

THE HANGOVER EFFECT: COUPLING SEAGRASS LOSS, MACROALGAL GROWTH, & WATER QUALITY IN CHARLOTTE HARBOR

Chris J. Anastasiou¹, Nate Morton², Mark Walton¹, Tara Schiro¹

¹Southwest Florida Water Management District, Tampa, FL

²NV5 powered by Quantum Spatial, Inc., St. Petersburg, FL

Charlotte Harbor, in southwest Florida, is the second largest open water estuary in Florida with a surface area of approximately 700 square kilometers. From 1988 to 2018, seagrass coverage remained relatively stable between roughly 7,000 and 8,000 hectares. In 2020, seagrass coverage reached its lowest levels in 32 years, since the Southwest Florida Water Management District began mapping seagrass. Between 2018 and 2020, the Harbor lost an unprecedented 1,798 hectares of seagrass. Most notably, the east side of Charlotte Harbor, known as “the east wall,” lost half (712 hectares) of its seagrass. Concurrent with seagrass loss was an explosion of drift and attached benthic macroalgae. This relatively sudden shift from seagrass to macroalgae occurred in the wake of a protracted regional red tide event that lasted approximately 15 months from October 2017 to January 2019. While red tide was extreme in many coastal areas along southwest Florida, the east wall was largely spared direct impact. We hypothesize that seagrass loss and macroalgal proliferation along the east wall was not a direct result of red tide, rather it was a function of its aftermath, a phenomenon we term “the hangover effect.” During and after the major red tide event, massive amounts of nutrients from dead and decaying organisms were likely released into the water column. Many of these nutrients through the process of denitrification would have become bioavailable in the water column which were then rapidly assimilated by the macroalgae. We utilize seagrass maps, aerial imagery, water quality data, and hydrodynamic modeling to support the idea that “the hangover effect” at least in part led to the greatest loss of seagrass in Charlotte Harbor in over 30 years.

PRESENTER BIO: Dr. Anastasiou is Chief Water Quality Scientist and Seagrass Mapping Program Lead for the Southwest Florida Water Management District with 25 years of experience in estuarine, freshwater, and springs ecology. He has worked on a variety of research and restoration projects from the Mississippi River Delta to the Florida Everglades.