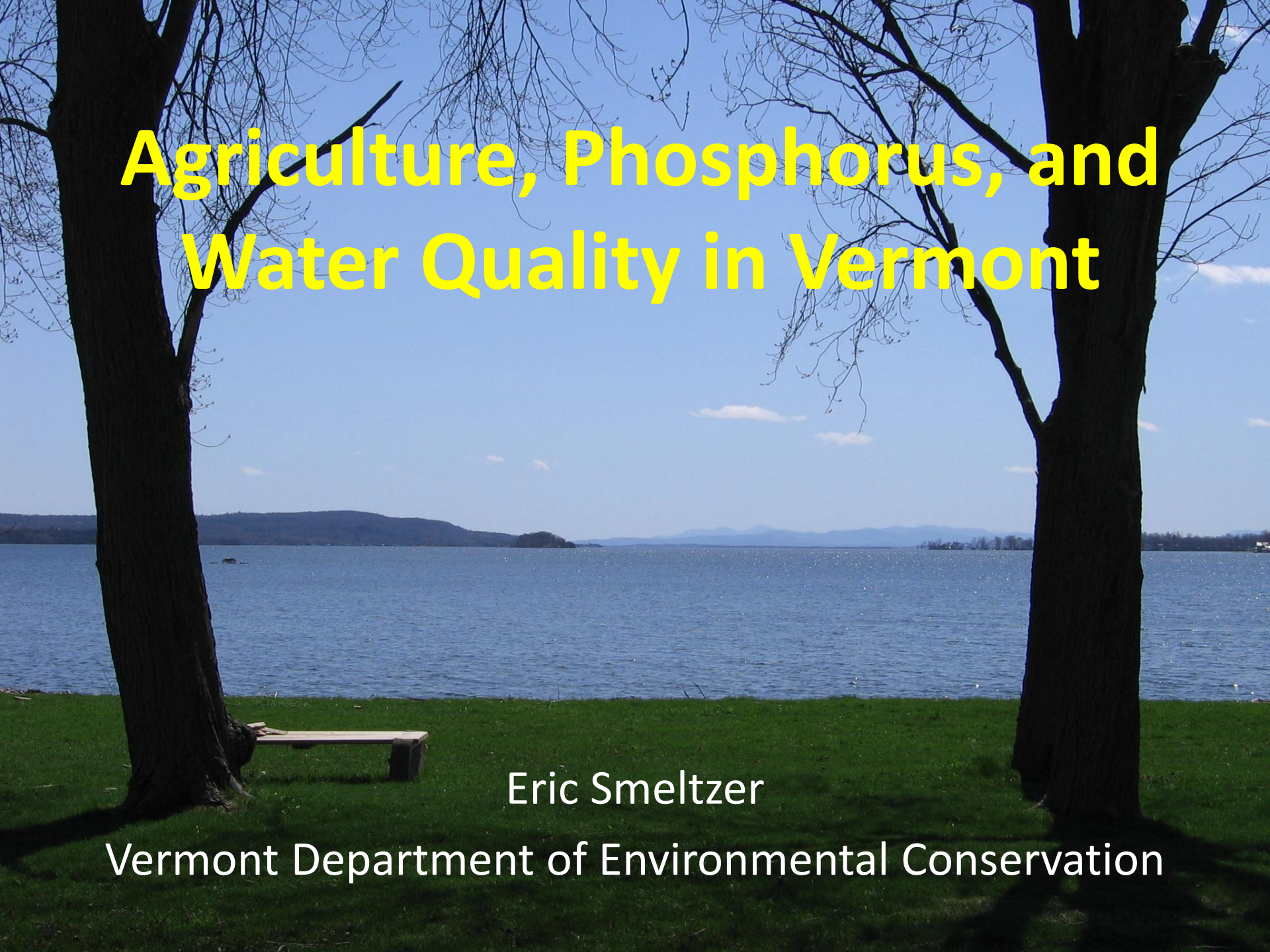


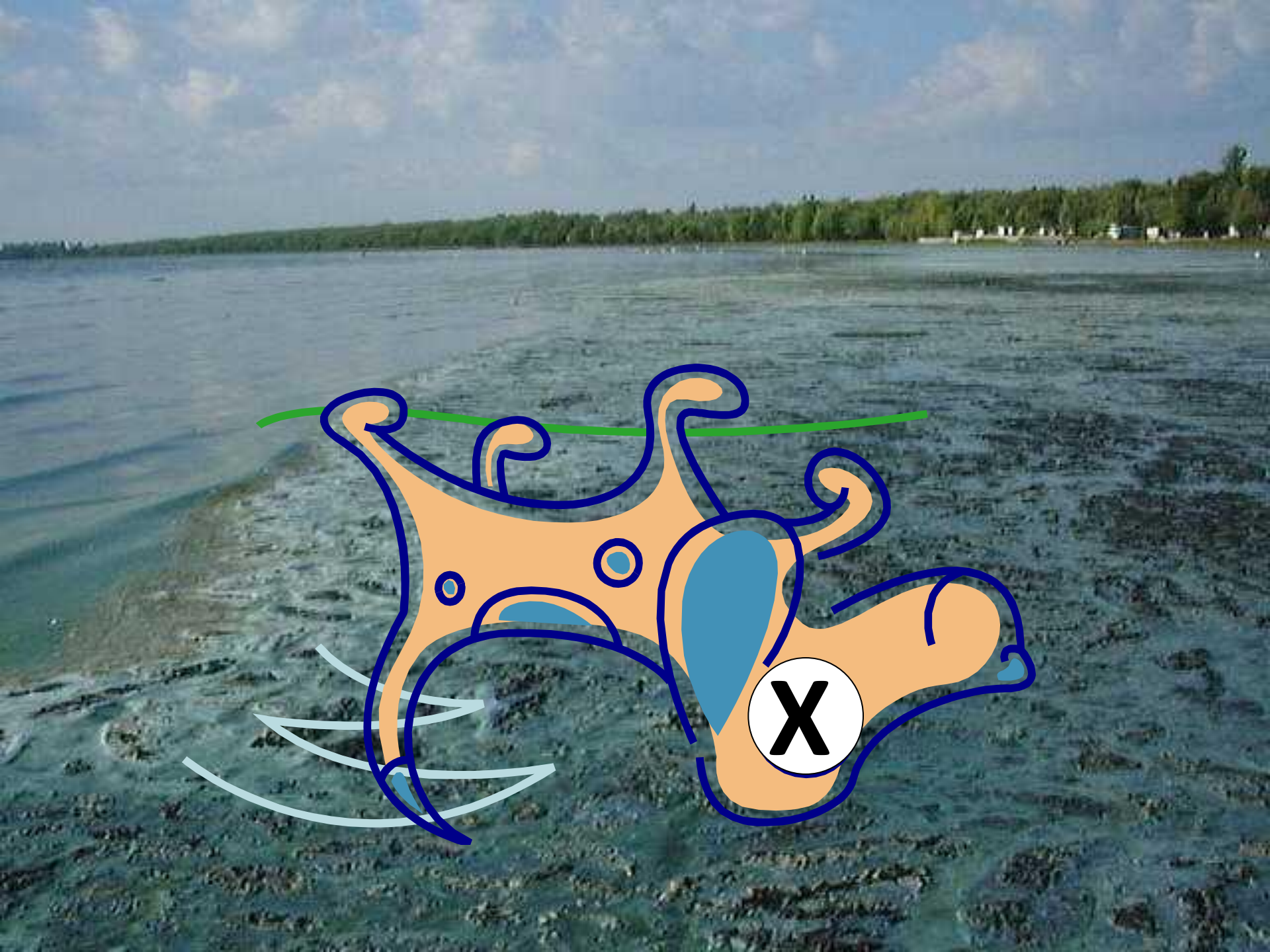
Agriculture, Phosphorus, and Water Quality in Vermont

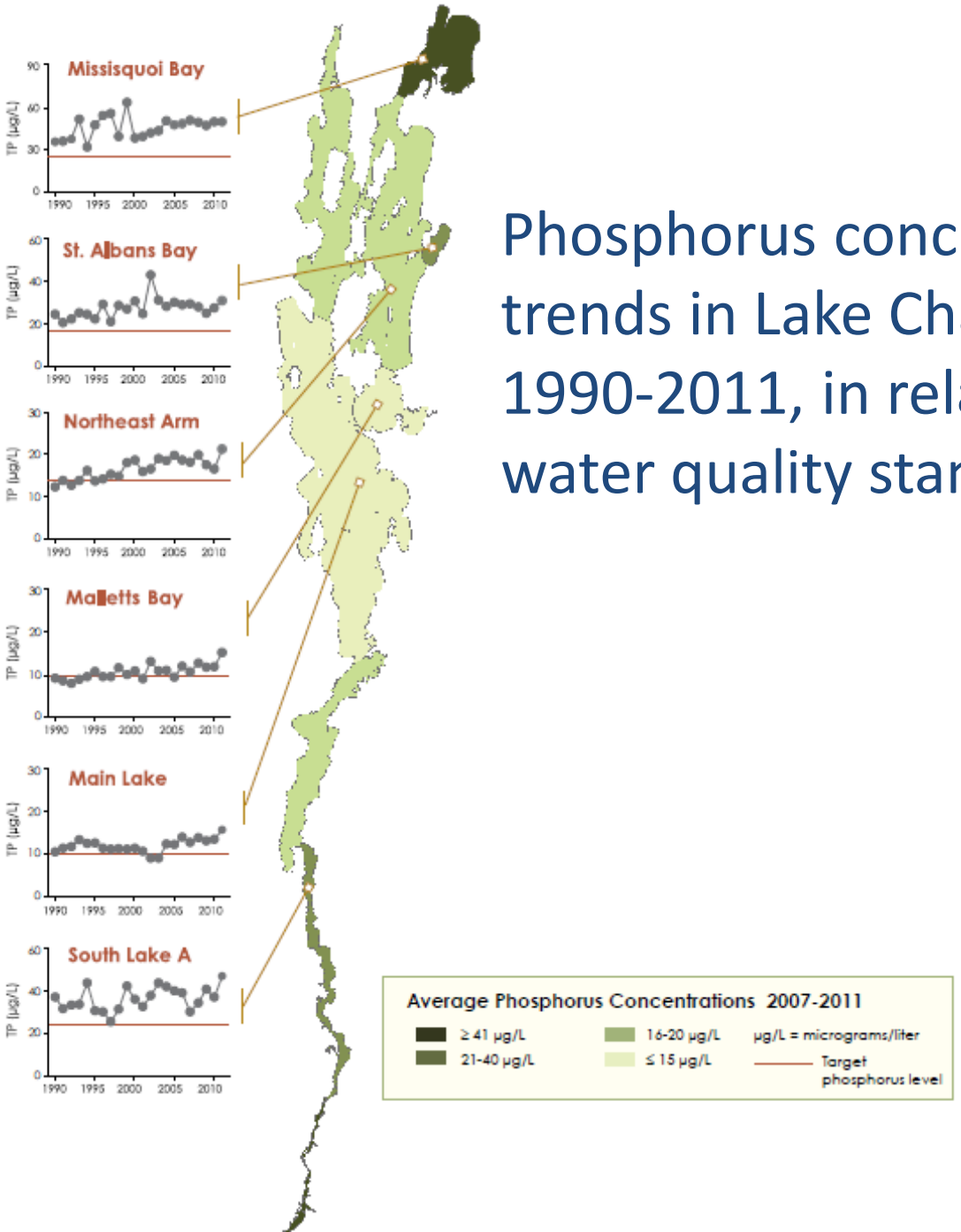
Eric Smeltzer

Vermont Department of Environmental Conservation


Excessive phosphorus promotes blue-green algae (cyanobacteria) blooms in the lake.

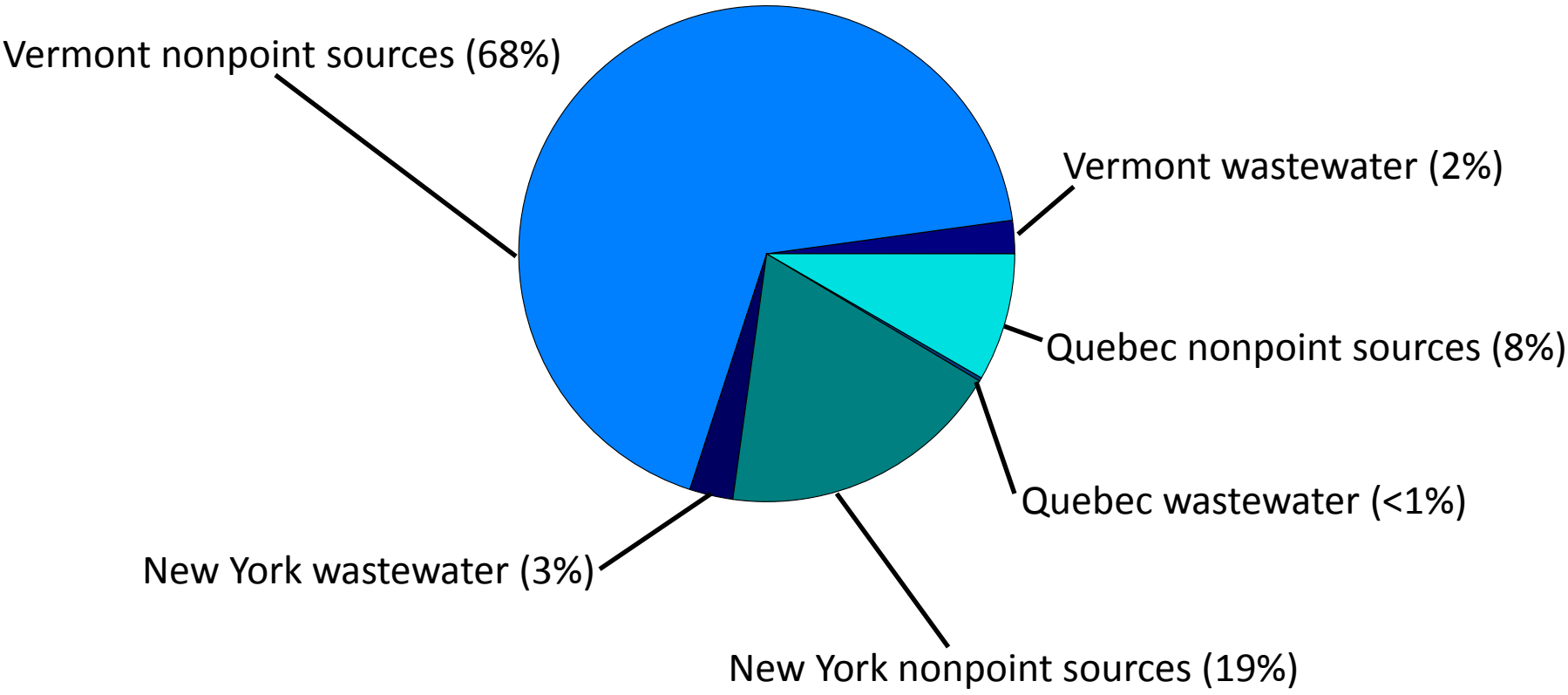

Anabaena sp.


X

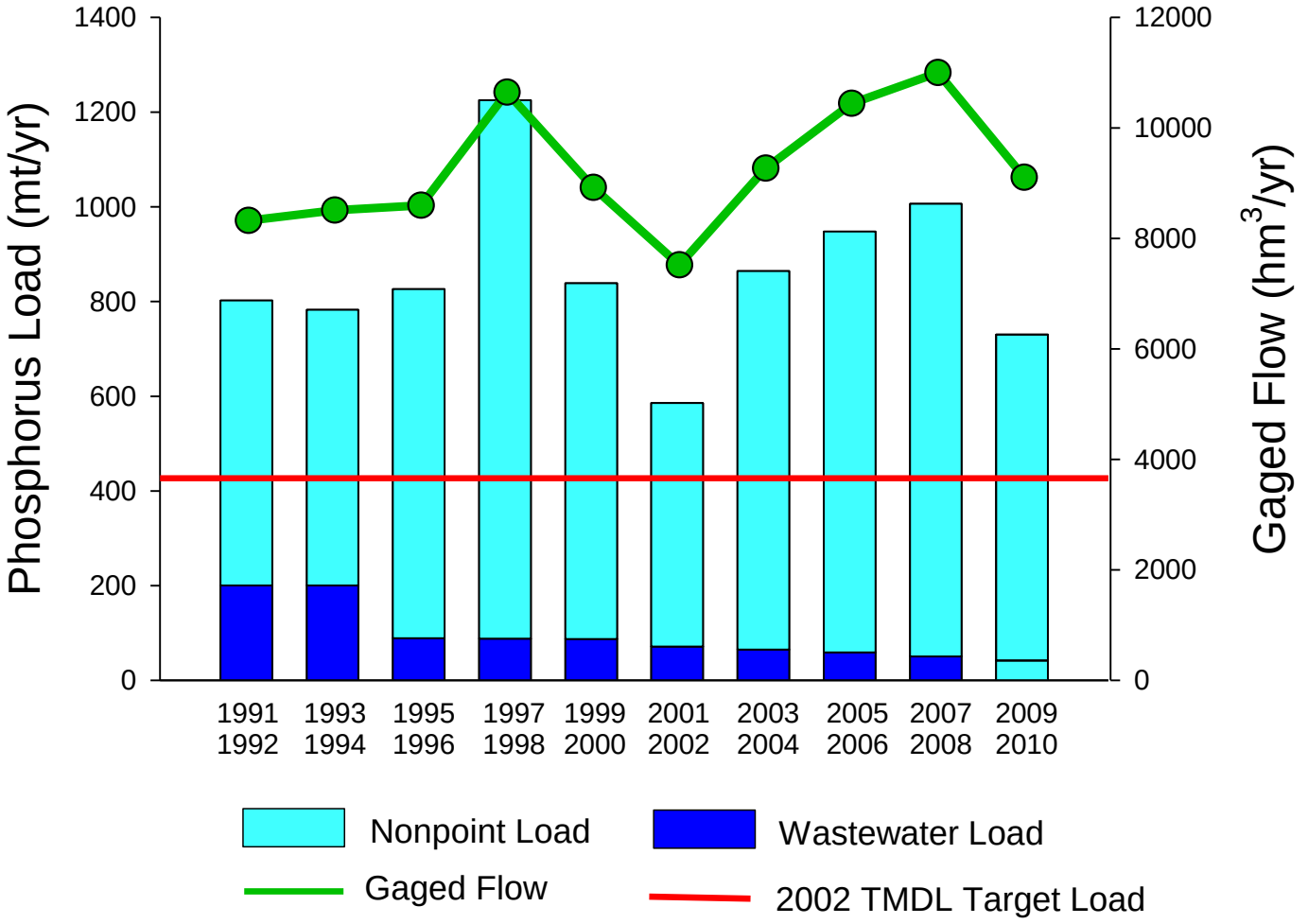


Phosphorus concentrations and trends in Lake Champlain, 1990-2011, in relation to in-lake water quality standards

Sources of phosphorus loading to Lake Champlain



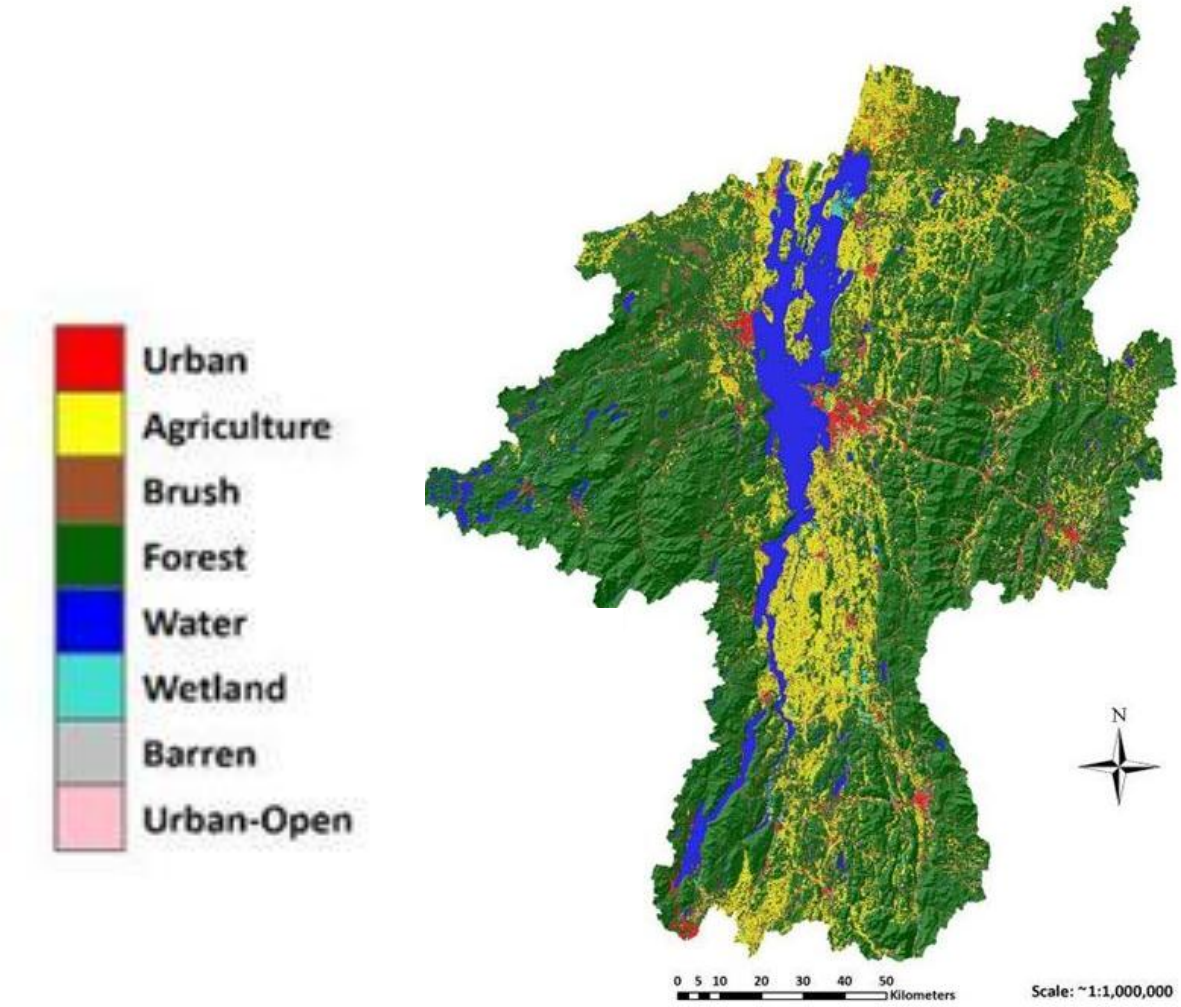
Trends in phosphorus loading to Lake Champlain



"During the period 1990-2009, a large number of downward trends in (flow-normalized) N and P concentrations and yield suggest that P control efforts across much of the Lake Champlain basin may be producing measurable improvements in both nutrients."

--Medalie et al., (USGS). 2012. Journal of Great Lakes Research.

Lake Champlain Basin Land Use

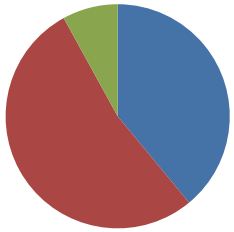


Lake Champlain Basin Program

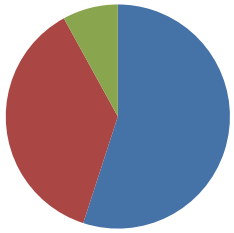
Nonpoint Sources of Phosphorus Loading in Vermont Watersheds

Agricultural runoff | Urban runoff | Forest runoff | Streambank erosion*

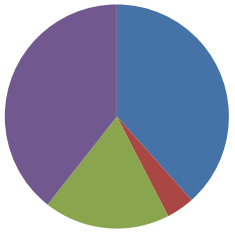
Lake Champlain Basin
(Troy et al. 2007)



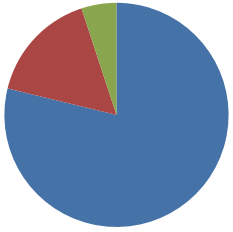
Lake Champlain Basin
(Hegman et al. 1999)



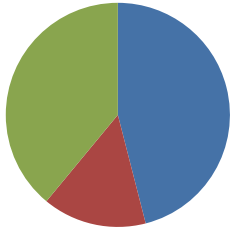
Missisquoi Bay
(Stone Environmental, 2011)



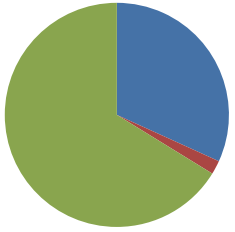
St. Albans Bay
(Gaddis and Voinov, 2010)



Lake Memphremagog
(SMi Aménatech, Inc., 2009)

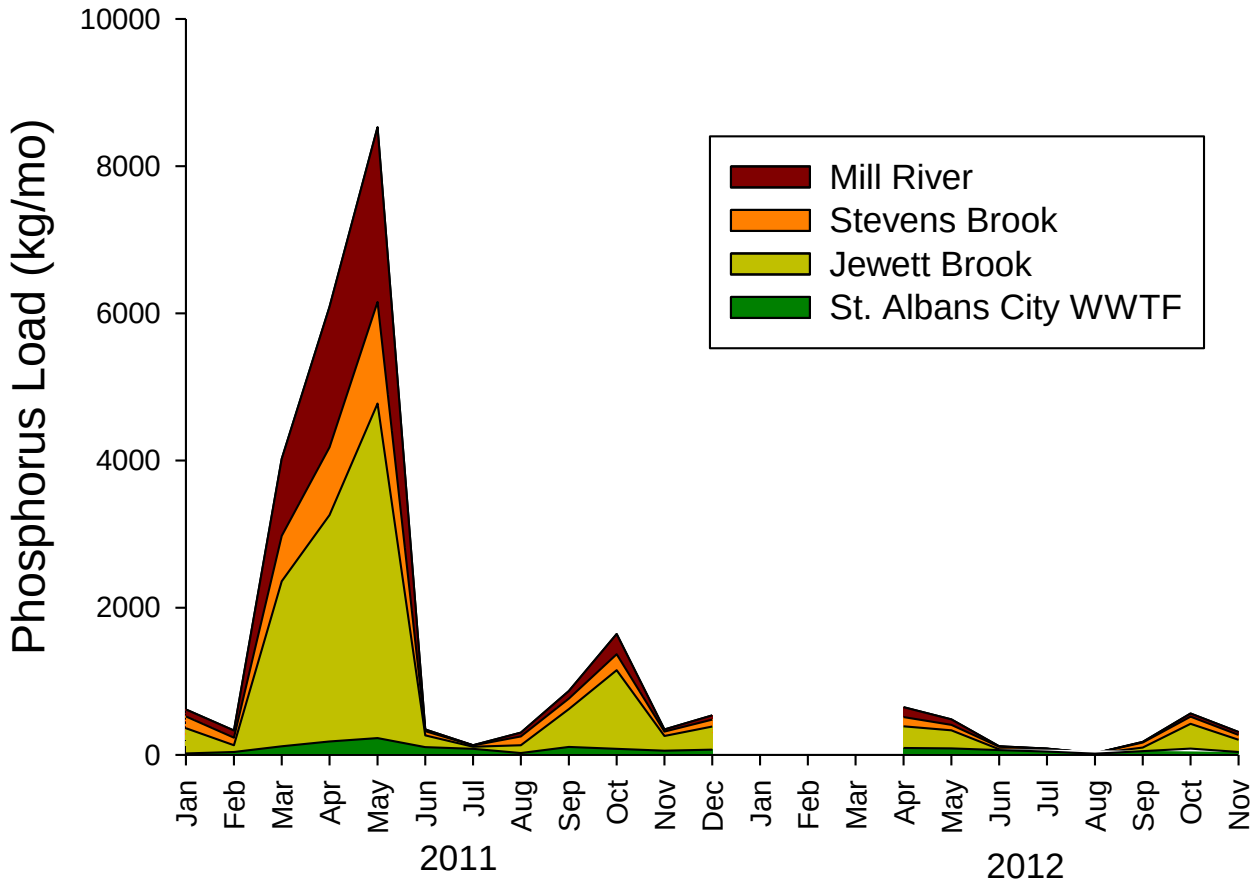


Connecticut River
(Moore et al., 2004)

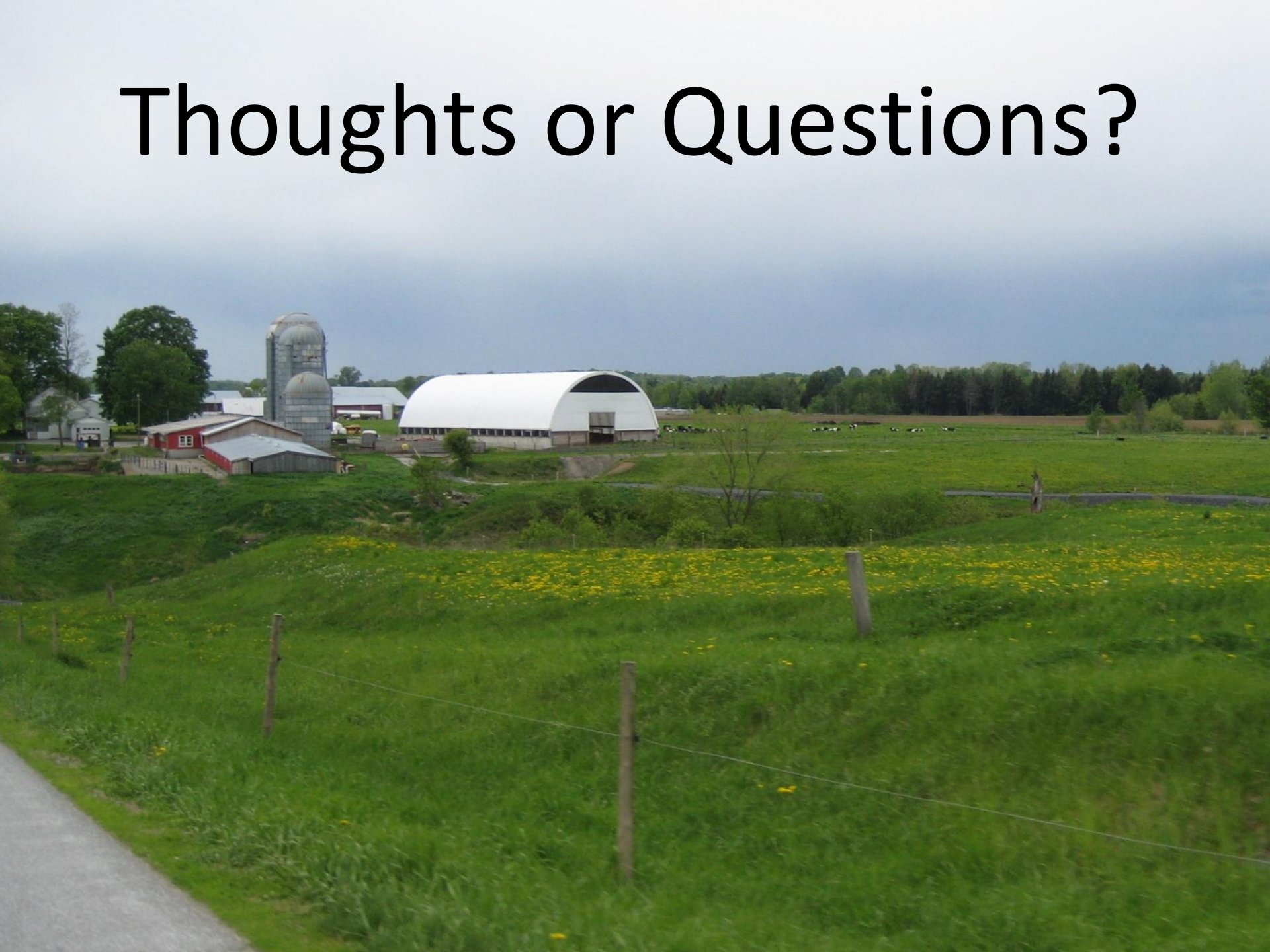


*Streambank erosion was assessed separately only in the Missisquoi Bay watershed. In other watersheds, this source was implicitly included within the other land use categories.

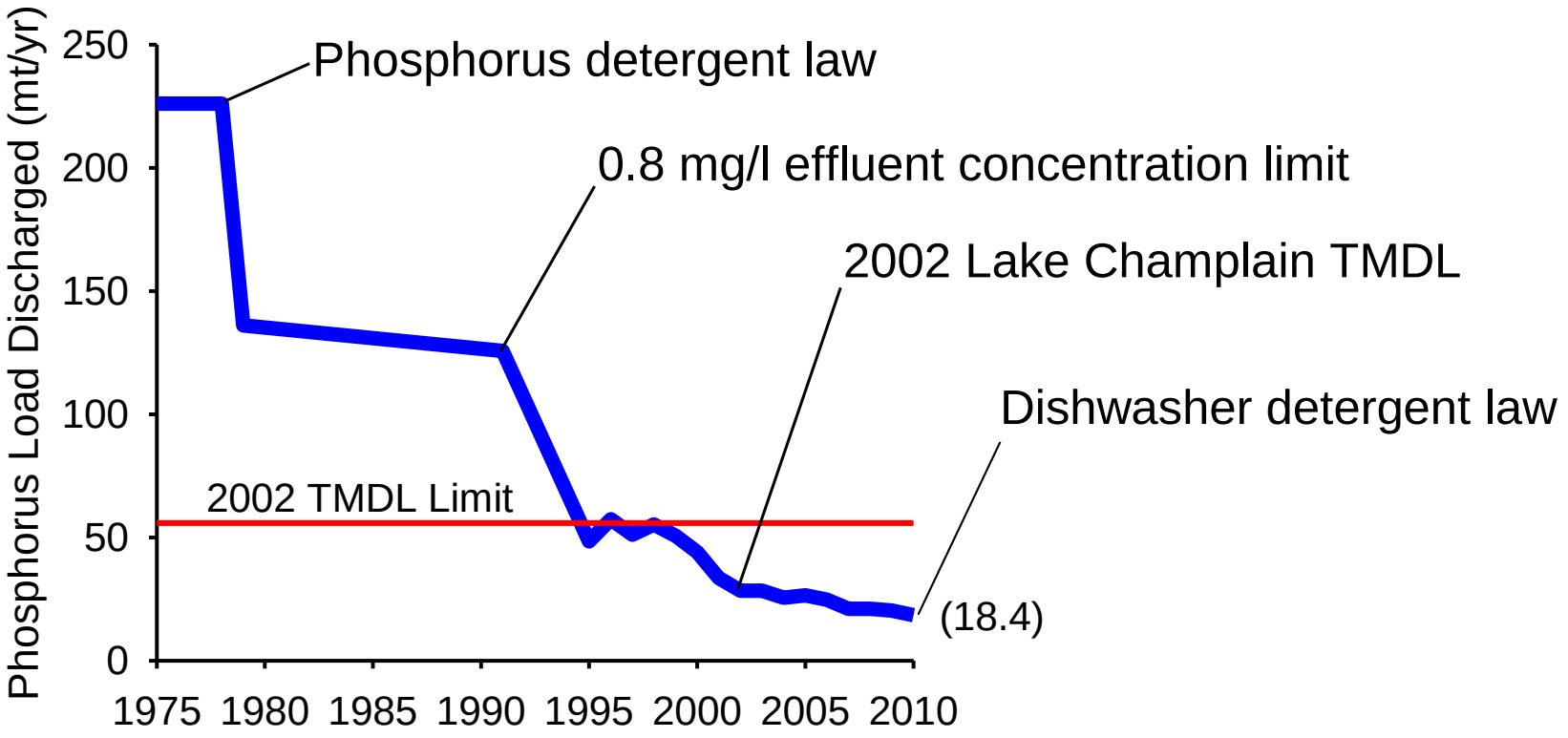
Tributary sources of phosphorus loading to St. Albans Bay



Thoughts or Questions?



Long-term trends in Vermont wastewater phosphorus loads to Lake Champlain



Internal phosphorus loading from lake sediments can delay the lake's recovery following external load reduction (e.g., St. Albans Bay)