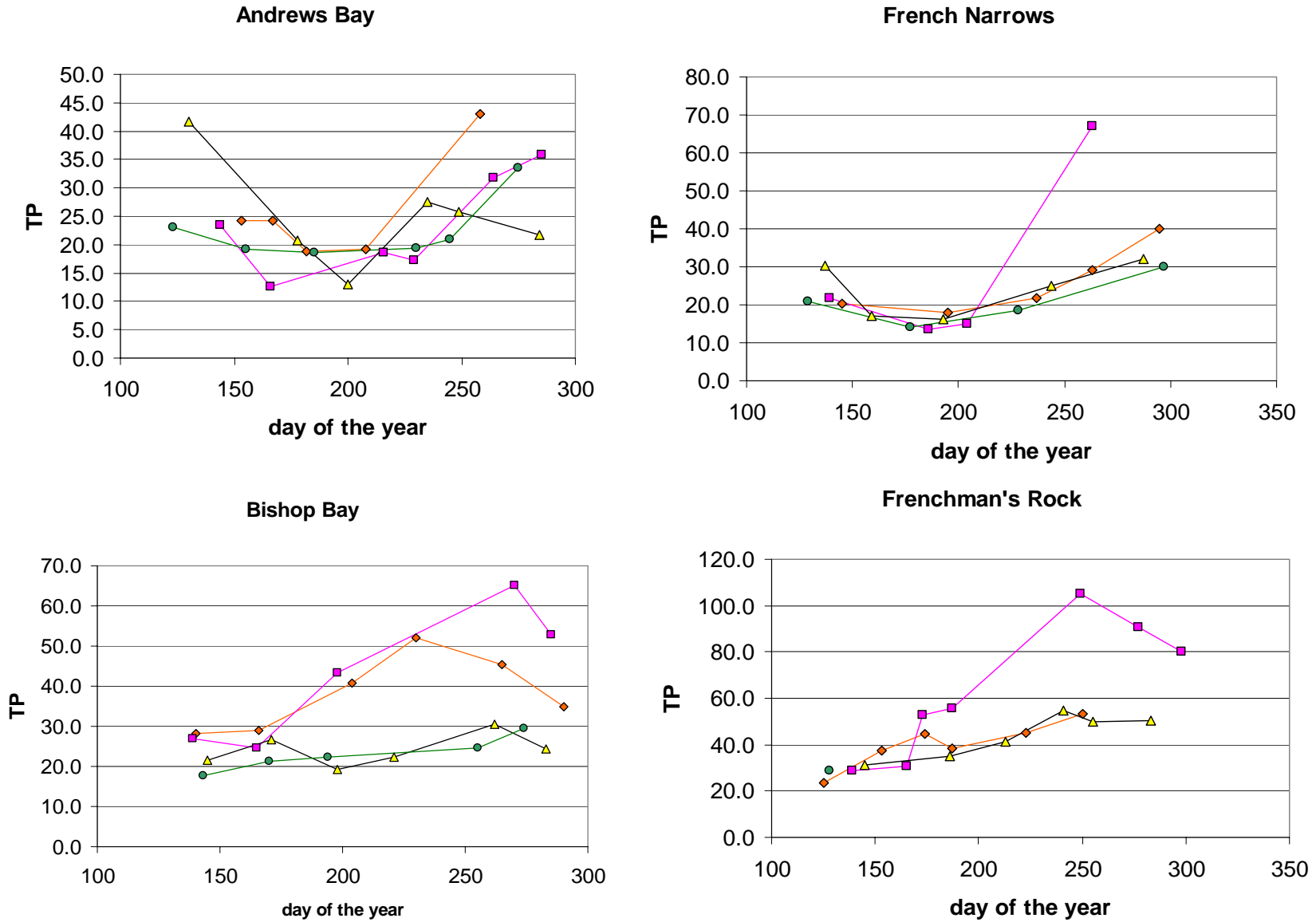


Figure 4. Seasonal TP patterns at selected locations in Lake of the Woods.

# ALL STATIONS

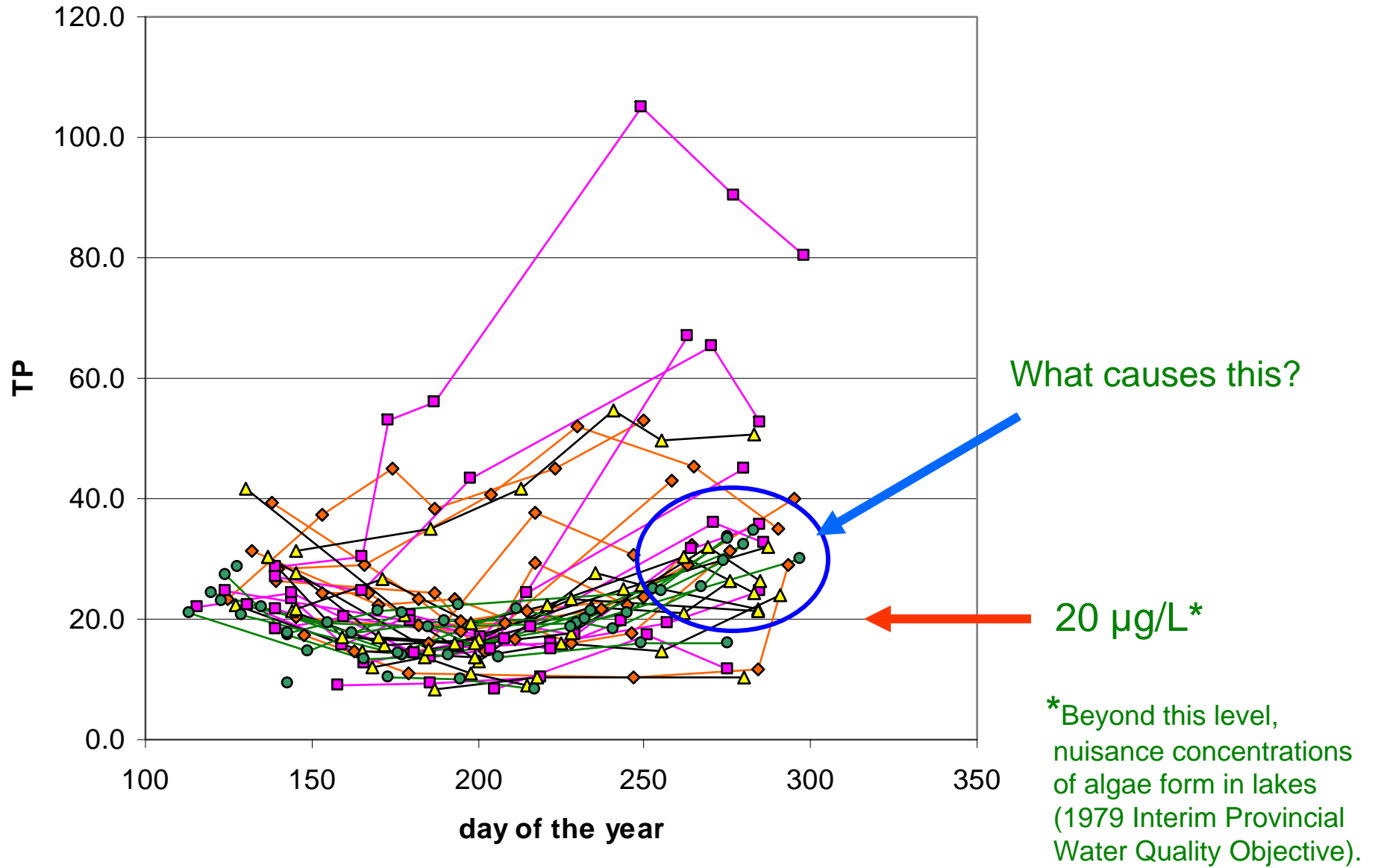


Figure 5. Seasonal TP (µg/L) trends for all stations in Lake of the Woods.

### NORTHERN STATIONS

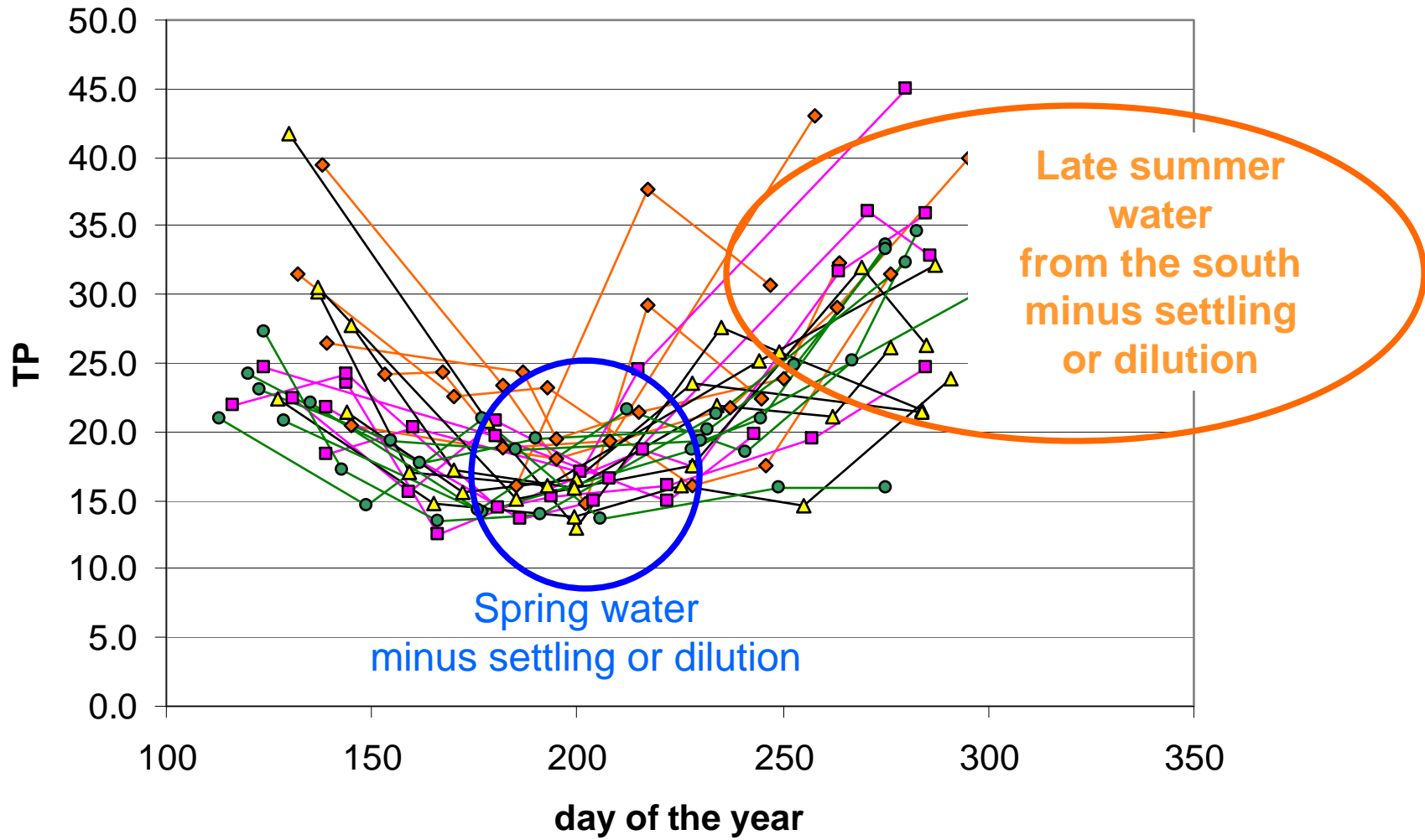


Figure 6. Seasonal phenologies with respect to origins of water.



Back to the question of whether nutrients have increased...

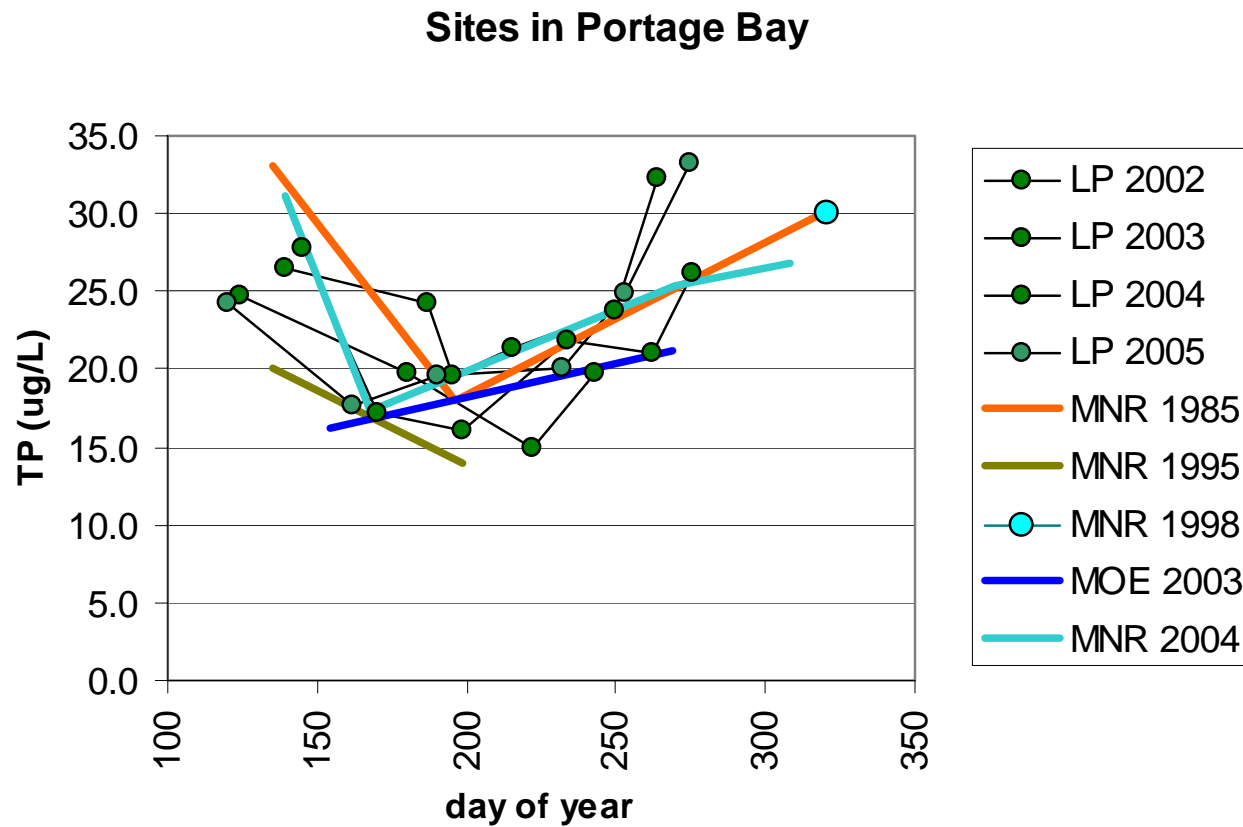


Figure 7. TP trends at Portage Bay.

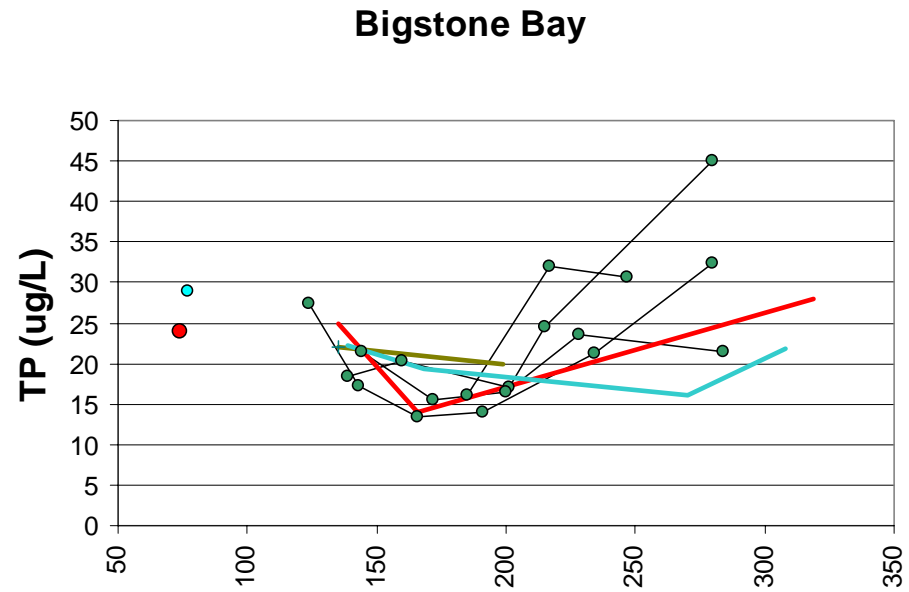
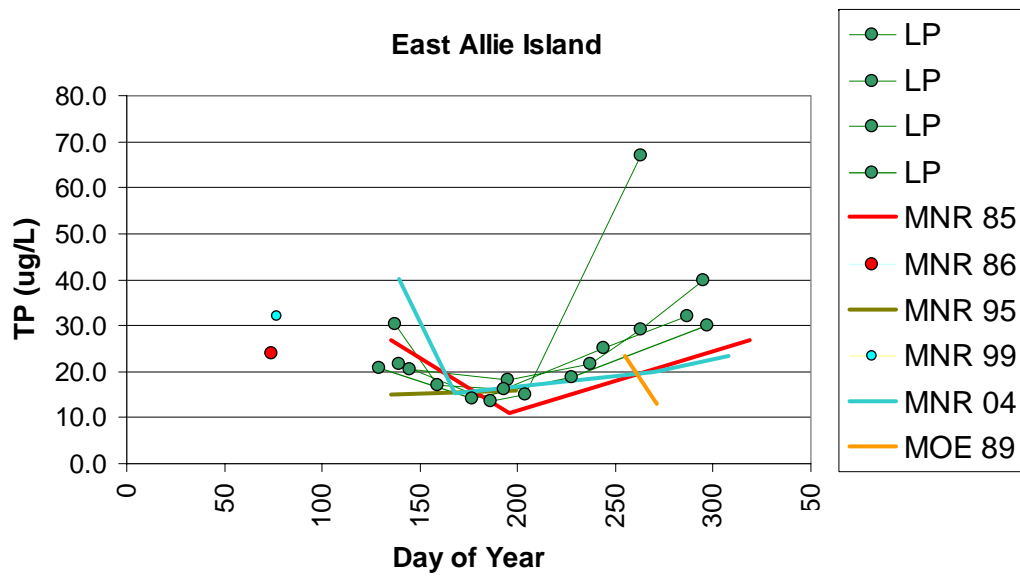


Figure 8. TP trends at East Allie Island and Bigstone Bay.

### BISHOP BAY (mid lake)

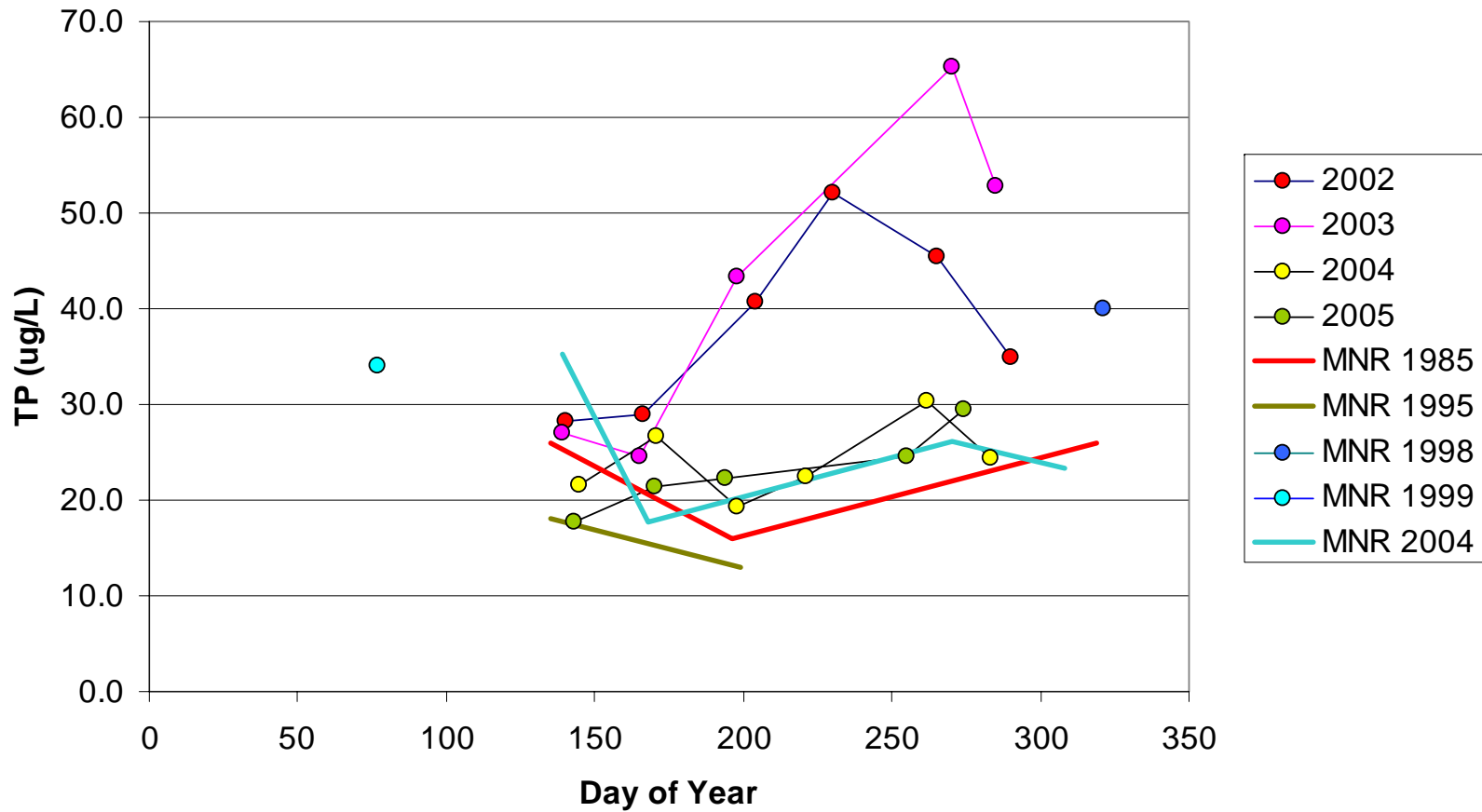


Figure 9. TP trends at Bishop Bay near the centre of Lake of the Woods.

## Conclusions based on total phosphorus (TP) data:

- Historical TP values are within present-day, observed, inter-annual variance.
- There is no concrete evidence that TP concentrations have increased substantially over the past 20 years.

### *However*

- There have been extreme blooms in each of the recent years even with high variance between years.
- Since TP concentrations are usually well above 20µg/L in the late summer, there may be no real difference in how the lake responds to different seasonal patterns in TP concentrations.

