

## FLORIDA KEYS RESIDENTIAL CANAL DEVELOPMENT IMPACTS ON NEARSHORE WATER QUALITY & BENTHIC DIVERSITY

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Small islands allow nutrients and sediment to enter near shore waters through groundwater seepage and surface storm run-off. Tropical carbonate islands such as the Florida Keys once relied on dense broadleaf forests and mangrove wetlands to restrict nutrient input to marine environments, supporting clear turquoise waters indicative of oligotrophic conditions. The Florida Keys now has about 500 dredged canals of varying depths, lengths, and orientations. Canals can trap organic material, including seaweed and seagrass, which accumulates and contributes to poor water quality with the accumulation of nutrients. Poor design and circulation in canals have been addressed in the past through a series of demonstration projects to remediate this problem through back-filling, adding culverts, or adding seaweed curtains. Universal wastewater treatment has been implemented throughout the Florida Keys, removing cesspits and septic systems as a source of land-based sources of nutrients. However, the legacy of the past rests at the bottom of dredged canals.

This research addressed is, “*Do canals in the Florida Keys contribute to nearshore water quality degradation?*” The research examined 13 sites in the Florida Keys, 9 residential canal sites and 4 state parks with undeveloped shorelines. Water samples were collected quarterly over two years from 2019 to 2021. A grid sampling design was developed with a 200 m by 500-meter areas running from the shoreline offshore (to 500 m). Random blocks within the grid were sampled for 8 water quality parameters, and benthic surveys were conducted to document benthic community classification, SAV and epifauna occurrences and abundance. The challenge was to design an efficient plan to understand any "halo" effect of nutrients from canals moving into adjacent nearshore environments. Results showed patterns of ecological degradation close to shore and changes in water quality related to orientation of the canals and the presence of dredged navigation channels outside of the canals.

**PRESENTER BIO:** Dr. Sealey is a professor in the Department of Biology and heads the Coastal Ecology Laboratory. She has over 35 years of experience in benthic ecology and coastal restoration. She has worked on the original inventory of Florida Keys residential canals in the early 2000's.