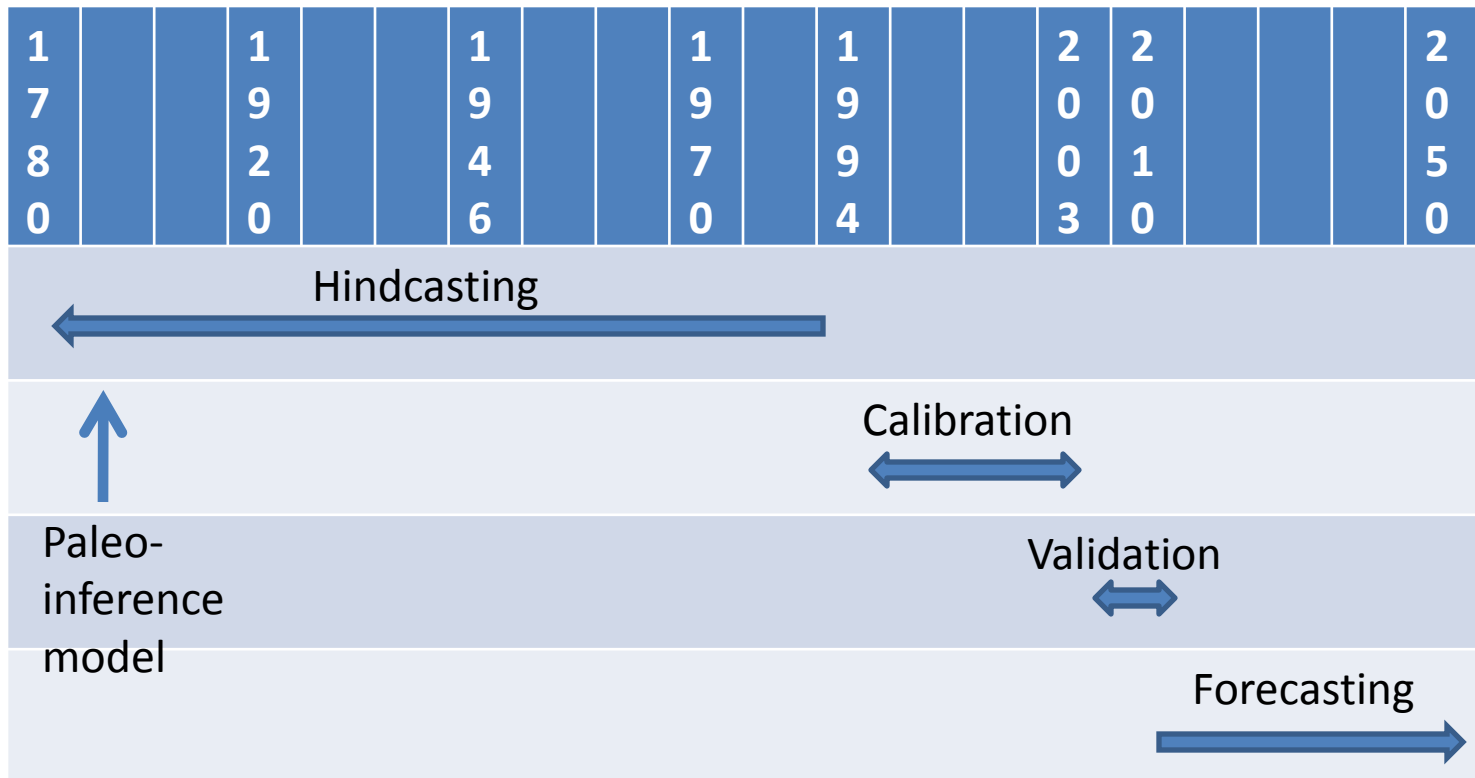
A scenic view of Cayuga Lake under a clear blue sky. In the foreground, a large weeping willow tree with yellow-green leaves hangs down from the top left. A wooden log lies on the grass in the lower left. The lake's surface is blue with gentle ripples, and a rocky shoreline with green vegetation is visible in the middle ground. In the distance, a small white lighthouse is visible on the opposite shore.

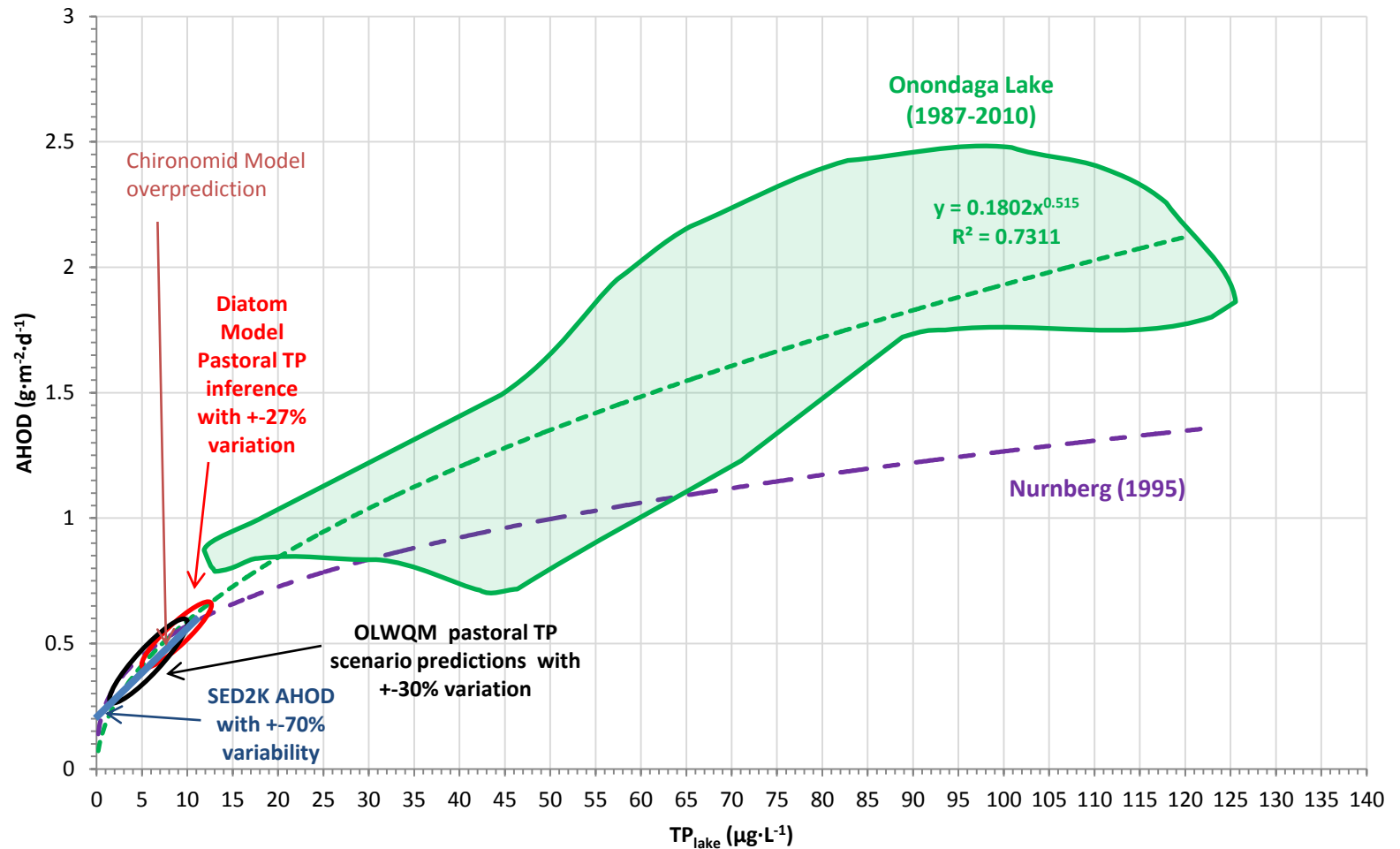
Cayuga Lake TMDL Ensemble Modeling:

Strengthening TMDL Conclusions by
Comparing the Results of a Paleolimnology TP
Inference Model to Those of a Mechanistic
Water Quality Model Hindcast

Lake Simulation Model Testing



Schematic Representation of the TMDL Modeling Results for Pastoral Conditions in Onondaga Lake



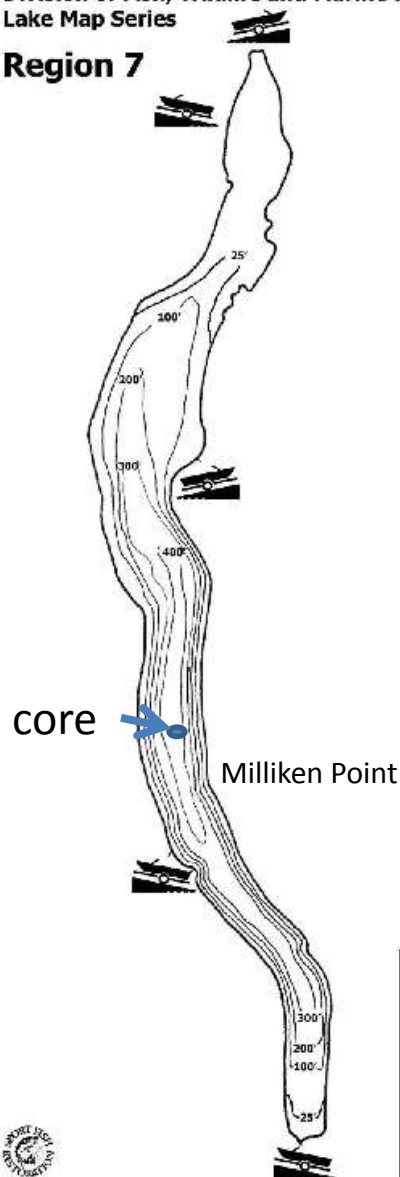
Why plan to do inference modeling for Cayuga Lake sediments?

- To confirm (ground truth, validate) the TMDL water quality model's ability to predict (hindcast) the lake's natural conditions for phosphorus.
- To develop a reliable (defensible), quantitative assessment of phosphorus throughout the Lake's history.

New York State Department of Environmental Conservation
Division of Fish, Wildlife and Marine Resources
Lake Map Series



Region 7



Cayuga Lake



Not For Use in Navigation

Cayuga Lake

County: Seneca, Cayuga, Tompkins

Surface Area: 42,956 Acres

Fish Species Present: Lake Trout, Landlocked Salmon, Brown Trout, Rainbow Trout, Smallmouth Bass, Largemouth Bass, Northern Pike, Chain Pickerel, Yellow Perch, Black Crapsole, Bluegill, Rock Bass, Pumpkinseed, Channel Catfish, Freshwater Drum, Brown Bullhead

Scale: 0 22,000 ft



NYSDEC box core apparatus; 1 meter long, 12" square.



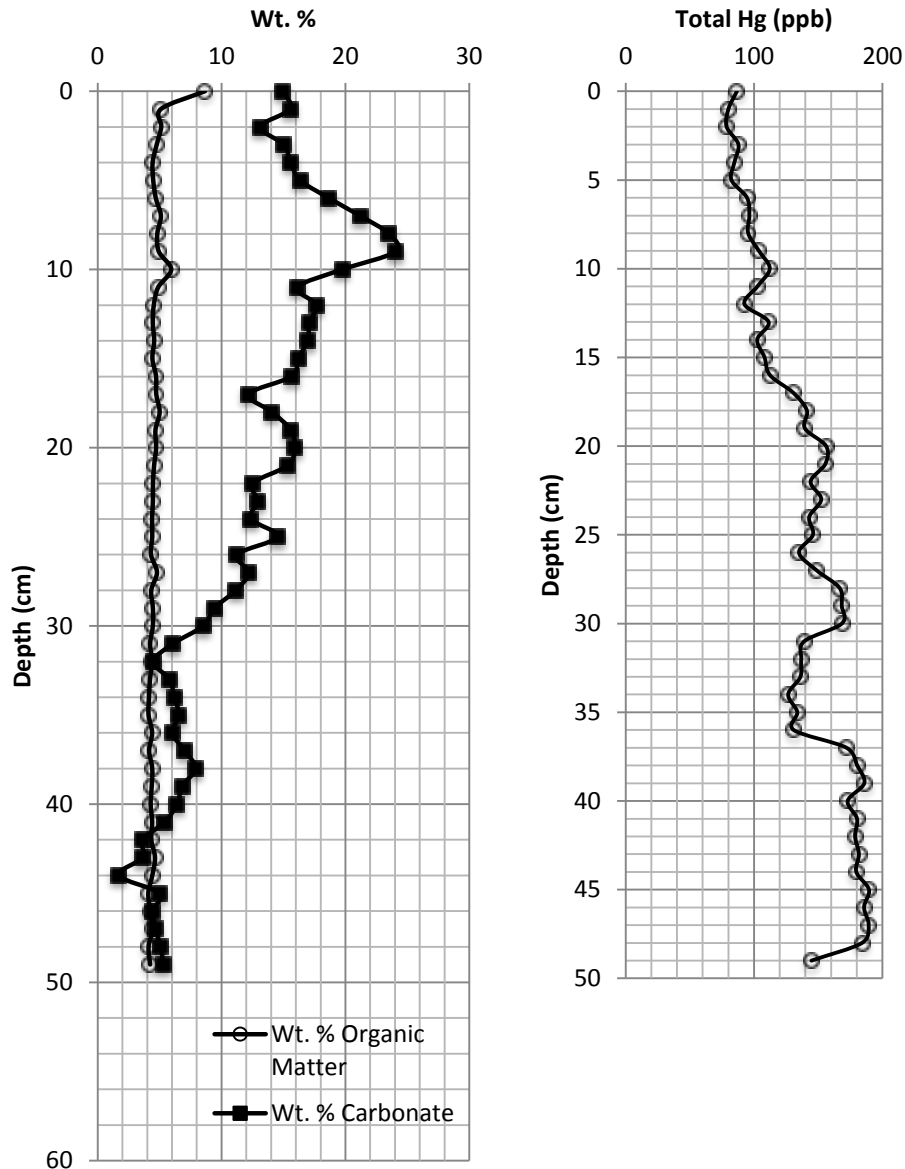
3.5-inch diameter plastic liners (faintly seen) inserted into box core sediment.



9/17/13 Sediment Core from Cayuga Lake (top at bottom left corner)



Loss-on-Ignition and Hg Profiles (Curtin, unpubl. data)



Mullins, H. T. 1998, Environmental change controls of lacustrine carbonate, Cayuga Lake, New York. *Geology* 26;443-446.

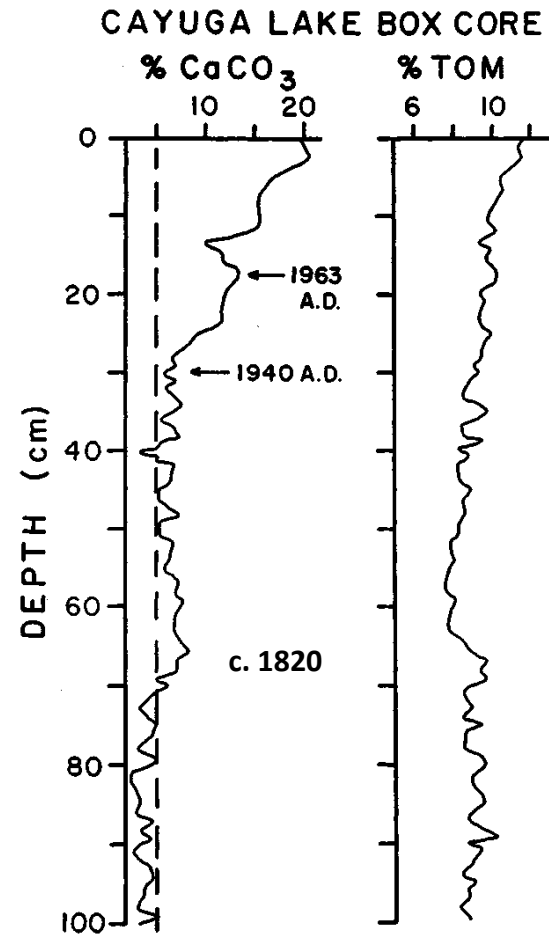


Figure 3. Dry weight percent calcium carbonate and total organic matter (TOM) content versus depth for box core CL-1 (see Fig. 1). Date of A.D. 1963 is based on direct ^{137}Cs and ^{210}Pb data, whereas date of A.D. 1940 is based on linear extrapolation from A.D. 1963.

Planned Cayuga Lake core analyses (USEPA/Abt Assoc. Inc):

- Core recovery in May 2014 (Anchor QEA using Hobart and William Smith Colleges boat)
- Radiometric dating = Cs-137, Pb-210 (Saint Croix Watershed Research Station, MN)
- Loss-on-Ignition (Hobart and William Smith Colleges)
- Diatom enumeration (Hutchinson Environmental Sciences Ltd.)
- Diatom inference model for TP (NYSDEC)
- Total phosphorus in sediment (Life Science Laboratories)
- Na, Mg, Al, Si, P, K, Ca, Ti, Mn, Fe (Washington U. Dept. of Earth and Planetary Sci.)
- Mercury and other (Hobart and William Smith Colleges)