CAYUGA LAKE TMDL
PALEO-INFERENCE
MODELING

Goal: Establish "pre-TMDL" lake conditions for TP using quantitative diatom inferences and water quality modeling hindcast results.

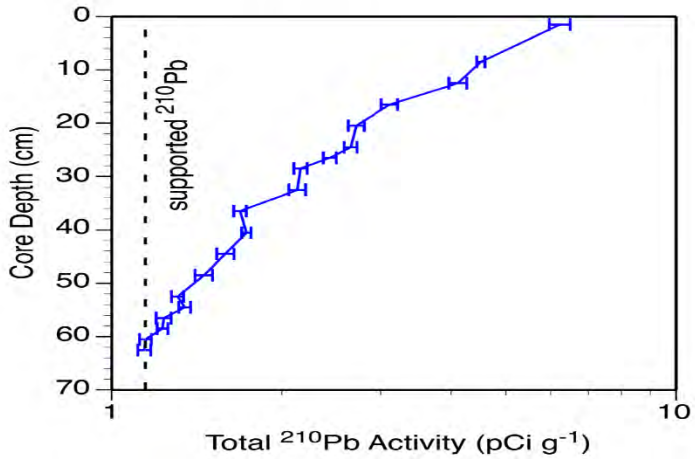
Step 1: Coring – completed 5/13/2014

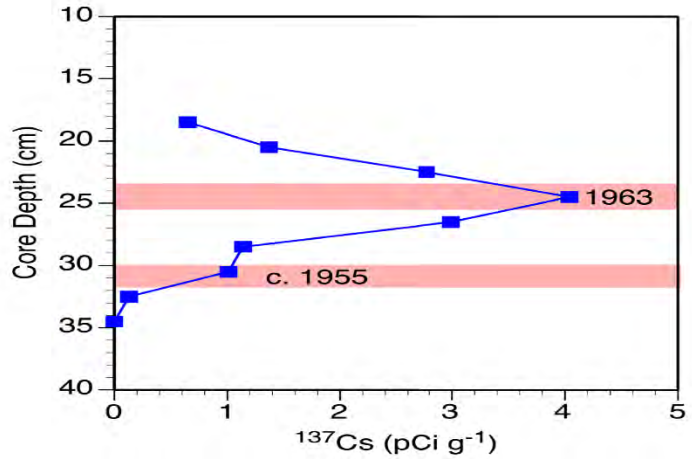
Step 2: Analysis for age, diatoms, supporting parameters (loss-on-ignition, sed TP, metals) – USEPA (Abt Assoc., Anchor QEA, Hutchinson Environ. Sci., Life Sci. Labs, St. Croix Watershed Res. Sta., Wash. Univ. SL), HWSC

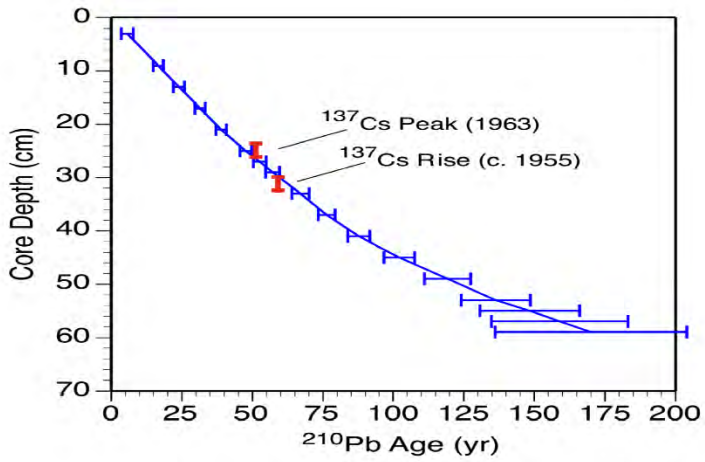
Step 3: Diatom TP inference modeling - NYSDEC

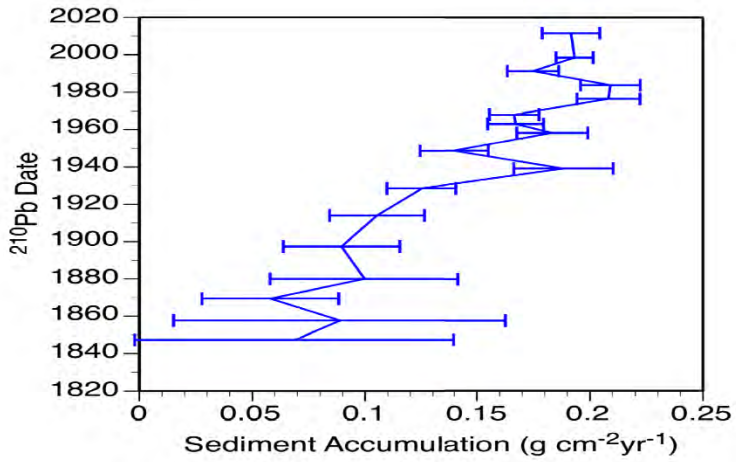
The sub-core split open, top to left. (Note “layers” due to uneven split.) Laminations throughout except for top brown layer. Thin grey layer, then black layer near top. Laminations strong at 50 cm/20 in.

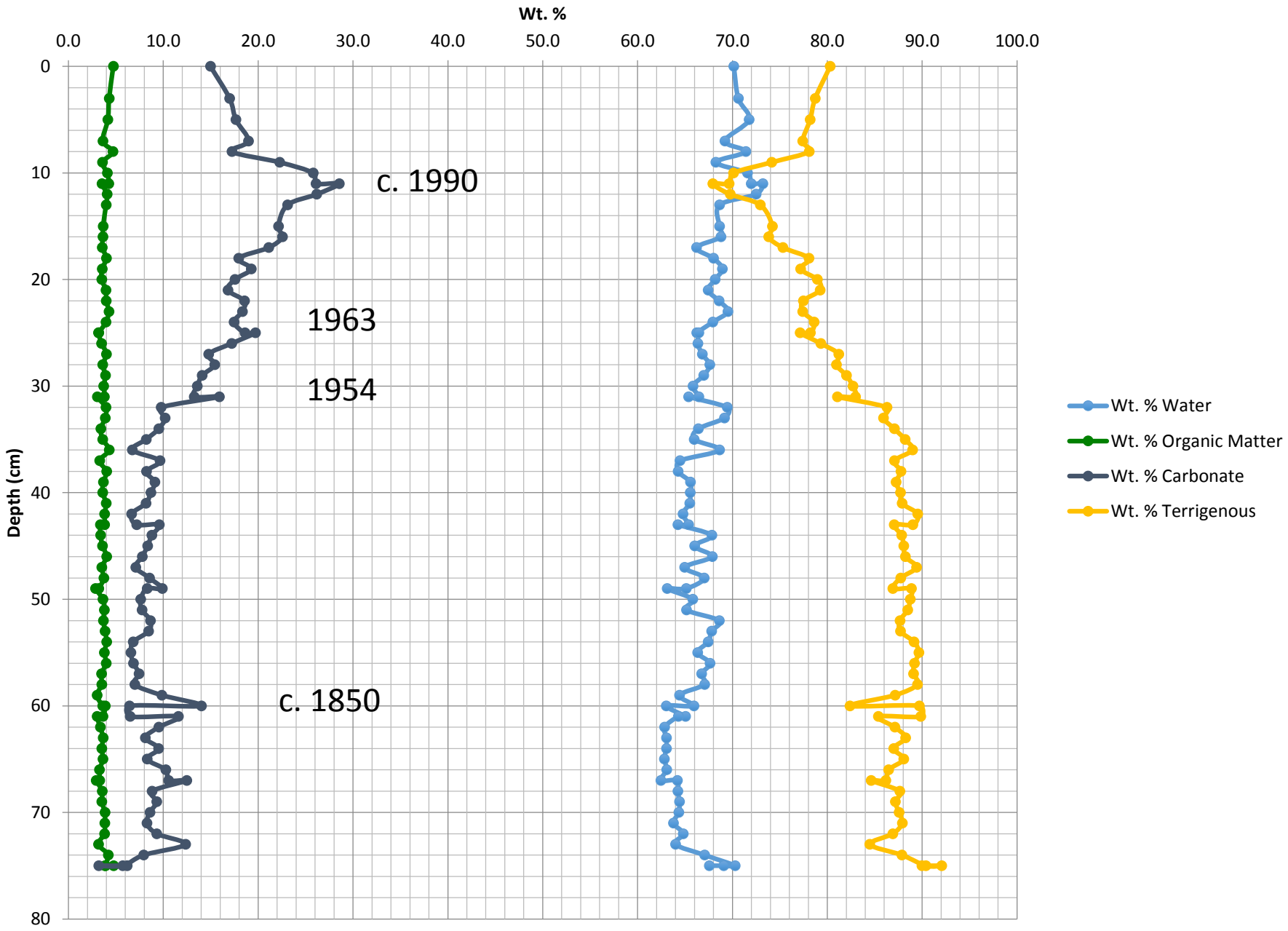
Cayuga Lake
New York
CL-SED 2014





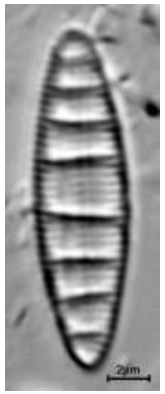




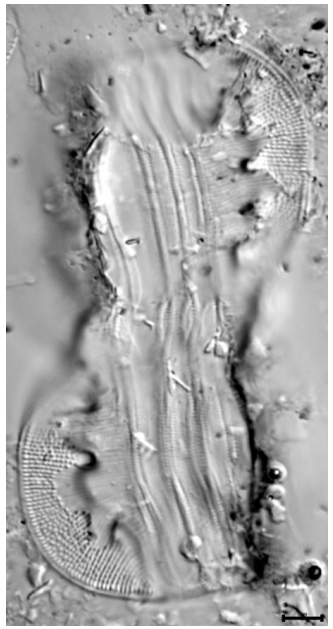

Wt. %
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
Depth (cm)
0
10
20
30
40
50
60
70
80
c. 1990
1963
1954
c. 1850
Wt. % Water
Wt. % Organic Matter
Wt. % Carbonate
Wt. % Terrigenous

Navicula

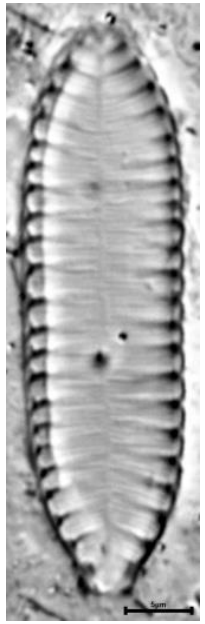
Pinnularia



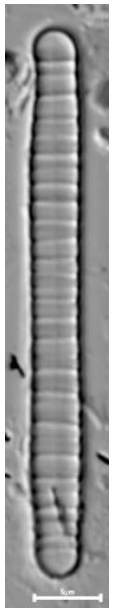
Denticula



Entomoneis



Surirella



Diatoma

Asterionella

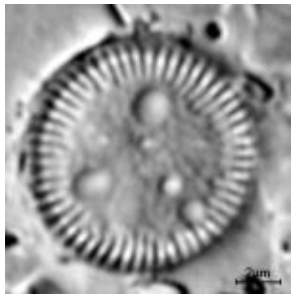
Tabellaria

Nitzschia

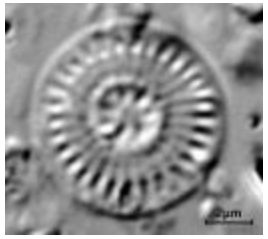
Fragilaria

Achnanthes

Cymbella

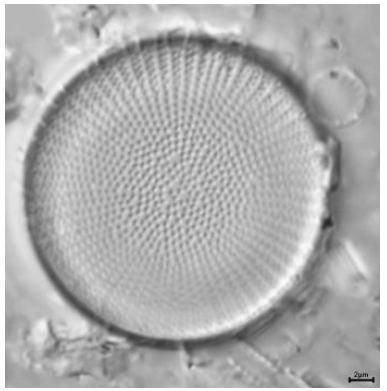


Cyclotella

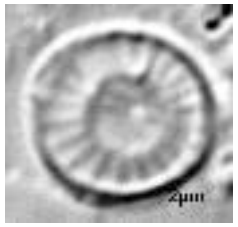


Discostella

Aulacoseira

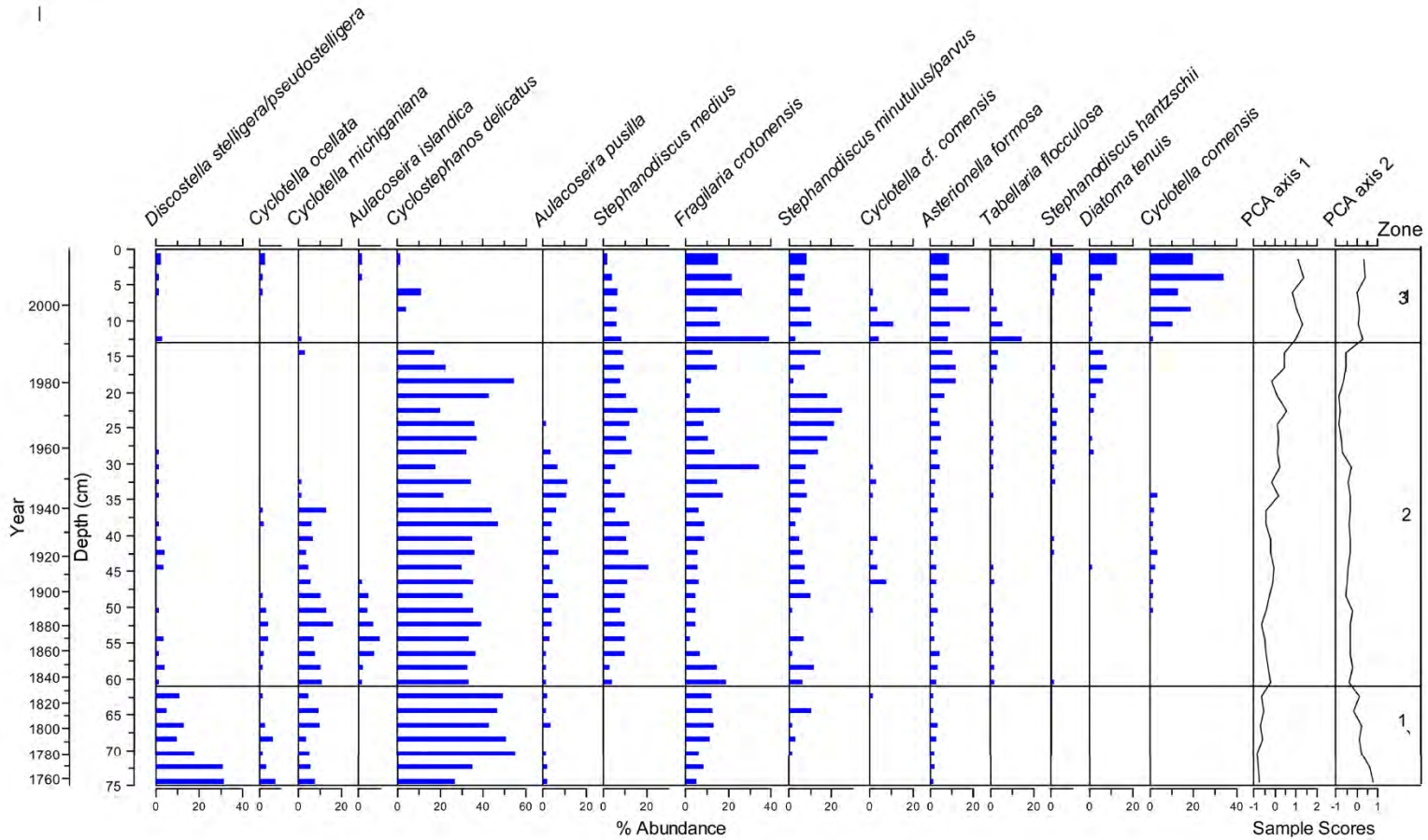


Stephanodiscus



Cyclostephanos

Figure 2. Profiles of dominant diatom taxa (n=15, maximum abundance >5) for the Cayuga Lake core with PCA sample scores and zonation by CONISS.

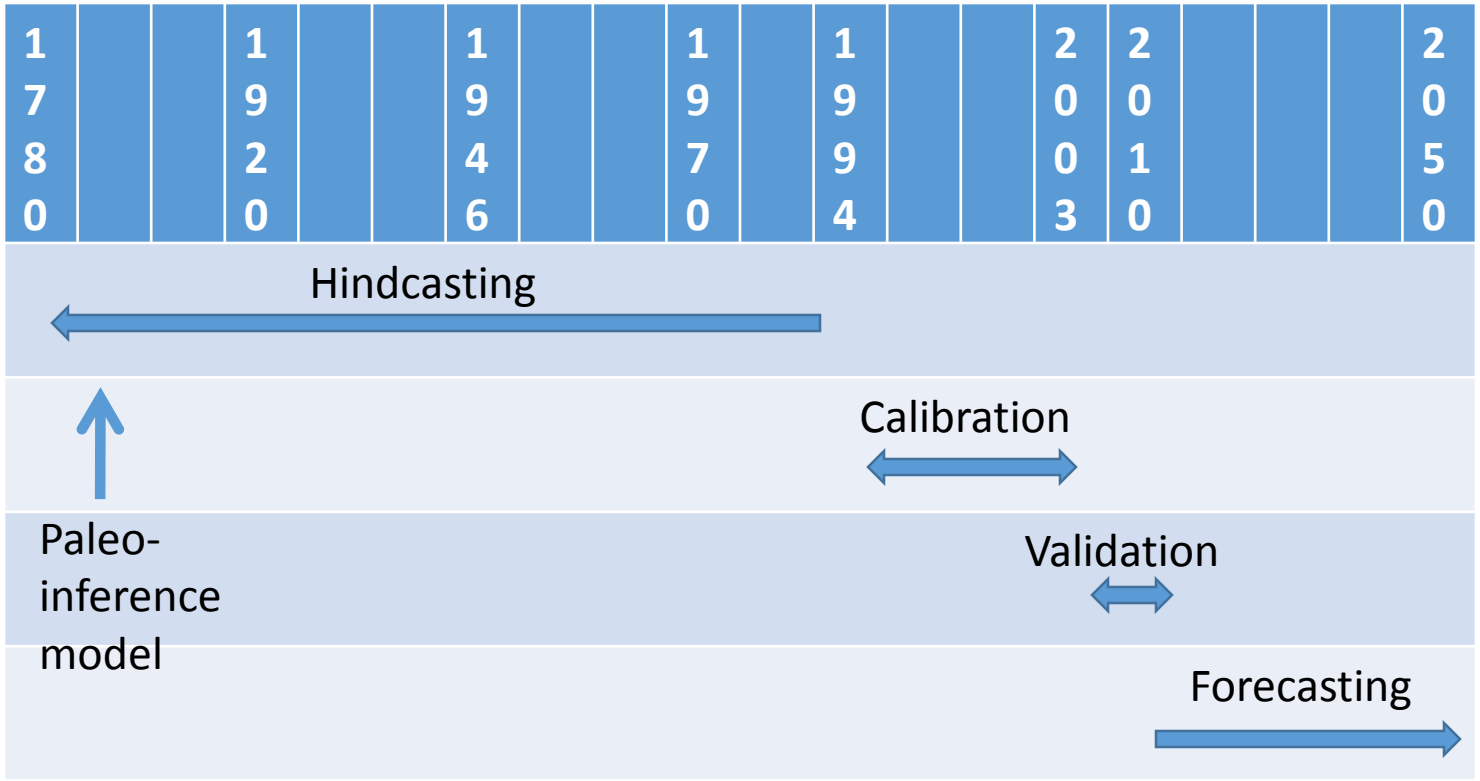


Remaining Tasks

1) Diatom TP inference modeling

2) Data correlation – how it all lines up

3) Comparison to water quality model results for period of TMDL concern

4) Report – how TMDL endpoints relate to historical TP levels in Cayuga Lake

TMDL Lake Simulation Model Testing