

ICOAST: SMART INDICATORS OF ANTHROPOGENIC CONTAMINATION

*Elise S. Morrison*¹, *Nancy Denslow*², *John Bowden*², *Mohammad-Zaman Nouri*², **Todd Z. Osborne**³, *Thomas S. Bianchi*¹

¹Department of Geological Sciences, University of Florida, Gainesville, FL, USA

²Center for Environmental and Human Toxicology & Department of Physiological Sciences, University of Florida, Gainesville, FL, USA

³The Whitney Laboratory for Marine Bioscience, University of Florida St. Augustine, FL, USA

The diversity of anthropogenic impacts to coastal systems call for novel and “smart” indicators of anthropogenic contamination. Here, we have incorporated a suite of high-sensitivity techniques to assess anthropogenic contamination as part of the broader iCoast initiative. A 28 km transect was established in March 2019 to monitor the effects of seasonal changes and episodic storm events on contaminants within coastal waters. Sampling trips were conducted in March and June to establish baselines for seasonal and inter-annual variability, and additional sampling occurred before, during, and after Hurricane Dorian. Targeted and un-targeted chemical analyses were conducted to quantify contaminants of emerging concern and other indicators of anthropogenic contamination. Water samples (both particulate and dissolved fractions, POM and DOM, respectively) and sediment samples were analyzed for (1) a suite of 14 hormones, (2) a set of 14 fecal sterol/stanols; (3) untargeted contaminant analyses via orbitrap LC-MS; and (4) fecal coliforms. Supplementary data on water chemistry, including dissolved and particulate organic carbon, salinity, and chlorophyll-a, were also collected. Two hormones, progesterone and estrone, were found in all three components studied (i.e. water column particulates, dissolved, and sediment). However, other hormones were only seen in the water column (i.e. POM and DOM; ethinylestradiol), dissolved organic matter (cortisol), or particulate/sediment fraction (estradiol, equilin), highlighting that certain contaminants may have interactions with particles and sediments, and that multiple ecosystem compartments should be considered when evaluating coastal contaminants. In addition to hormones, the relative abundances of coprostanol, epicoprostanol, 24-ethylcoprostanol, cholestanol are currently being evaluated to determine the contributions of human, herbivore, and omnivore contamination in the system. Overall, the integration of these advanced approaches will provide further insights into the location and extent of anthropogenic contamination within coastal waters.

PRESENTER BIO: Dr. Todd Z. Osborne is an Assistant Professor and has a diverse research program focusing on biogeochemical processes in soil and water in a variety of ecosystems throughout Florida. I seek to meld my scientific interests and training with a lifelong passion for the environment.