WATER QUALITY TRENDS IN LAKE OKEECHOBEE: CLIMATE CHANGE OR OTHER INFLUENCE?

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Forty-eight years of water quality data collected from Lake Okeechobee were used to demonstrate if potential effects of climate change could be observed using a long period of record. Water quality data were compiled for six stations within the lake and were aggregated as monthly averages of water temperature, dissolved oxygen, water pH and specific conductance. Trend analyses were determined using a seasonal Mann-Kendall tests.

The results of these trend analyses showed that water temperature and pH did not exhibit any significant change during the period analyzed. In contrast, a significant decreasing trend was observed for dissolved oxygen; however, the annual rate of the change was too low to be detectable. Specific conductance, on the other hand, exhibited a highly significant decreasing trend with an approximately 40% decrease over 48 years. Anomalously high specific conductance levels (mean = 624 µS/cm) were observed during the first decade. Specific conductance averaged approximately 400 µS/cm in last 10 years and reflects more typical levels for a Florida lake.

Increases in regional rainfall could be a consequence linked to climate change. In turn increased precipitation could result in decreases of specific conductance over time in Lake Okeechobee, which receives regional flows and a considerable amount of rainfall. To evaluate this, major ion data were used to identify potential causes for the observed trend in specific conductance. Typically, dilution though increased rainfall is not expected to have a substantial impact on the relative composition of major ions. However, a change in the ionic composition over the period could suggest that the source of ions to the lake has shifted and resulted in changes to the observed specific conductance levels. Based on the major ion data collected in the lake, the ionic composition of lake water shifted from being Na-Cl and Ca-HCO_3 co-dominant during the first two decades to Ca-HCO_3 dominant by the latter decades. Therefore, increased rainfall may not explain the observed trend as other factors, such as changes in land use, hydro-management, and local and regional anthropogenic activities, exert a greater influence on water quality.

PRESENTER BIO Dr. Iricanin is a principal scientist with more than 30 years of experience regarding water quality issues in fresh and marine waters. He has been involved in various Everglades restoration projects, as well as the derivation of the water quality-based effluent limit for inflows to the Everglades Protection Area.