Potential for Statewide Saline Encroachment of Florida Spring Water

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ABSTRACT

Florida has over 700 known springs and they have been popular recreational sites for many years. Because of recent declines in spring water quality, state sponsored programs have been initiated to mitigate the deterioration of, and to monitor the conditions of, spring water quality. Until recently, the monitoring efforts have mostly been site-specific and without reference to area-wide, long-term variation. For this latter reason, the Florida Department of Environmental Protection, through its Florida Geological Survey, conducted a statewide analysis for trends in the water quality of springs.

Trend analyses were performed on 48 chemical, biological, and physical indicators for the period of 1991-2003 (Mann-Kendall tests, $\alpha = 0.05$) from 58 springs located across the state. Although nutrients were the initial major concern, more significant increases in saline encroachment-related indicators were observed. The trends were overwhelmingly upward statewide (sign tests, $\alpha = 0.05$) and were associated with saline indicators such as sodium, chloride, and sulfate, as well as rock-matrix analytes (e.g. calcium and magnesium). The trends were accompanied by concurrent decreases in flow.

The increasing trends indicate potential large, area-wide encroachment of saline waters. Because saline and, as it turned out, rock-matrix analyte trends are precursors to saline water encroachment, springs should be incorporated, along with wells, into a unified, statewide water-quality monitoring network to track saltwater encroachment.

Keywords

Florida · spring water quality · monitoring · trend analysis ·saltwater encroachment