

Novel Approaches to Lake Apopka Sediment Management

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Abstract

Lake Apopka is a 12,140 hectare lake in central Florida just west of Orlando at the headwaters of the Harris Chain of Lakes. Hydrologic manipulation during the early and mid-1900s resulted in significant lake level reduction and severed nearly 8,100 hectares of former sawgrass marsh on the north side of the lake which was subsequently converted to agricultural production. Lake Apopka, once a popular sportfishing destination, transitioned rapidly from a macrophyte-dominated system to an algal-dominated system as a result of nutrient export from agricultural operations. As a result of legislative action in the 1990s, most agricultural activities within the former marsh ceased and the St. Johns River Water Management District (SJRWMD) was tasked with managing restoration. Most of the SJRWMD's efforts have focused on restoring submersed aquatic vegetation (SAV) within the lake by reducing nutrient export from the North Shore Restoration Area (NSRA), and implementation of the Marsh Flow-Way (MFW). As a result of restoration efforts, nutrient concentrations within Lake Apopka have decreased significantly but unconsolidated flocculent (UCF) sediments within Lake Apopka appear to be reducing light availability and hampering SAV recovery, particularly during low water level. While the MFW provides some UCF removal, targeted in-lake removal of UCF sediments could expedite restoration and result in tremendous savings compared to traditional dredging methods. The SJRWMD recently completed a series of dredging demonstration projects to evaluate the effectiveness of targeted removal of UCF sediments. Targeted UCF dredging showed promising results that could be easily applied lakewide in combination with innovative hydraulic dredging techniques such as thin layer placement.