

MARA LAKE SEDIMENT CORE DIATOM ANALYSIS

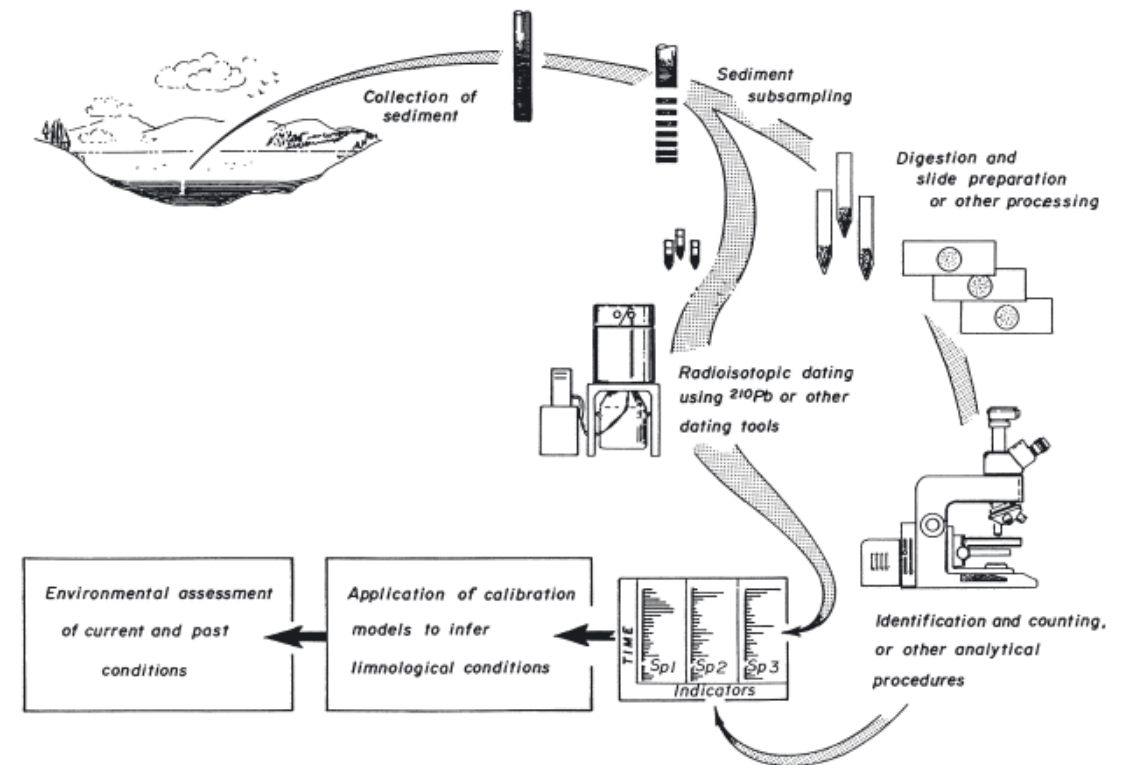
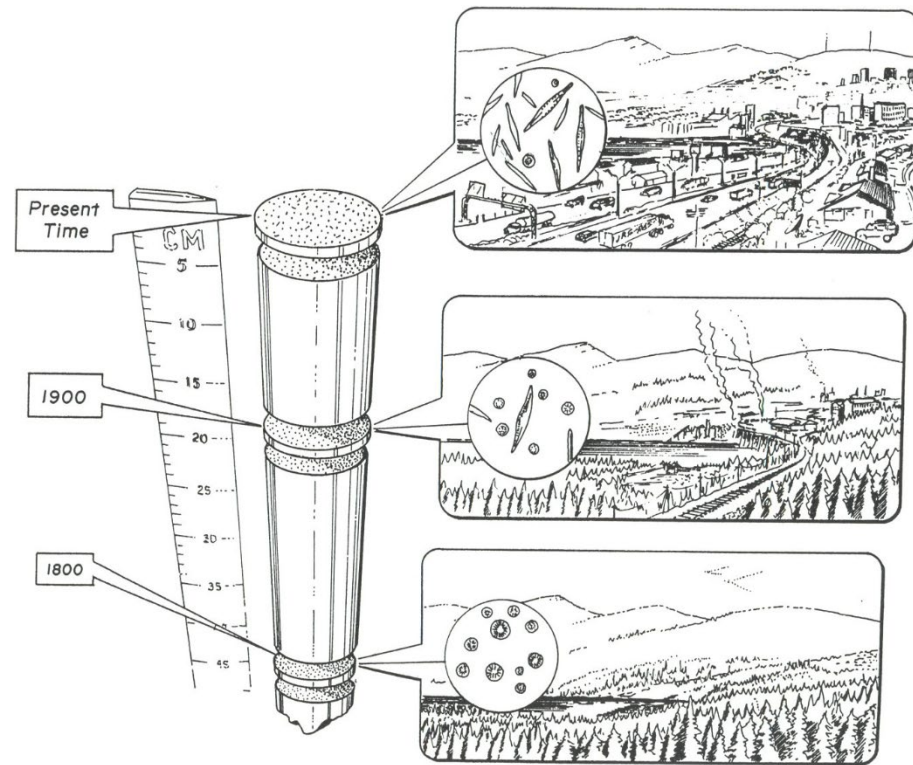
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OBJECTIVE: ESTIMATE PHOSPHORUS LEVELS IN MARA LAKE FROM ~1850 TO PRESENT

1. Collect sediment cores and determine sediment age by radiometric dating
2. Measure phosphorus accumulation over time in the sediments
3. Analyze diatom fossils to infer potential changes in phosphorus loading
4. Infer past changes in phosphorus levels from combined evidence

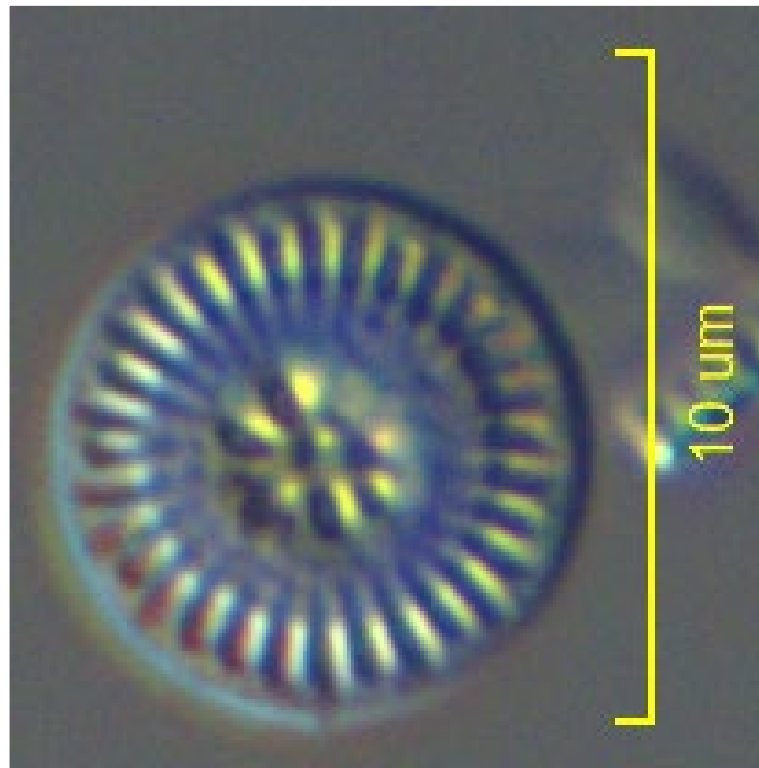
DIATOMS AS INDICATORS OF ENVIRONMENTAL CHANGE



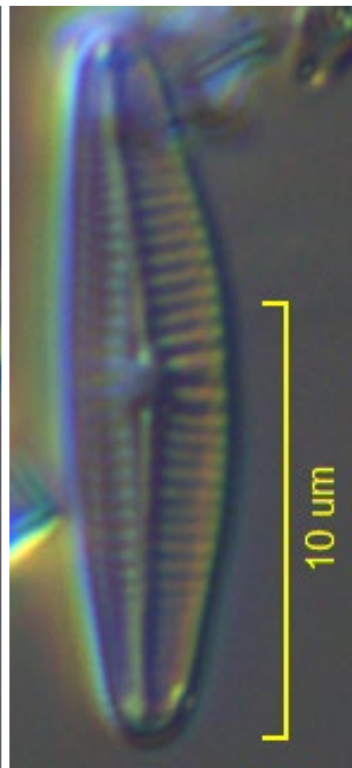
Figures from Smol (2008)



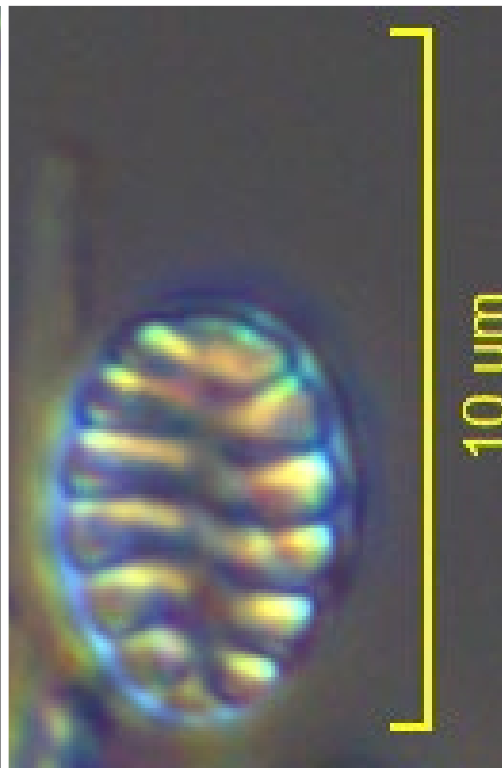
DIATOMS OF MARA LAKE



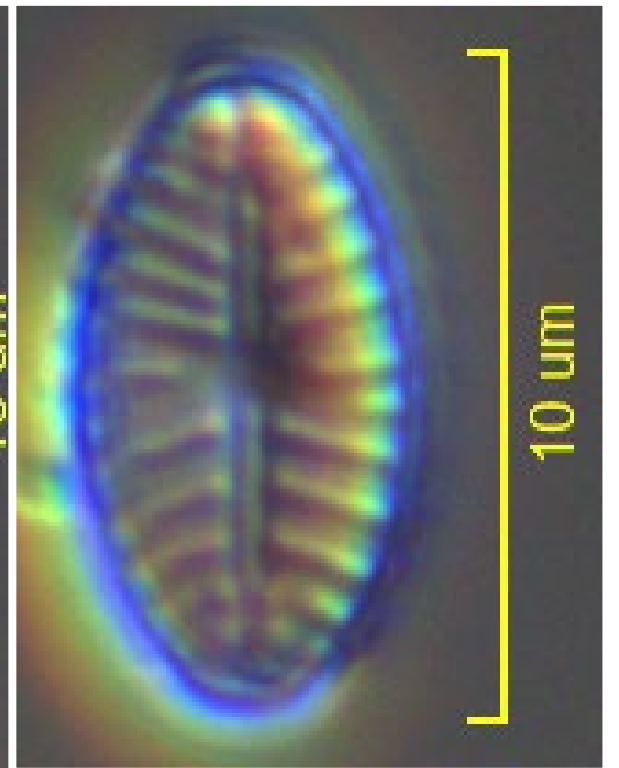
Discostella stelligera



Achnanthidium minutissimum



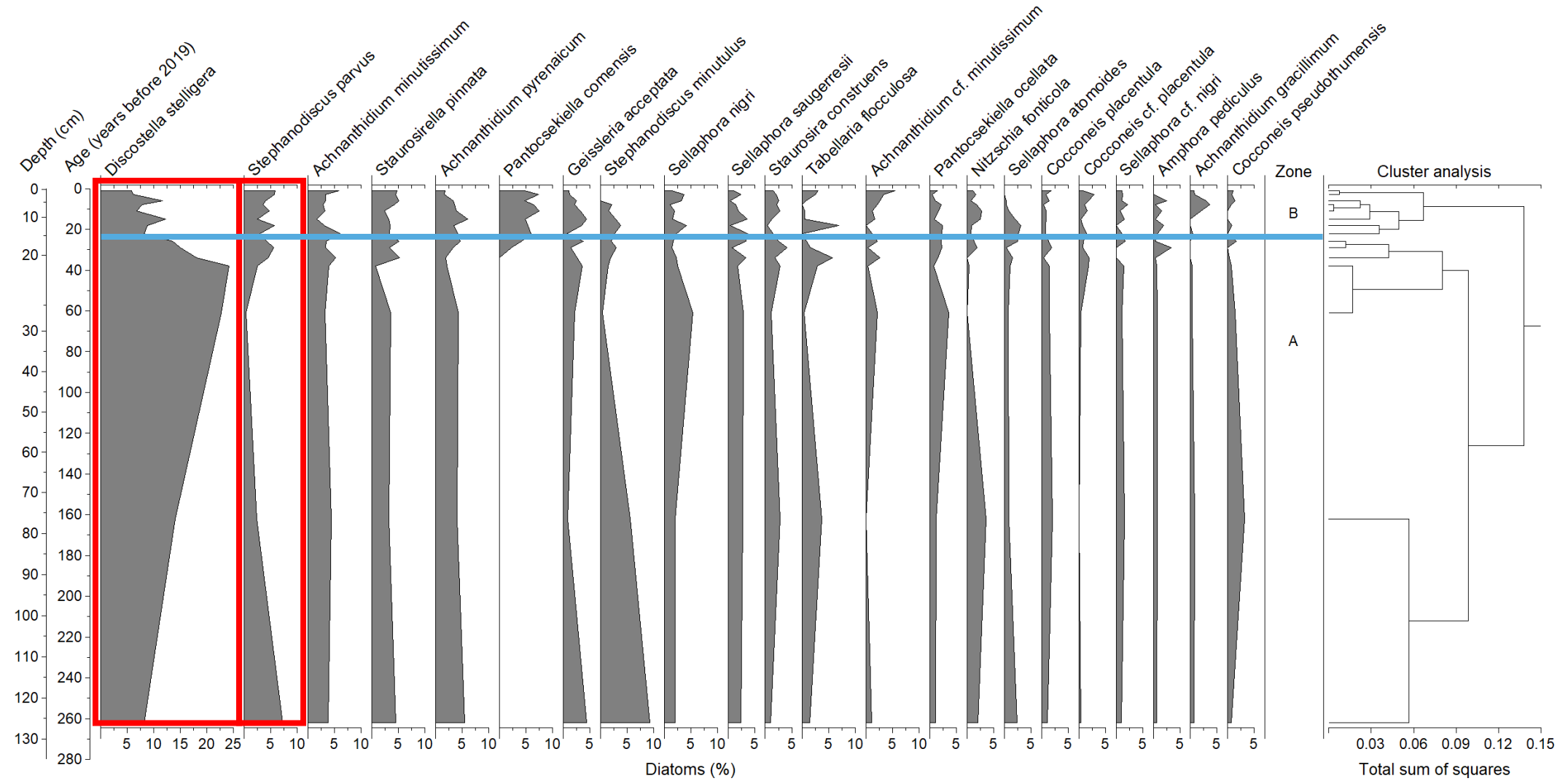
Staurosirella pinnata



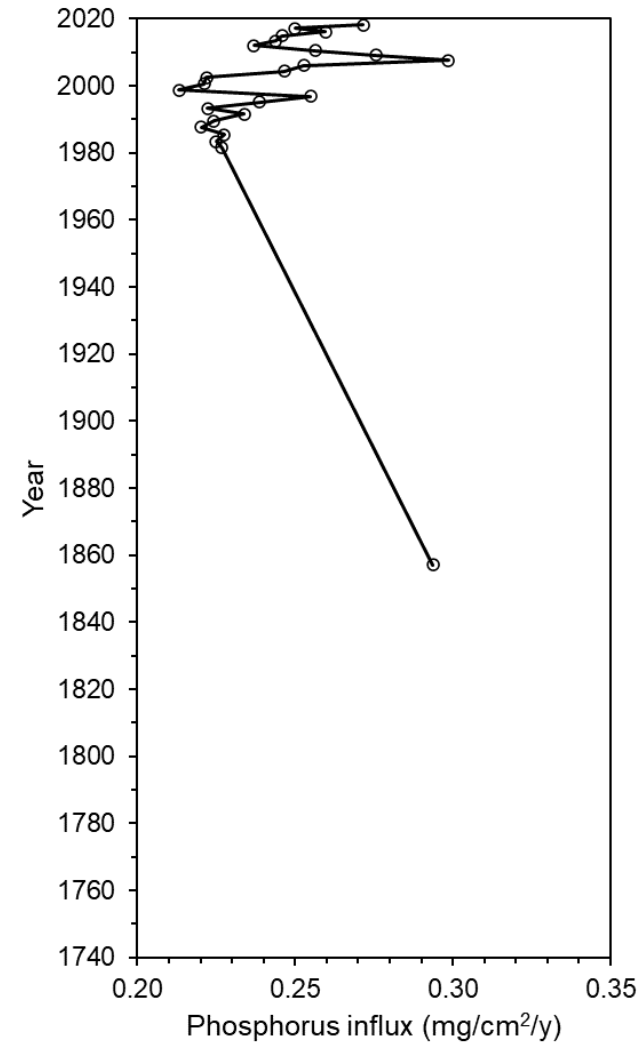
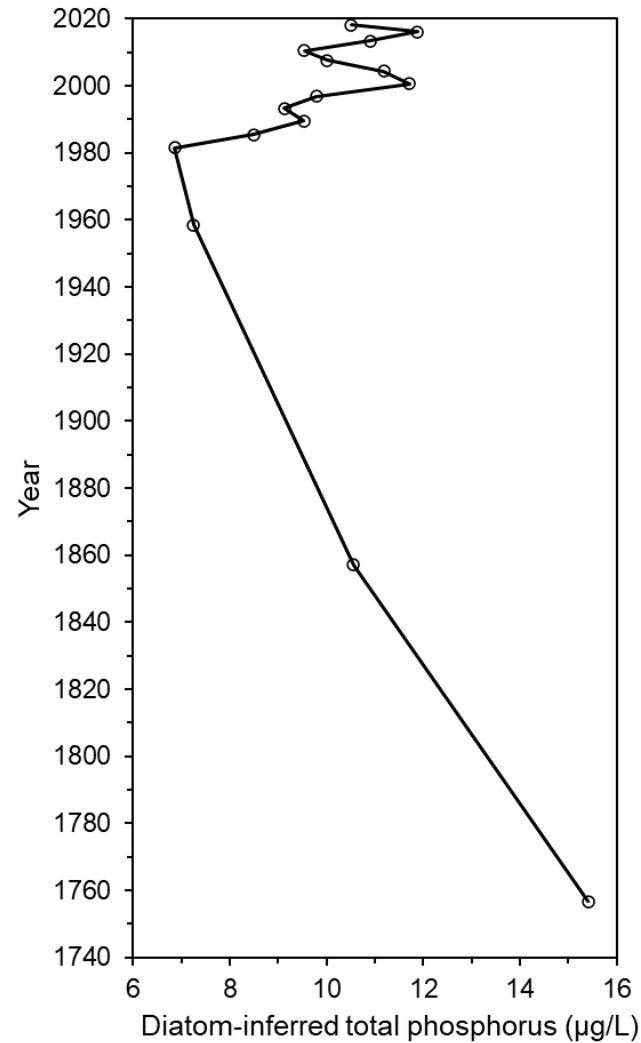
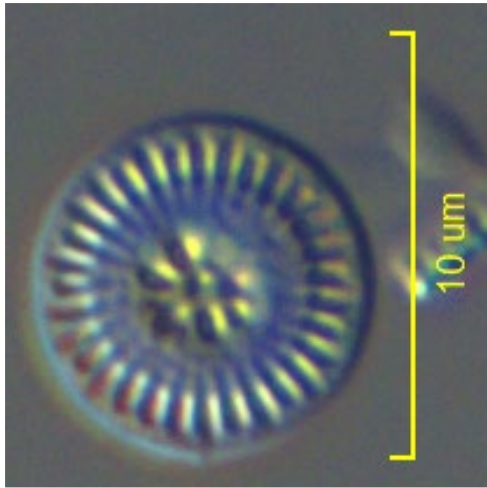
Geissleria acceptata



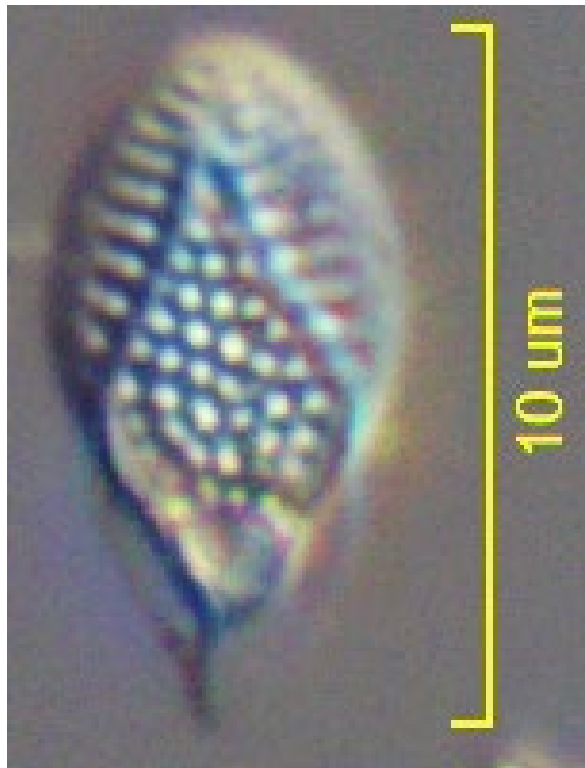
THE MARA LAKE DIATOM COMMUNITY CHANGED OVER TIME



INFERRING HISTORICAL PHOSPHORUS LEVELS



BONUS: CHRYSOPHYTE SCALE ABUNDANCE HAS INCREASED IN RECENT DECADES





CONCLUSIONS

- Total phosphorus levels in Mara Lake today are probably not unprecedented in its history
- Total phosphorus levels in Mara Lake at the onset of major land-use change in the 20th century were likely lower than today and have increased since the 1980s
- Paleolimnological inferences of increasing phosphorus loading and increasing abundance of bloom-forming algae in recent decades are consistent with contemporary observations and the mass balance of phosphorus in the Shuswap watershed as land use has changed