Macroalgae Deployment Report

2023, Iceland

In the summer of 2023, Running Tide deployed two open ocean growth experiments (OOGEs) to learn and iterate upon our macroalgae research efforts. Both experiments used local *Ulva lactuca*, harvested, reared, and inoculated in our Akranes facility. These deployments were the first open ocean deployments of *Ulva lactuca* by Running Tide, and demonstrated significant improvement in operational and experimental maturity relative to previous deployments in 2021 and 2022. The goal of growth experiments was to develop operational and scientific capability from inoculation to deployment to verification that could inform full-scale macroalgae deployments in future years. Additionally, OOGE deployments establish baseline performance of our macroalgae product (macroalgae + substrate + operational logistics) in a given oceanic location over time, setting an important starting point in an iterative, multi-year product development cycle and uncovering opportunities for improvement in our system design.

Key Scientific Result:

Experiment one (timelapse shown in Figure 1) successfully demonstrated a visual baseline of juvenile growth in the open ocean. Experiment two (Figure 2) successfully demonstrated that mature *Ulva* can survive in the open ocean without significant blade loss due to wave action. In this figure we can clearly see macroalgae blades whipping back and forth without tearing. Further, Running Tide's image-verification system (camera buoys) and data retrieval system, which were deployed to monitor terrestrial biomass sinking earlier this year, worked well in monitoring macroalgae growth. Throughout the course of the OOGEs, the verification hardware generated over 3000 images, our largest open ocean growth dataset to date.

Running Tide will continue to refine and iterate upon these experiments into 2024.

For further information and details, please contact Running Tide.

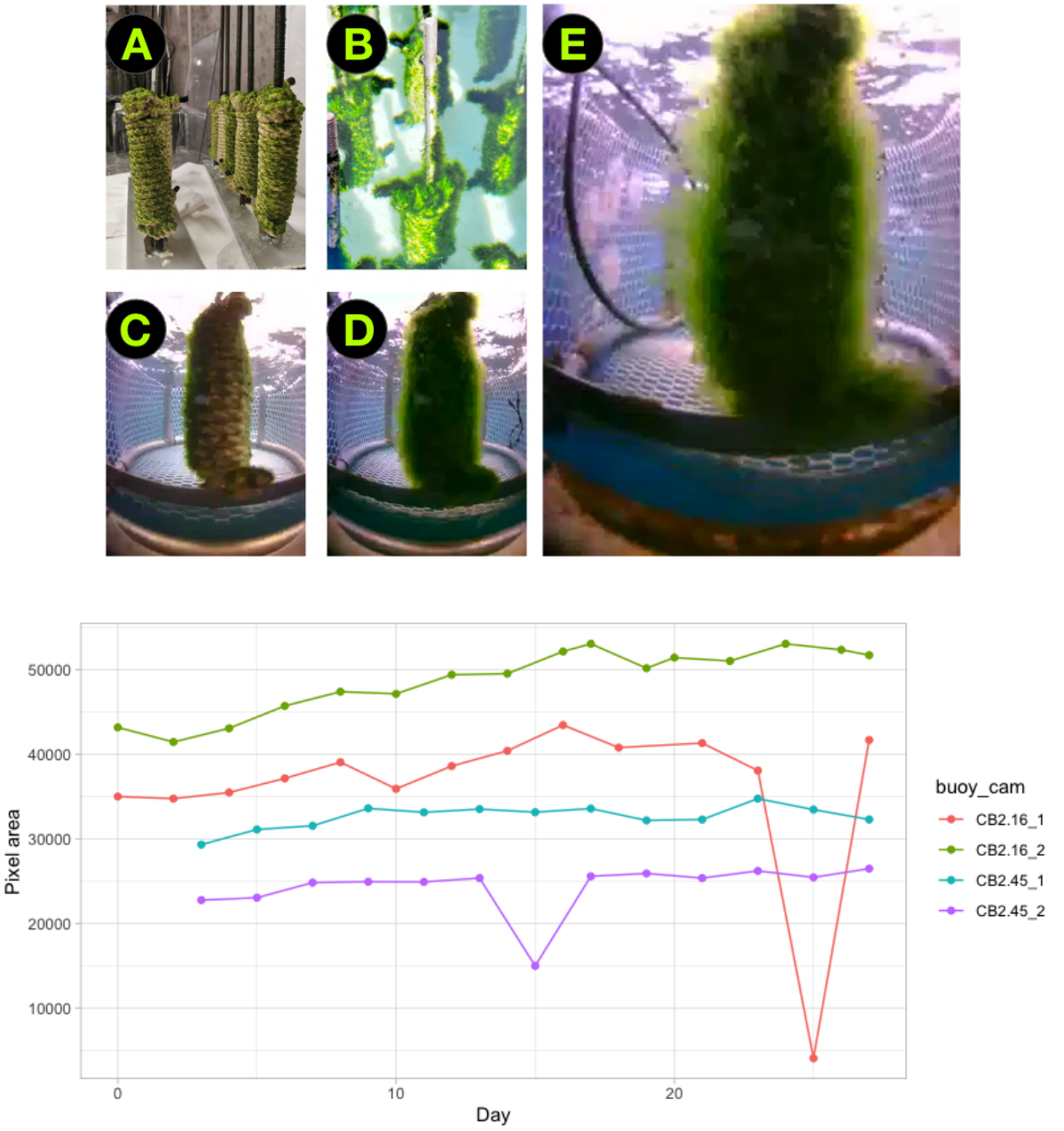

Figure 1: Time series of the inoculated cotton hanks. From left to right: (A) Three weeks after inoculation (July 10th). (B) Day of deployment (July 19th), (C) Camera buoy 2.1, camera 2, one day after deployment (July 20th), (D) Camera buoy 2.1, camera 2 three weeks after deployment (Aug. 12th), (E; the large photo) camera buoy 2.1, camera 2 six weeks after deployment (Sept. 5th). The graph at the bottom represents pixel area by time across multiple camera buoys (CB), all indicated in different colors. Note: the drops in the Buoy 2.16 camera 1 (red line) or Buoy 2.45 camera 2 (purple line) are based on a noise artifact in the data, visually those images are within their respective trend lines.

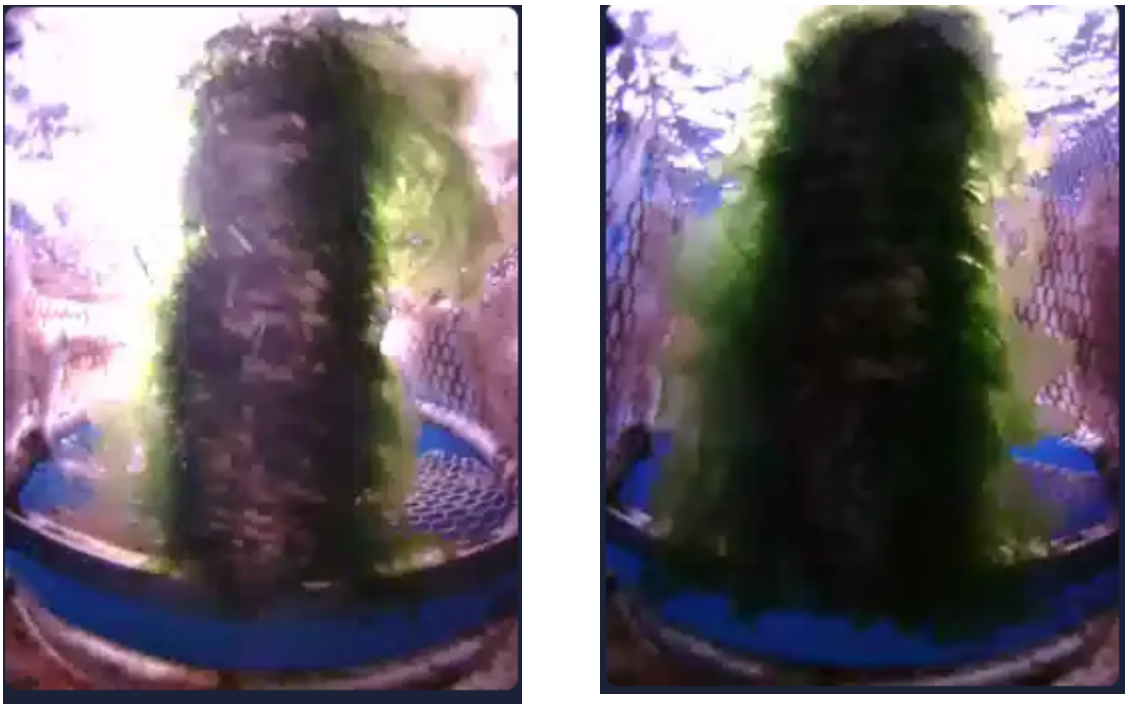

Figure 2: Two photos taken one day apart, with the photo on the left taken first. Demonstrating clear water movement across macroalgae blades that are not tearing the material away from the substrate.