WELCOME PRESENTATION

A Paradigm for preventing cyanoHABs: The Why and How of Moving from Monitoring and Management to Prevention and Remediation of Cyanobacteria Harmful Algae Blooms (cyanoHABs)

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Water pollution in the Great Lakes, linked with eutrophication and cyanobacteria was first brought to the scientific literature in the 1970s. Despite some reductions in Great Lakes waterblooms, due to selected nutrient management efforts, cyanobacteria reemerged in the 1990's as toxic harmful algae waterblooms (cyanoHABs), once again linked to eutrophication. Over the ensuing 50-year span, toxic cyanobacteria Harmful Algae Blooms (cyanoHABs) have been shown to degrade freshwater resources worldwide. While much has been learned about their occurrence, organisms responsible, toxicology, biochemistry and genetics, most approaches dealing with the problem have been restricted to: (a) "Monitoring and Detection": trying to improve our ability to predict when and where cyanoHABs will strike, and (b) Reactive Symptomatic Treatments that target individual symptoms of eutrophication after the fact. Despite our best efforts, the water quality in our ecological water infrastructure continues to worsen because we are failing to correctly identify the problem. This presentation aims to highlight the competitive advantages cyanobacteria gain in eutrophic conditions, and in particular, their ability to access the accumulated nutrients in the sediment of eutrophic water bodies. It then examines how current reactive interventions targeting individual symptoms of eutrophication provide short-term aesthetic relief, but only serve to entrench conditions that favor cyanobacterial dominance in the long-term. The discussion also details how we can develop an understanding of the complex dynamics of the Nutrient Cycle – as well as resilient and sustainable food webs and ecosystems – from the domains of biology and biochemistry (or Biotechnology) and the implementation of the Systems Theory paradigm. The presentation concludes by looking at how an understanding of Systems Theory, and the inevitable feedback loops they entail, enables us to implement a more thoughtful and applied scientific approach to combating the fundamental drivers of the Global Water Crisis: eutrophication and toxic cyanoHABs, through the application of proactive Prevention and Remediation strategies based on Biotechnology. This will allow us to target the root causes of the degradation of source water bodies around the world and leverage the power of Nature's self-regulating and self-renewing biological processes to safeguard our freshwater resources for future generations.