MACRONUTRIENT DELIVERY FROM A FREE-FLOWING OCKLAWAHA: IMPLICATIONS FOR THE LOWER ST. JOHNS RIVER

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Rodman Reservoir, the roughly 9000-acre in-line impoundment of the lower Ocklawaha River, traps and transforms, to varying levels, inflowing sediments and chemical constituents. The restoration to a free-flowing condition has raised concerns that loss of the absorption of inflowing nitrogen and phosphorus within the reservoir's 21-mile reach could exacerbate eutrophication of the downstream freshwater Lower St. Johns River (LSJR). A 2016 nutrient budget analysis quantified this net nutrient change (calculated as inflowing mass load – outflowing) and concluded that the potential phosphorus load increase is small, and of a magnitude that can be mitigated with a variety of projects of demonstrated efficacy. Most of the nitrogen delivered to Rodman Reservoir originates from Silver River as nitrate-nitrite-N, a form that is readily reduced within the reservoir, and if the simple net difference mass load were to traverse the reach unabated under the free-flowing condition would constitute a proportionally larger increase. Cultural eutrophication in the freshwater LSJR is manifested in chronic, spring and summer blooms, in which prevailing nitrogen limitation is routinely overcome by nitrogen-fixing cyanobacteria. An examination of the long-term phytoplankton monitoring data indicates that higher ambient nitrate-nitrite-N preceding bloom seasons is associated with lower cyanobacteria abundance and higher proportions of more desirable eukaryotic algae, enhancing upward trophic transfer in an estuary where phytoplankton provide the overwhelming supply of primary production. This seemingly contradictory postulate is supported by research worldwide on the alteration of nutrient stoichiometry by dams, adversely affecting downstream phytoplankton communities. This apparent enhancement to the phytoplankton composition of the LSJR through the rebalancing of N:P (and silica resupply, which is also retained within the reservoir) further supports the benefits to the pelagic and littoral ecology of the LSJR achievable with the restoration of a free-flowing Ocklawaha.

PRESENTER BIO: John Hendrickson is a former Supervising Environmental Scientist with the St. Johns River Water Management District, where he worked to develop of sound, achievable management recommendations to preserve the health and ecosystem services of northeast Florida's water resources. He is currently a co-chair on the science committee of the Reunite the Rivers Coalition.