Nutrient pollution is a major problem for many aquatic systems, because it feeds harmful cyanobacterial blooms (HCBs). It can be moderated through good governance, but to date management has been reactive, with decision makers responding to problems only after they become acute rather than preventing them, even when there is ample advance warning from scientists [1,2]. According to Webster [3,4], reactive governance leads to a process called the policy treadmill. In this, the left-hand cycle starts with an environmental problem, which sends signals to scientists, decision-makers, firms, the public, and other actors. These signals can cause increases in political concern when those who “hear” them have political power. Greater political concern increases the probability that management will switch to a more effective cycle, but the transition depends on other factors, such as available technologies and policy options. Disconnects occur whenever problem signals fail to reach or fail to motivate decision makers. There are many types of disconnects, but one of the most important occurs when there are differences between “objective” risk signals and subjective risk perceptions [5–7]. Of course, no measures of risk are perfectly objective, but we use the term to differentiate between empirical data/science and individual beliefs.

Disconnects between the actual and perceived level of risk can delay or stop the feedback loop depicted on the right in Figure 1, preventing the buildup of concern and related transition to more effective management. This delay in turn allows a build-up of ecological damage that can trigger large and possibly irreversible regime shifts, such as eutrophication [8,9]. Therefore it is important to understand the conditions under which disconnects emerge between objective and subjective risk perception, including social interactions that can affect aggregate perceptions of risk (i.e. political concern) [10,11]. We are most interested in the psychological and socio-economic filters that speed up or slow down policy response by dampening or amplifying objective risk signals.

We propose to convene a group of diverse scholars with expertise on the biophysical, psychological, socio-economic, health, and regulatory aspects of water quality issues to:

- Develop comparable measures of objective risk signals for HCBs in the Lake Erie and Lake Champlain basins.
- Compile data sources on subjective risks/beliefs to create a dataset of psychological and socio-economic risk signals to integrate with the objective risk database.
- Use systems modeling techniques to test the hypothesis that amplification of subjective risk perceptions may trigger a shift in policy cycle from ineffective to effective; and dampening of subjective risk perceptions may trigger policy cycle to shift from effective to ineffective cycle.
References:


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[1] https://www.sesync.org/opportunities/propose-a-pursuit