

# Temperature data recorded using HOBO Pendant MX2201 loggers deployed at 14 sites in Tomales Bay and Bodega Harbor during August 2019

**Website:** <https://www.bco-dmo.org/dataset/924671>

**Data Type:** Other Field Results

**Version:** 1

**Version Date:** 2024-04-09

## Project

» [Using genomics to link traits to ecosystem function in the eelgrass \*Zostera marina\*](#) (ZosteraEcoGenomics)

Contributors	Affiliation	Role
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## Abstract

To record water temperature, we deployed HOBO Pendant MX2201 loggers (fastened to PVC pipe) in the area from the 14 sites in Tomales and Bodega Harbors from which we collected genetic samples. The pipe was driven into the sediment until the logger was approximately <15 centimeters (cm) above the sediment surface, positioned to rarely be emersed except during low spring tides. We recorded water temperature at 15-minute intervals during a two-week period at all sites from 16 August to 29 August in 2019.

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## Coverage

**Location:** Tomales Bay and Bodega Harbor in California

**Spatial Extent:** N:38.3334 E:-122.846 S:38.105 W:-123.06

**Temporal Extent:** 2019-08-16 - 2019-08-29

## Methods & Sampling

To record water temperature, we deployed HOBO Pendant MX2201 loggers (fastened to PVC pipe) in the area at each of the sites from which we collected genetic samples. The pipe was driven into the sediment until the logger was approximately <15 centimeters above the sediment surface, positioned to rarely be emersed except during low spring tides. We recorded water temperature at 15-minute intervals during a two-week period at all sites from 16 August to 29 August in 2019.

## BCO-DMO Processing Description

- Added column "Site" to the "Metadata" sheet of original file "temperature\_data\_shared\_dates.xlsx" to create a site list.

- Imported both sheets of original file "temperature\_data\_shared\_dates.xlsx" into the BCO-DMO system.
- Used 'Unpivot' processor to create a column for Site name.
- Joined the site latitude and longitude from the site list to the primary data file.
- Corrected typo in one site name (changed "Beachg" to "Beach" in "Doran Beach").
- Converted the local date/time field to ISO8601 format.
- Created a second column for date/time in UTC time zone.
- Sorted data by site name, then date/time.
- Saved the final file as "924671\_v1\_tomales\_bodega\_temp.csv".

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## Related Publications

Schiebelhut, L. M., Grosberg, R. K., Stachowicz, J. J., & Bay, R. A. (2023). Genomic responses to parallel temperature gradients in the eelgrass *Zostera marina* in adjacent bays. *Molecular Ecology*, 32(11), 2835–2849. Portico. <https://doi.org/10.1111/mec.16899>  
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## Related Datasets

### IsRelatedTo

Schiebelhut, L., Grosberg, R., Stachowicz, J. J., & Bay, R. (2023). *Data and code associated with: Genomic responses to parallel selection in the eelgrass *Zostera marina* in adjacent bays* (Version 7) [Data set]. Dryad. <https://doi.org/10.6071/M3DD4F>

Stachowicz, J. J. (2024) **Sample collection information and sequence accessions at the National Center for Biotechnology Information (NCBI) for whole genome sequencing of eelgrass (*Zostera marina*) collected at Bodega and Tomales Bay, CA, USA from July to September 2019.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2024-04-10 <http://lod.bco-dmo.org/id/dataset/924786> [[view at BCO-DMO](#)]

*Relationship Description: These datasets were collected concurrently as part of a study of parallel genomic adaptation of *Zostera marina* in northern California estuaries published in Scheibelhut, et al. (2023).*

Stachowicz, J. J. (2024) **Shoot measurements (sheath length and width) for the eelgrass (*Zostera marina*) shoots sampled for whole genome sequencing collected from Bodega and Tomales Bay, CA, USA from July to September 2019.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2024-04-10 <http://lod.bco-dmo.org/id/dataset/924808> [[view at BCO-DMO](#)]

*Relationship Description: These datasets were collected concurrently as part of a study of parallel genomic adaptation of *Zostera marina* in northern California estuaries published in Scheibelhut, et al. (2023).*

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## Parameters

Parameter	Description	Units
site	Name of the sampling site	unitless
Latitude	Latitude of the sampling site	decimal degrees
Longitude	Longitude of the sampling site	decimal degrees
ISO_DateTime_PDT	Date and time (PDT) in ISO 8601 format	unitless
ISO_DateTime_UTC	Date and time (UTC) in ISO 8601 format	unitless
temp	Temperature	degrees Celsius

## Instruments

<b>Dataset-specific Instrument Name</b>	HOBO Pendant MX2201 loggers (Onset, Bourne MA)
<b>Generic Instrument Name</b>	Onset HOBO Pendant MX2201 temperature logger
<b>Generic Instrument Description</b>	The Onset HOBO MX2201 is an in-situ instrument for wet or underwater applications. It supports soil temperature, temperature, and water temperature. A one-channel logger that records up to approximately 96,000 measurements or internal logger events with 8K bytes memory. It has a polypropylene housing case. Uses Bluetooth to transmit data. Can be used with a solar radiation shield. Measurement range: -20 deg C to 70 deg C. Accuracy: +/- 0.50 deg C from 0 deg C to 50 deg C. Water depth rating: 30.5 m

## Project Information

### Using genomics to link traits to ecosystem function in the eelgrass *Zostera marina* (ZosteraEcoGenomics)

**Coverage:** In *Zostera marina* beds worldwide, including western and eastern margins of both the Atlantic and Pacific Oceans. Project centered in Bodega Bay, CA 38.31 N; 123.059 W

#### *NSF Award Abstract:*

Seagrass ecosystems provide important services to coastal regions, including primary production, carbon storage, nutrient cycling, habitat for fisheries species, and erosion control. At the same time, eelgrass is threatened by direct destruction, pollution, and other human impacts on the environment. We know that genetic diversity in eelgrass enhances seagrass bed growth and persistence, but application of this knowledge to restoration and conservation is limited. This work will guide restoration programs by considering what specific aspects of diversity are important to conservation and restoration of seagrass ecosystems, helping to guide the selection of source material to improve restoration success (which is often low). The project integrates the effects of multiple components of diversity and clarifies the extent to which genetic and ecological uniqueness can predict ecosystem functions.

**Intellectual Merit:** Genetic diversity as measured by the number of genetically distinct individuals (genets) in an assemblage influences critical ecosystem functions in a wide range of ecosystems. Functional diversity, the presence of key traits, or population flexibility to respond to environmental change are all potential mechanisms underlying these patterns, but distinguishing among them requires a clear link between genetic diversity and the phenotypes present in an assemblage. The investigators, and others, have previously demonstrated that genet diversity in eelgrass (*Zostera marina*) increases stand productivity, animal community diversity, and resilience to environmental change. These genet diversity effects are associated with increases in genetically determined trait diversity. Predicting trait diversity without having to measure traits of every genet remains a major barrier to wider application of functional diversity approaches in restoration and management. In this project, the investigators assess the association between Single Nucleotide Polymorphisms (SNPs) across the genome and performance-related traits that we will measure at the individual, population, and seascape-scale. They also assess environmental correlates of trait differentiation from field sampling. Finally, the research team will compare the predictive power of genomic SNP diversity versus other metrics of intraspecific diversity for the functioning (productivity, invertebrate abundance) of field planted eelgrass assemblages. If genomic variation can reliably be used to predict functional traits, then the value of genomic sequencing efforts for informing management will be greatly enhanced. **Broader Impacts:** Seagrass restoration and mitigation is

currently of major interest in California and elsewhere and the project results will inform current initiatives regarding eelgrass management in California through the state's Ocean Protection Council. In addition to recruiting individual students from diverse backgrounds to work on the project, the project broadens participation of students in STEM fields through its partnership with three existing outreach/training programs at UC Davis.

This award reflects NSF's statutory mission and has been deemed worthy of support through evaluation using the Foundation's intellectual merit and broader impacts review criteria.

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## Funding

Funding Source	Award
<a href="#">NSF Division of Ocean Sciences (NSF OCE)</a>	<a href="#">OCE-1829976</a>

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