Separating Human Induced and Natural Impacts on Butterfield Lake, NY

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May 4, 2019

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Butterfield Lake Background
Defining Issues: Historical Data
Sampling Design: Water Quality

- Redwood Wastewater treatment plant
- Optical brighteners survey
- Fecal indicator bacteria monitoring
  - In-lake and tributary monitoring
  - Vertical profiles
  - Automated sampling of runoff
Redwood WWTP
Millsite and Grass Lake

- Also have elevated nutrients in inflowing waters (Zaengle 2015, Gervase 2018)
- Cooperative management possibility
In-lake Monitoring
In-lake Monitoring

- Dissolved Oxygen
- Total Phosphorus
Wrap up/Conclusions

• Butterfield Lake is naturally mesotrophic and should be managed with realistic goals in mind
• Impacts from invasive species are the most prevalent issues facing the lake
• Although wastewater treatment was not shown to be a major issue, continued effort will only improve water quality in the region.
Questions?
Defining Issues: Historical Macrophyte Data

Map 8: Distribution of *M. spicatum* (Eurasian watermilfoil) in Butterfield Lake

- Total Surface Area: 388 ha
- *M. spicatum* percent cover: 7.5%
- Dense *M. spicatum* cover: 12.2 ha
- Moderate *M. spicatum* cover: 8.2 ha
- Sparse *M. spicatum* cover: 9.0 ha
Plant Ecology

• EWM (*M. spicatum*):
  – Bio-control already assessed as not feasible (Johnson and Belinsky 2001)
  – Completely submersed, generally up to 15 ft (but can create dense canopy at surface)
  – Spread via fragmentation
Sampling Aquatic Plants

Legend
- Zero
- Trace
- Sparse
- Moderate
- Dense
- Waterbody
- Stream
- Watershed Boundary
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Questions?
Defining Issues: Historical Fisheries Data
Fishery Size Structure