

# Waste Water and Reef Health in the Florida Keys

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The islands that form the Florida Keys are adjacent to the only major coral reef within the territorial borders of the continental United States. Currently there are approximately 40,000 septic tanks, 10,000 cesspits, and 1,000 Class IV injection wells utilized for sewage disposal in the Keys. Due to the porous nature of limestone (which makes up the strata of the islands), coupled with natural physical dynamics of the region such as substrate flushing from precipitation and tidal pumping, these types of sewage-disposal systems are inadequate for protection of ground and surface waters from sewage-associated pollutants (e.g., nutrients, toxins, microorganisms, etc.).

Several studies conducted in the Florida Keys have demonstrated movement of contaminants from septic tanks and injection wells to the surrounding nearshore marine environment. In one study, 95% of the 19 samples sites (ranging from Key Largo to Key West) were positive for at least one of four pathogenic human virus groups (enteroviruses, HAV, Norwalk, Norwalk-like viruses). These results demonstrated that the canals and nearshore waters throughout the Florida Keys were being impacted by human fecal material carrying human enteric viruses through regional use of inadequate wastewater-disposal systems. Other studies showed that human enteroviruses could also be detected in coral mucus in nearshore environments. Recent and current studies have demonstrated the presence of the same viruses in offshore groundwater and the offshore reef environment.

This presentation will cover historical and ongoing microbiological research in the Florida Keys, which addresses the presence of waste water in nearshore and offshore sites throughout the Keys coral reef system. The primary focus will be the occurrence of indicator and pathogenic organisms in Keys marine waters and the use of molecular source tracking to identify point of origin (human versus animal).