Utilizing Depth of Colonization of Seagrasses to Develop Numeric Water Quality Criteria for Florida Estuaries

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US EPA is working with state and local partners in Florida to develop numeric water quality criteria to protect estuaries from nutrient pollution. Similar to other nutrient management programs in Florida, EPA is considering status of seagrass habitats as an indicator of biological integrity, with depth of colonization of seagrasses used to relate potential seagrass extent to water quality requirements (especially water clarity). We developed and validated an automated methodology for evaluating depth of colonization and applied it to generate 228 estimates of seagrass colonization depth for coverage years spanning 67 years (1940-2007) in a total of 100 segments within 19 estuarine and coastal areas in Florida. A validation test showed that two parameters that were computed, Zc50 and ZcMax, approximated the average and 95th percentile depth at the deep-water margin of seagrass beds. Zc50 was estimated separately for continuous seagrass vs. all seagrass. Average values for Zc50 as well as long-term trends were evaluated for the entire state, illustrating a decline on average from early years (e.g., 1940-1953) to a middle period (1982-1999) and a variable degree of recovery since 2000. The largest decrease in Zc50 occurred in Florida panhandle estuaries. Extensive water quality data compiled in the Florida DEP's Impaired Waters Rule database was evaluated to characterize Secchi depth, CDOM, TSS, and chlorophyll-a in relation to depth of colonization estimates. Zc50 was significantly related to water clarity averaged during the leading 3-year period inclusive of the coverage year. Relationships within estuaries were stronger than those across estuaries. Management programs addressing nutrient enrichment in several Florida estuaries have established seagrass recovery goals based on the highest documented seagrass extent. We evaluate the potential to apply a similar approach to other Florida estuaries.

First Choice Session:
SCI-065 Numeric Nutrient Criteria for Estuaries and Their Watersheds

Alternate Session:
SCI-067 Nutrients in Coastal Waters - Data, Loads, Models and Interpretation