

# Proposed Dredging of Craven Pond

Three Lakes Association's Evaluation  
of Anticipated Phosphorus Loading  
on Lake Bellaire Water Quality

Presented to Bellaire Village  
Council

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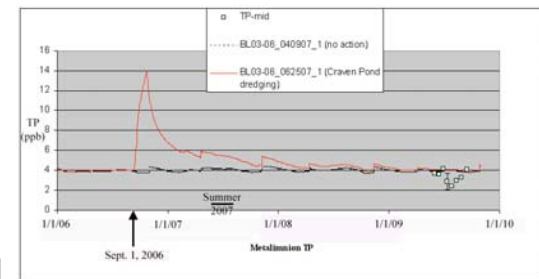
## Dredging Scenario Assumptions

- About 80,000 cubic yards sediment to be removed, six-week operation, five days per week
- Five lab tests simulating sediment & phosphorus potentially suspended in pond water during dredging...
  - Ⓢ Mix 125 ml sediment + 500 ml pond water
  - Ⓢ 212 ug/L phosphorus in surface water after 7 hr settling
- Phosphorus loading rate during dredging...
  - Ⓢ 37.8 kg/day based on 100 cfs (Cedar River) x 212 ug/L
  - Ⓢ 1,600 kg phosphorus into Lake Bellaire in six week
- Suspended solids from dredging passes over dam, no mitigation

## Craven Pond Dredging by the Village of Bellaire

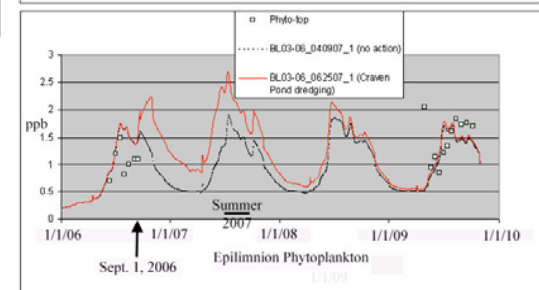


Phosphorus levels  
go up to 14 ppb,  
drop to ~ 6 ppb  
compared to 4 ppb  
by last summer

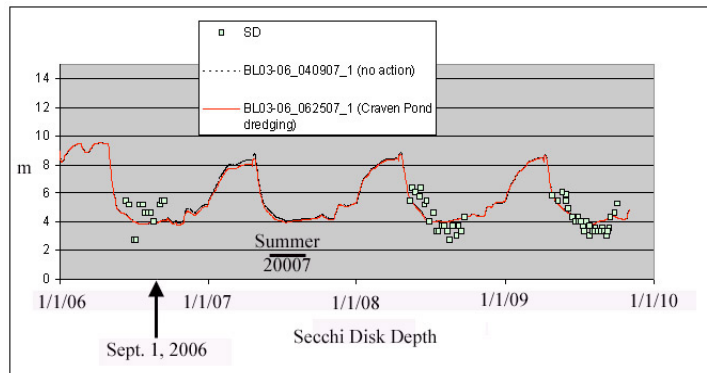


Key: Red- prediction  
Black - no dredging

Phytoplankton  
levels go up and  
stay elevated  
through the next  
summer

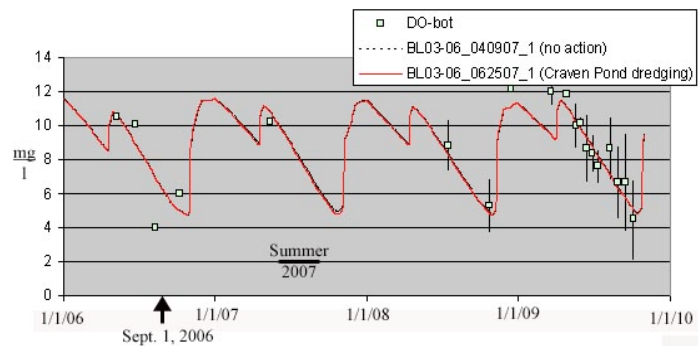


### Water Clarity based on Secchi Disk Depth



**Conclusion: No Change**

### Dissolved Oxygen near bottom of Lake Bellaire



**Conclusion: No Change**

### Uncertainties include...

- Duration of the dredging operation, vs 6 weeks
- Actual vs estimated phosphorus release rate, 38 kg/d
- Capability of reducing phosphorus release rate...
  - Ⓢ Increasing settling time by raising & lowering dam spillway
  - Ⓢ Using submerged barriers around dredging operation to contain some suspended solids
  - Ⓢ Other ideas for reducing mixing of sediment & pond water

### Conclusions

- Phosphorus concentration in Lake Bellaire is expected to increase from 4 to 14 ppb during the winter months and then decrease to about 6 ppb (4 ppb is normal) by next spring.
- Water clarity is not expected to be significantly less next summer compared to previous summers.
- Parameters of some concern to be monitored after dredging:
  - Ⓢ Blue-green algae in Lake Bellaire next summer
  - Ⓢ Dissolved oxygen near bottom, Lake Bellaire, fall 2008
  - Ⓢ Sediment in Intermediate River
  - Ⓢ Phosphorus in lake midlevel