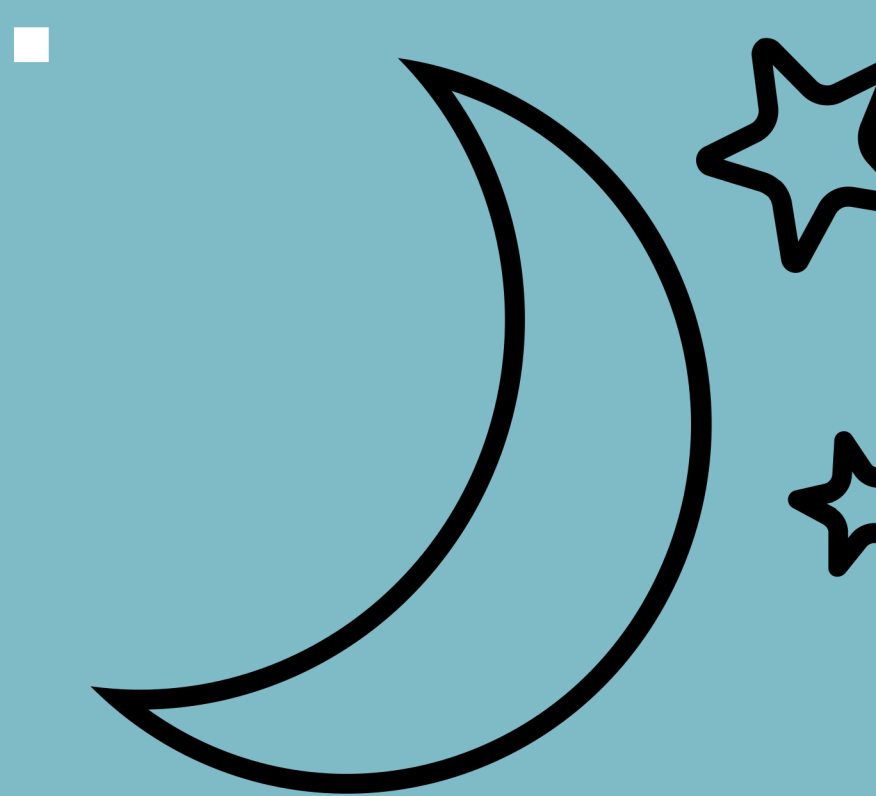


Hourly Measurements of Oxygen in Wequetequock Cove: Takes your breath away!



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Introduction

Wequetequock Cove experiences extremely low dissolved oxygen (DO) concentrations in summer mornings.

We inspected continuous hourly measurements of DO from Wequetequock Cove taken in May to August 2017 to understand influences on oxygen.

We compared DO concentrations to measurements of water temperature and wind speed that were collected simultaneously.

Methodology

To measure dissolved oxygen (DO), temperature, and salinity continuously:



HOBO salinity sensor



MiniDOT Optode oxygen-temperature logger

To measure wind speed continuously:



Data-logging anemometer

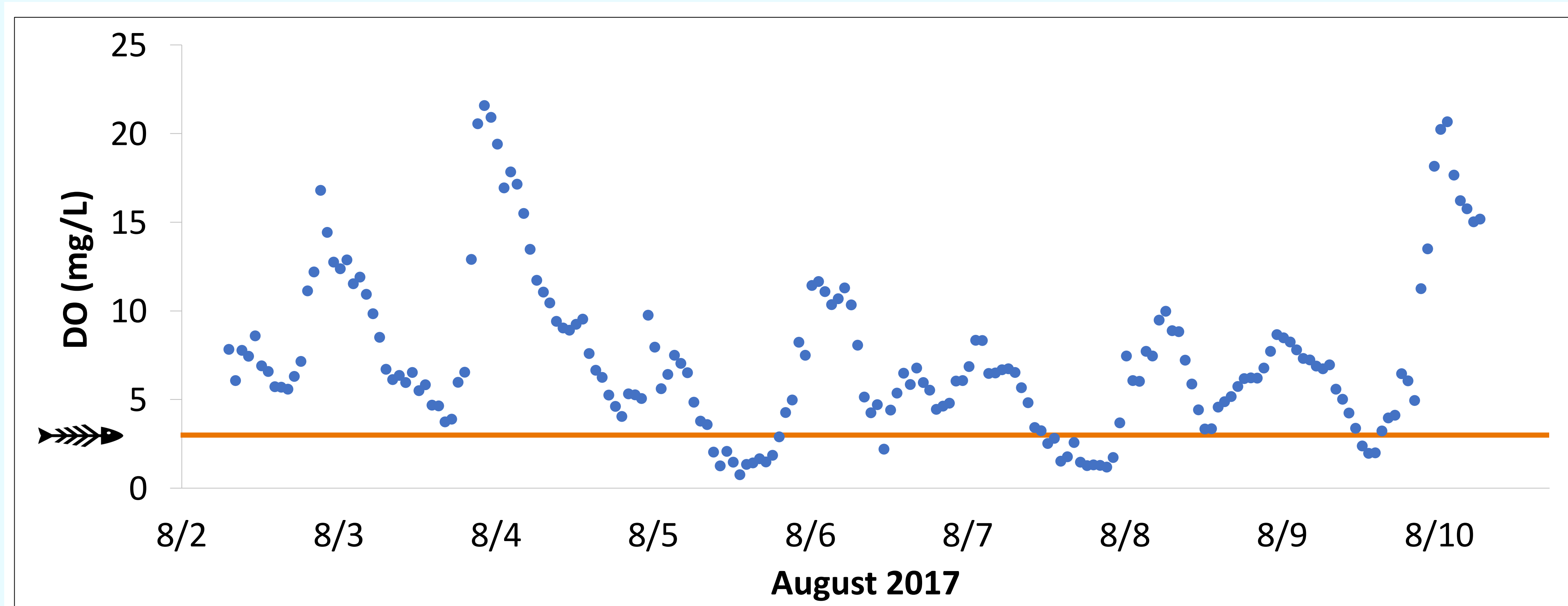


Figure 1. Dissolved oxygen concentration measured hourly the week of August 3, 2017, at the head of Wequetequock Cove. Minimum DO for fish survival is 3 mg/L.

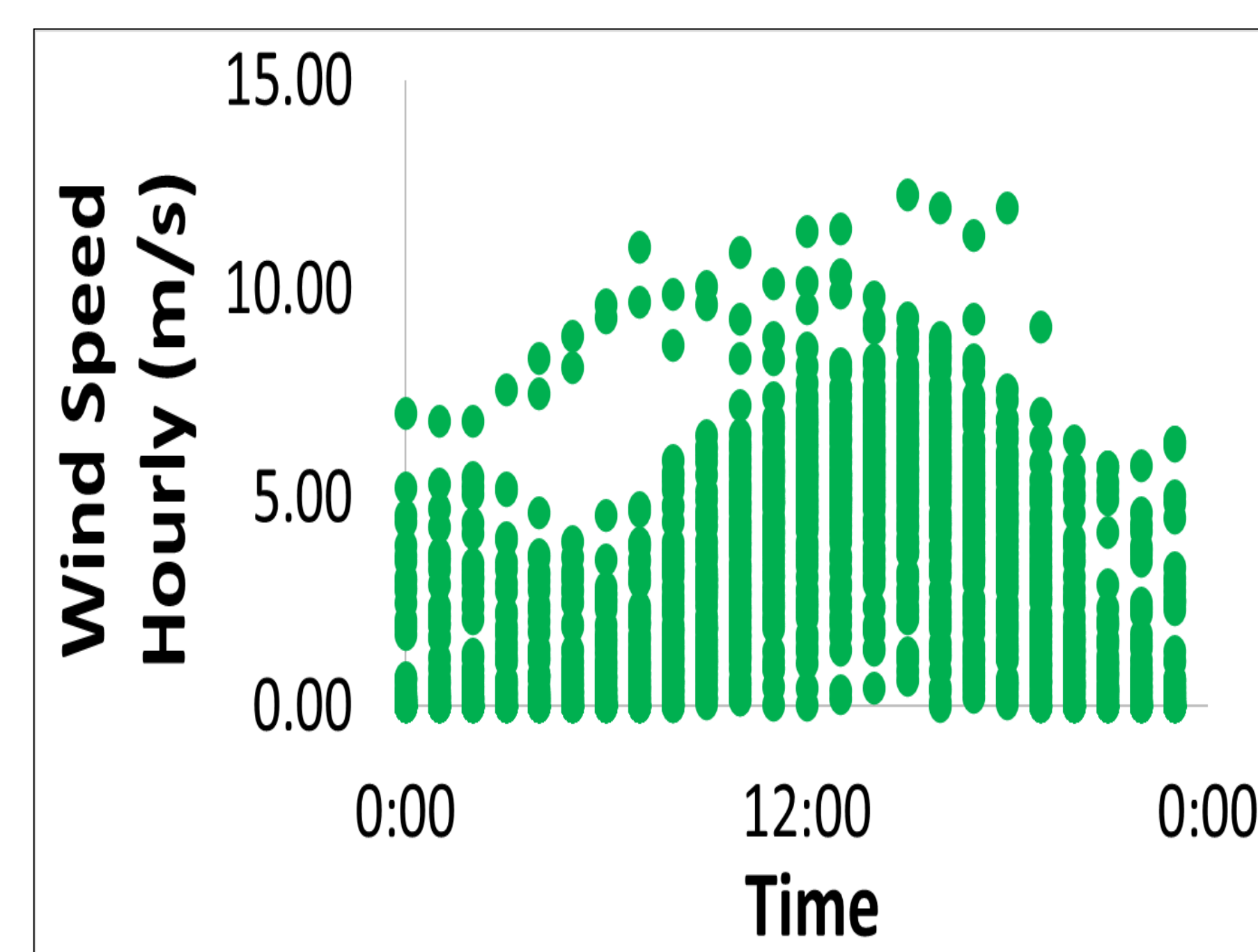


Figure 2. Hourly wind speed over the month of August in 2017 measured at the head of Wequetequock Cove

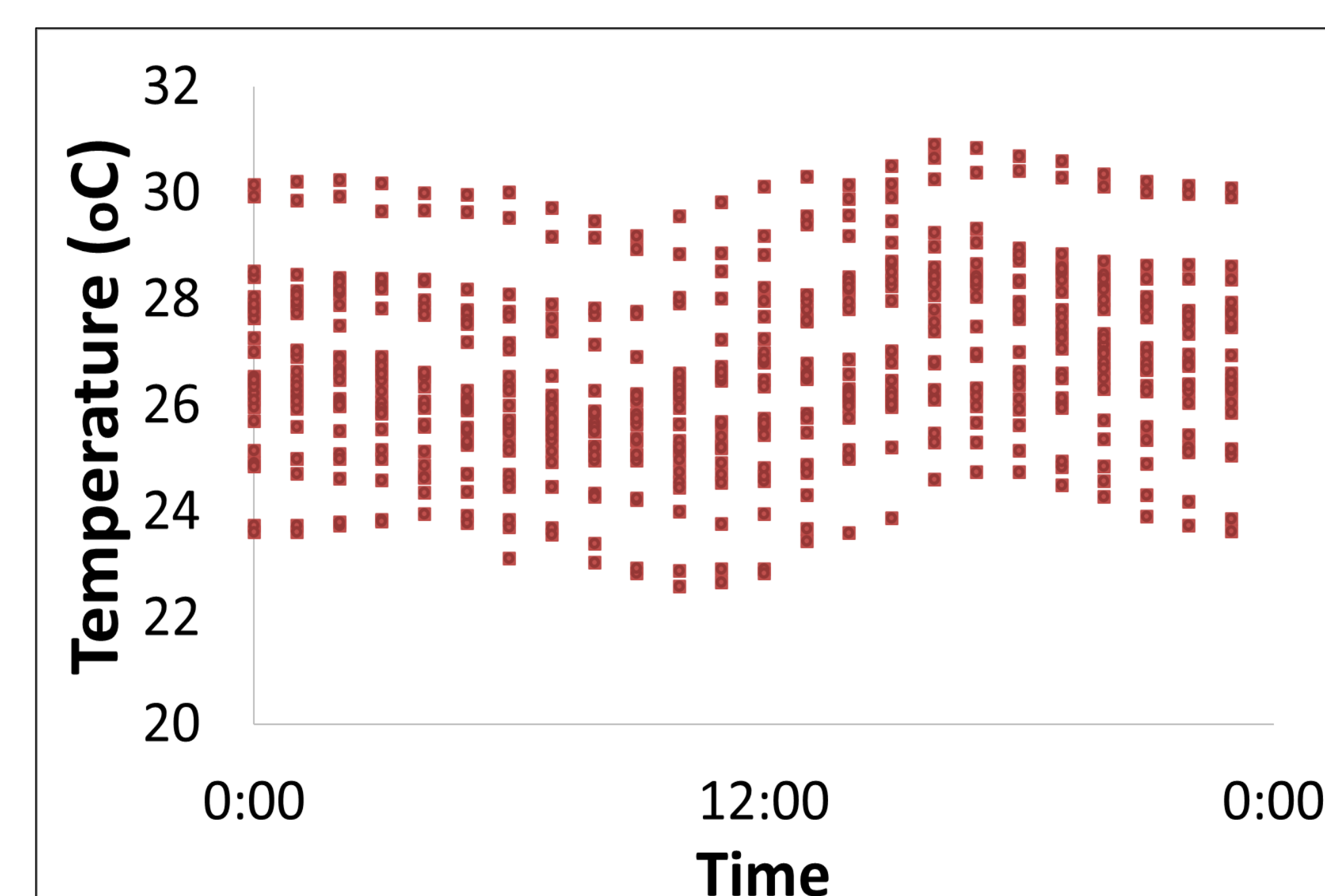


Figure 3: Water temperature measured hourly at the head of Wequetequock Cove in August 2017.

Results

- DO concentrations are low in mornings due to oxygen consumption by ecosystem components (Figure 1).
- DO can reach levels detrimental to aquatic animals.
- DO concentrations peak during the day, reaching levels due to production by plants and algae.
- Wind speeds peak in daytime, when oxygen is typically highest (Figure 2).
- Temperature peaks in daytime, when oxygen is highest (Figure 3).

Conclusions

- Dissolved oxygen concentrations fluctuate on a diurnal cycle due to photosynthesis and respiration.
- Low oxygen at night results from consumption by ecosystem components, including Cladophora.
- Wind and temperature do not directly explain the large diurnal changes in oxygen.

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