This research explores the efficacy of HawkEye imagery in ocean color (OC) remote sensing, concentrating on the Cape Fear River Estuary (CFRE) in southeastern North Carolina. Coastal zones, while economically and ecologically valuable, face threats such as pollution and habitat destruction. OC remote sensing has revolutionized marine studies, notably in evaluating global phytoplankton concentrations. However, its accuracy diminishes in coastal regions due to their optically complex waters. Here, we describe our collection and analysis of sea-truthing data near Wilmington and Masonboro Inlet, comparing in-situ readings with data from various satellites like MODIS Aqua, Sentinel 3A/3B OLCI, and SeaHawk HawkEye. Notably, while most satellite/in-situ match-ups utilize 2-dimensional sea surface data, we employ an instrument capable of vertically profiling through the water column to consider 3-dimensional variability. Emphasizing the relationship between chlorophyll concentration, bathymetry, and water column mixing processes, the research ultimately seeks to assess the accuracy of satellite observations against direct aquatic measurements, driving improvements in marine conservation and resource management strategies.