

Iceland Benthic Pilot Preliminary Overview

2023, Iceland

This pilot experiment is intended to expand the knowledge and understanding of carbon additionality in the benthic layer of coastal sites across Running Tide's operating locations. The study will provide data on the ecological impact of sinking carbon substrates and eventually macroalgae biomass. Specifically, we will focus on the changes in observational biological data and ocean chemistry over time in response to carbon additionality. This data will be used to evaluate the impact of Running Tide's operations and subsequently iterate on our internal processes. This data can also serve as preliminary or supplemental data for third party investigations (academic, NGO, etc) into carbon additionality at the benthic layer, specifically (or not) to evaluate Running Tide's processes.

The experiment was commenced in June 2023 in Hvalfjörður, Iceland, where 500kg of lime kiln dust coated substrate (wood chips) were placed at 30m depth. Samples (seawater and sediment) are collected regularly at the test site and control site for chemical analysis, eDNA (microbial diversity) and macro and meiofauna community composition. Loggers, placed at both sites, collect continuous data on pH, conductivity, DO and temperature. This experiment is set to run for at least one year with continuous sample collection throughout the testing period.

Key Scientific Result:

16 weeks after the start of the experiment, no significant effects of the deposited biomass have been observed on pH, total alkalinity, calcium and dissolved organic carbon in seawater and total nitrogen, phosphorus, and total organic and inorganic carbon in sediment. See figures below (Fig. 1-8).

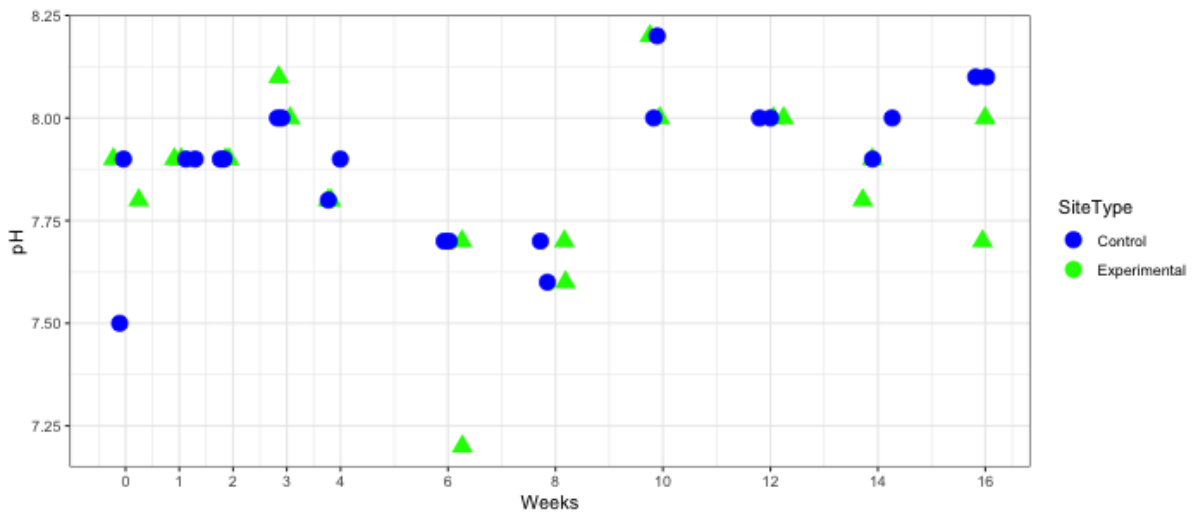


Figure 1. Preliminary pH results from the Iceland Coastal Benthic Experiment. Seawater samples were collected on a weekly basis after the baseline (0) samples were obtained and the experiment deployed. Blue circles = control site; green triangles = experimental site.

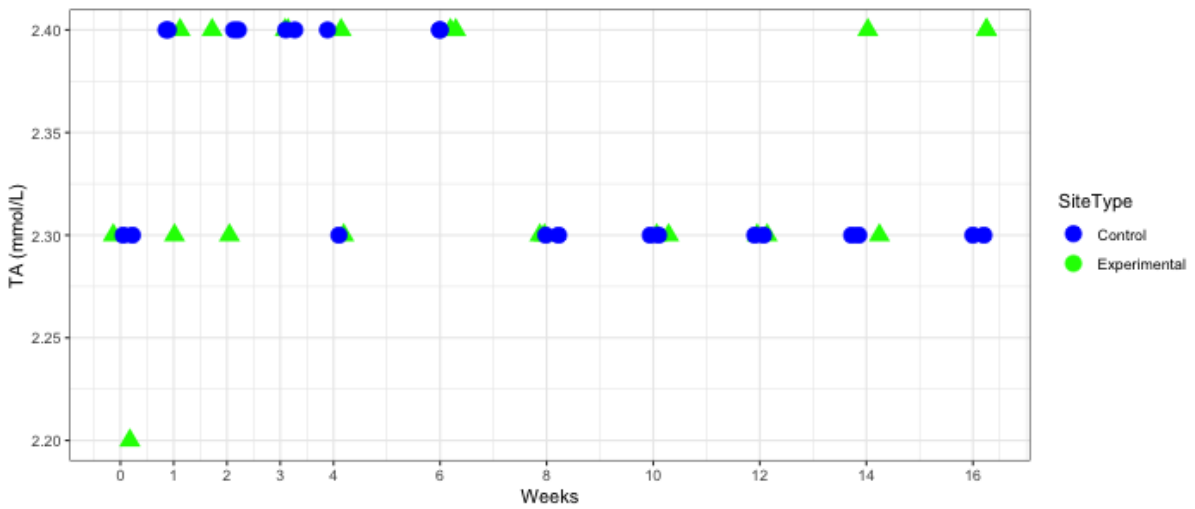


Figure 2. Preliminary total alkalinity (TA) results from the Iceland Coastal Benthic Experiment. Seawater samples were collected on a weekly basis after the baseline (0) samples were obtained and the experiment deployed. Blue circles = control site; green triangles = experimental site.

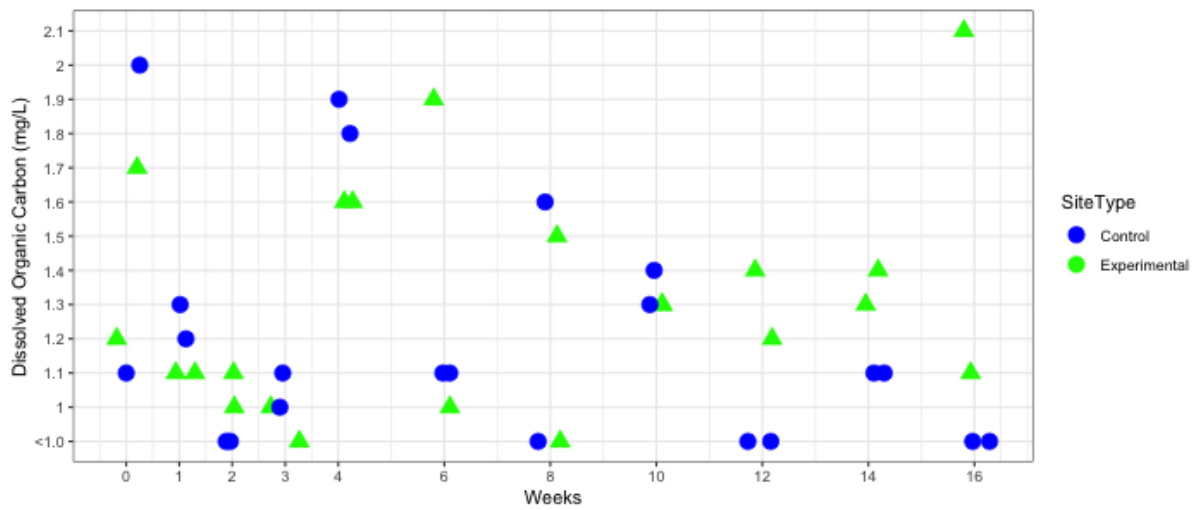


Figure 3. Preliminary dissolved organic carbon (DOC) results from the Iceland Coastal Benthic Experiment. Seawater samples were collected on a weekly basis after the baseline (0) samples were obtained and the experiment deployed. Blue circles = control site; green triangles = experimental site.

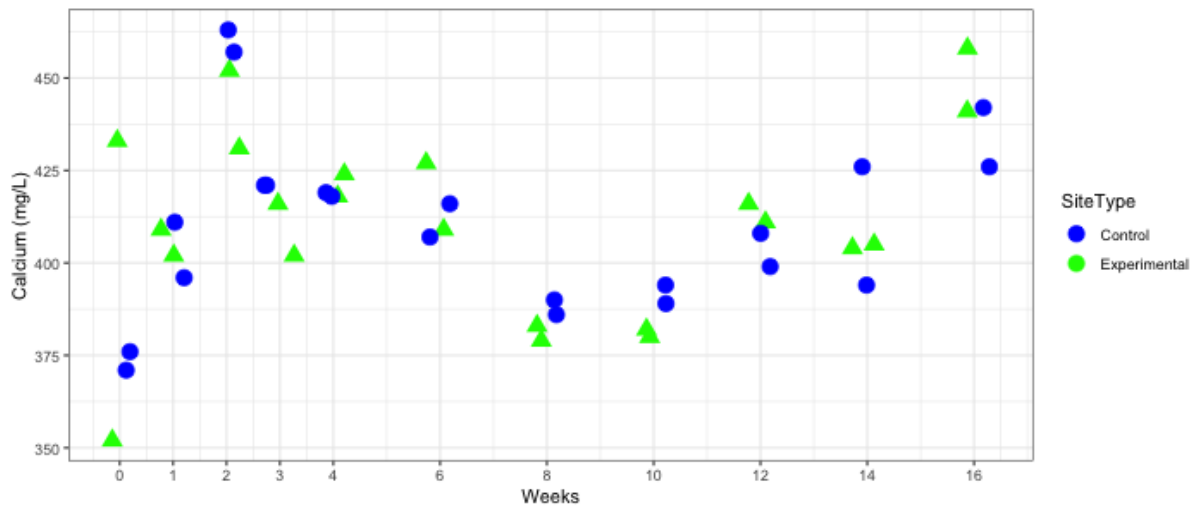


Figure 4. Preliminary calcium concentration results from the Iceland Coastal Benthic Experiment. Seawater samples were collected on a weekly basis after the baseline (0) samples were obtained and the experiment deployed. Blue circles = control site; green triangles = experimental site.

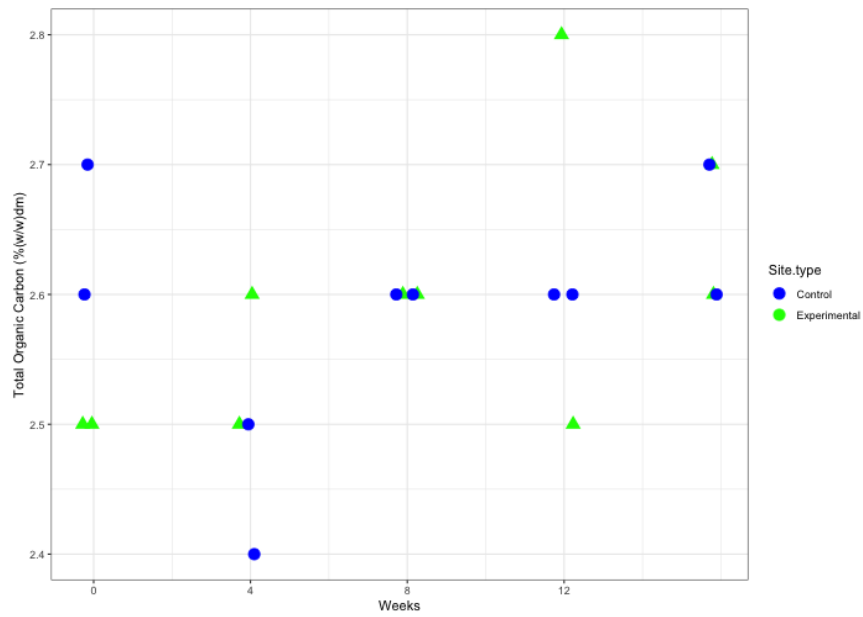


Figure 5. Preliminary total organic carbon results from the Iceland Coastal Benthic Experiment. Sediment samples were collected monthly after the baseline (0) samples were obtained and the experiment deployed. Blue circles = control site; green triangles = experimental site.

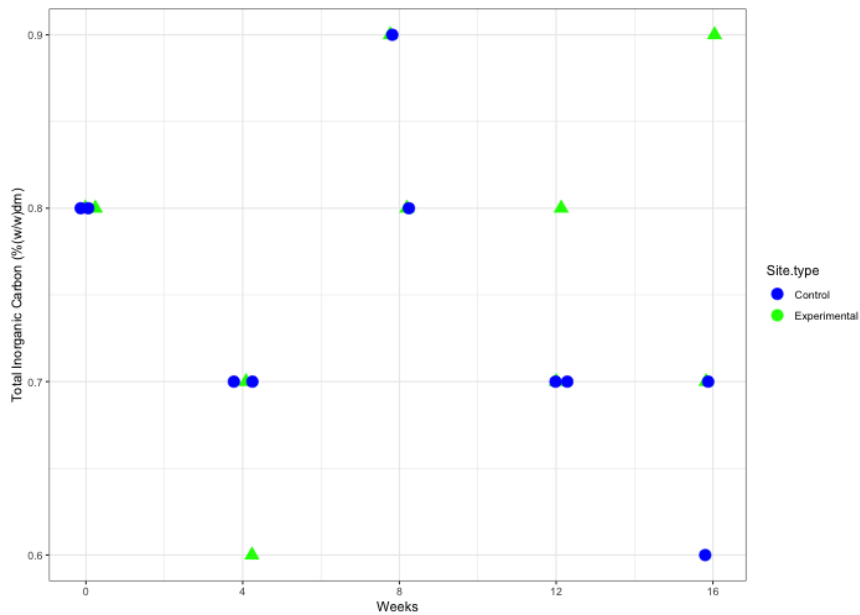


Figure 6. Preliminary total inorganic carbon results from the Iceland Coastal Benthic Experiment. Sediment samples were collected monthly after the baseline (0) samples were obtained and the experiment deployed. Blue circles = control site; green triangles = experimental site.

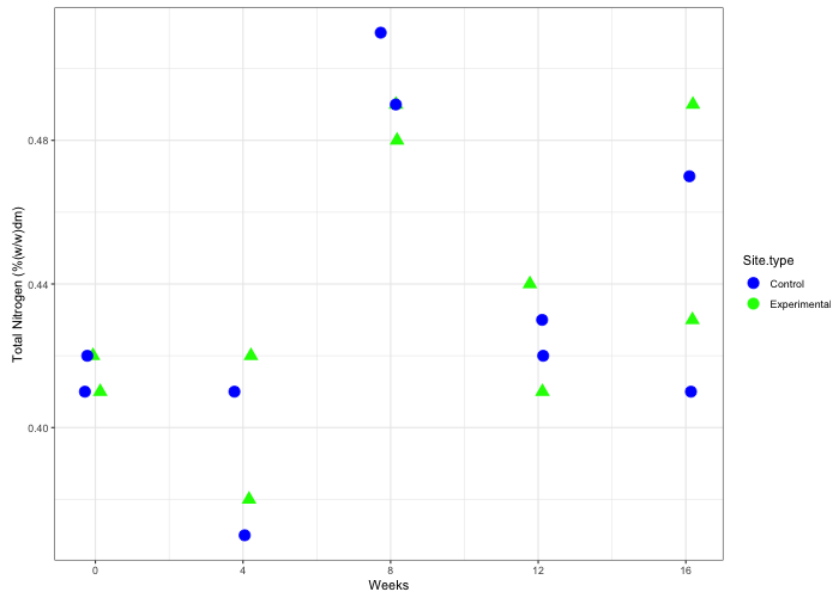


Figure 7. Preliminary total nitrogen concentration results from the Iceland Coastal Benthic Experiment. Sediment samples were collected monthly after the baseline (0) samples were obtained and the experiment deployed. Blue circles = control site; green triangles = experimental site.

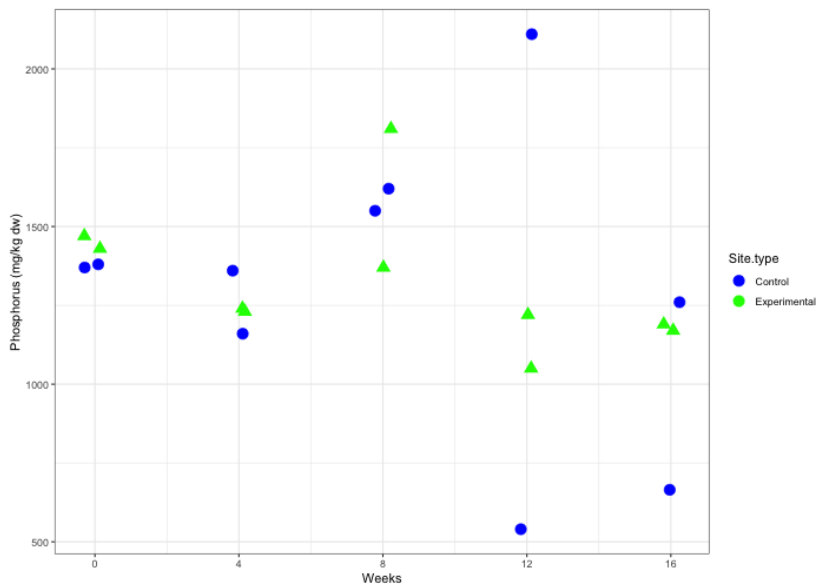


Figure 8. Preliminary phosphorus concentration results from the Iceland Coastal Benthic Experiment. Sediment samples were collected monthly after the baseline (0) samples were obtained and the experiment deployed. Blue circles = control site; green triangles = experimental site.