Datasets: Bivalve biomonitoring data sets from Tijuana River Estuary, Los Peñasquitos Lagoon, and San Diego Bay

This document provides detailed information about nine datasets that were generated through a Collaborative Research project titled *Habitat Heartbeats: Incorporating Bivalve Biosensors into Estuary Monitoring Infrastructure*. This webpage provides information about the project. The project was supported by the National Estuarine Research Reserve System (NERRS) Science Collaborative, which is funded by the National Oceanic and Atmospheric Administration. All Science Collaborative supported projects that collect new data adhere to federal data sharing and archiving requirements.

About the Associated Project

Project page: https://nerrssciencecollaborative.org/project/LMiller2021
Grant Type: Collaborative Research
Focus Area(s): Application of SWMP Data, Water Quality
Keyword(s): monitoring, water quality, biosentinels
Reserve(s): Tijuana River, CA
Project Duration: October 2021 - March 2025
Grant Amount: $591,349.00

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Project Description
Southern California's estuaries can experience large swings in water quality due to events like freshwater inflow, sewage spills, and estuary mouth closures. The Tijuana River NERR (TRNERR) monitors several estuaries in San Diego County to better understand how biological communities respond to changes in water quality. While this biological monitoring produces detailed, high-quality data, the labor associated with this monitoring is significant and imposes limits on the frequency of monitoring. Regional partners, including the TRNERR, California State Parks, and the Coastal Conservancy, expressed a need for improved monitoring techniques to detect when water quality conditions threaten the biotic community. Automated monitoring of biological communities could provide real-time feedback about biological response to changes in water quality while reducing the frequency of in-person monitoring.

Through an iterative process with TRNERR and other users, this project team co-developed a biosensor monitoring system that uses shellfish (oysters and mussels) as biosentinels. Alongside state and local land managers and other wetland and aquaculture professionals, the team designed an open-source electronic sensor that attaches to shellfish and monitors gaping behavior and heart rate. These metrics that can be used as indicators of physiological stress in response to environmental changes. The team deployed shellfish outfitted with these sensors in three field locations in San Diego. The deployed shellfish provided a real-time data stream of gaping behavior and heart rate, associated with a variety of changing water quality conditions, including frequent salinity and oxygen fluctuations in Tijuana River Estuary and mouth closure events in Los Peñasquitos Lagoon. Periods of low salinity associated with rainfall or possible sewage outflows in Tijuana River were accompanied by group closures of shells and lower heart rates, and similar patterns were observed for periods when dissolved oxygen was now.

The project demonstrated the successful design and deployment of a low-cost, long-duration biosensor system. Ongoing refinement of this open-source hardware and software will help enhance monitoring capacity in Southern California, allowing for targeted deployments of biosentinels in the short term as well as their incorporation into routine long-term monitoring. The real time data stream provided by biosentinels will help managers adapt to changing conditions and inform decision making for events like estuary mouth closure and sewage spills. The biosensor system also holds potential value to other coastal areas and sectors, for example, long-term biosentinel performance data can inform siting for aquaculture or living shoreline projects.

Overview of Datasets

Nine datasets are described in this document:

- **Dataset 1: Tijuana River mussel shell gape data 2025-02 to 2025-04**
  Records of shell opening and closing behavior for *Mytilus galloprovincialis* mussels deployed on a mooring in Tijuana River Estuary. Available at Zenodo via the following link: https://doi.org/10.5281/zenodo.15548966

- **Dataset 2: Tijuana River mussel heart rate estimates 2025-02 to 2025-04**
  Heart rate estimates for *Mytilus galloprovincialis* mussels deployed on a mooring in Tijuana River Estuary. Available at Zenodo via the following link: https://doi.org/10.5281/zenodo.15549056

- **Dataset 3: Dissolved oxygen data for Tijuana River Estuary Boca Rio site, 2025-02 to 2025-04**
  Dissolved oxygen and temperature data collected from a surface mooring and near-bottom mooring in the Tijuana River Estuary. Available at Zenodo via the following link: https://doi.org/10.5281/zenodo.15532720

- **Dataset 4: FLUPSY bivalve heart rate data, San Diego Bay, 2024-01 to 2024-12**
  Estimates of heart rate for *Mytilus galloprovincialis* mussels and *Magallana [Crassostrea] gigas* oysters deployed in San Diego Bay. Available at Zenodo via the following link: https://doi.org/10.5281/zenodo.15549839

- **Dataset 5: FLUPSY bivalve shell gape data, San Diego Bay, 2024-01 to 2024-12**
  Estimates of shell opening and closing for *Mytilus galloprovincialis* mussels and *Magallana [Crassostrea] gigas* oysters deployed in San Diego Bay. Available at Zenodo via the following link: https://doi.org/10.5281/zenodo.15549937

- **Dataset 6: FLUPSY dissolved oxygen and temperature data, 2024-01 to 2025-04**
  Dissolved oxygen and water temperature data for two depths in Tuna Harbor, San Diego Bay. Available at Zenodo via the following link: https://doi.org/10.5281/zenodo.15557794

- **Dataset 7: Los Peñasquitos Lagoon bivalve heart rate estimates 2024-10 to 2025-05**
  Estimates of heart rate for *Mytilus galloprovincialis* mussels and *Magallana [Crassostrea] gigas* oysters deployed in Los Peñasquitos Lagoon, San Diego. Available at Zenodo via the following link: https://doi.org/10.5281/zenodo.15550435

- **Dataset 8: Los Peñasquitos Lagoon bivalve shell gape data 2024-10 to 2025-05**
  Estimates of shell opening for *Mytilus galloprovincialis* mussels and *Magallana [Crassostrea] gigas* oysters deployed in Los Peñasquitos Lagoon, San Diego. Available at Zenodo via the following link: https://doi.org/10.5281/zenodo.15551033

- **Dataset 9: Los Peñasquitos Lagoon bivalve shell gape data 2023-02 to 2024-01**
  Estimates of shell opening for *Magallana [Crassostrea] gigas* oysters deployed in Los Peñasquitos Lagoon, San Diego. Available at Zenodo via the following link: https://doi.org/10.5281/zenodo.15557937

Project Datasets: Bivalve biomonitoring data sets from Tijuana River Estuary, Los Peñasquitos Lagoon, and San Diego Bay

Questions about these datasets can be directed to:

Luke Miller, San Diego State University, luke.miller@sdsu.edu

About the Project Datasets

Detailed dataset descriptions are provided below.

Dataset 1: Tijuana River mussel shell gape data 2025-02 to 2025-04

Data overview:
Records of shell opening and closing behavior for *Mytilus galloprovincialis* mussels deployed on a mooring in Tijuana River Estuary.

More about the data:
Groups of Mytilus galloprovincialis mussels obtained from the Tijuana River Estuary at the Boca Rio site were outfitted with Hall effect sensors and a magnet, glued to the exterior of the shell near the shell valve margin, in order to record opening and closing of the shell valves. A floating mooring was deployed at the Boca Rio site on 2025-02-25 near the center of the channel. A group of mussels was suspended from the underside of the mooring float approximately 5cm beneath the water surface. A second group of mussels was suspended from the line near the channel bottom, approximately 50 cm above the benthos. Shell valve gaping values were recorded as raw sensor counts from the analog-to-digital converter of the data logger, and those raw counts were subsequently converted into an estimate of proportional shell opening, scaled as a percentage between 0 (fully closed) and 100 (fully open), for each individual mussel. The deployment ended on 2025-04-30. Most of the mussels died during the course of the deployment, so data collected after death have been converted to NA values during the quality-checking process.

Keywords:
Mytilus californianus, shell opening, valve gape, Tijuana River Estuary, Boca Rio

Data collection period:
2025-02 to 2025-04

Geographic extent:
Tijuana River Estuary, Boca Rio site: 32.559557891521855, -117.12912940705345

File format:
csv – comma separated values

File name(s):
[1] "TJ_Bottom_gape_Mytilus_galloprovincialis_TJ0924_04white_red.csv"
[2] "TJ_Bottom_gape_Mytilus_galloprovincialis_TJ0924_05white_orange.csv"
[3] "TJ_Bottom_gape_Mytilus_galloprovincialis_TJ0924_06white_yellow.csv"
[4] "TJ_Bottom_gape_Mytilus_galloprovincialis_TJ0924_07white_green.csv"
[5] "TJ_Bottom_gape_Mytilus_galloprovincialis_TJ0924_08white_blue.csv"
[6] "TJ_Bottom_gape_Mytilus_galloprovincialis_TJ0924_09white_purple.csv"
[7] "TJ_Bottom_gape_Mytilus_galloprovincialis_TJ0924_11blue_orange.csv"
[8] "TJ_Surface_gape_Mytilus_galloprovincialis_TJ0124_21orange.csv"

[9] "TJ_Surface_gape_Mytilus_galloprovincialis_TJ0124_22yellow.csv"
[10] "TJ_Surface_gape_Mytilus_galloprovincialis_TJ0124_23green.csv"
[11] "TJ_Surface_gape_Mytilus_galloprovincialis_TJ0124_24purple.csv"
[12] "TJ_Surface_gape_Mytilus_galloprovincialis_TJ0124_25brown.csv"
[13] "TJ_Surface_gape_Mytilus_galloprovincialis_TJ0924_01red.csv"
[14] "TJ_Surface_gape_Mytilus_galloprovincialis_TJ0924_02blue.csv"
[15] "TJ_Surface_gape_Mytilus_galloprovincialis_TJ0924_03white.csv"

Data access and archival:
This dataset is publicly available at the following link: https://doi.org/10.5281/zenodo.15548966

Maps and schematics for data collection:

Dataset 2: Tijuana River mussel heart rate estimates 2025-02 to 2025-04

Data overview:
Heart rate estimates for *Mytilus galloprovincialis* mussels deployed on a mooring in Tijuana River Estuary

More about the data:
Groups of Mytilus galloprovincialis mussels obtained from the Tijuana River Estuary at the Boca Rio site were outfitted with a MAX30101 pulse oximeter, glued to the exterior of the shell near the shell valve margin, in order to record opening movement of the heart using reflected infrared light. A floating mooring was deployed at the Boca Rio site on 2025-02-25 near the center of the channel. A group of mussels was suspended from the line near the channel bottom, approximately 50 cm above the benthos. Heart movement was recorded, and those raw values were subsequently converted into an estimate of heart rate in beats per minute. The deployment ended on 2025-04-30. Most of the mussels died during the course of the deployment, so data collected after death have been converted to NA values during the quality-checking process.

Keywords:
Mytilus californianus, heart rate, Tijuana River Estuary, Boca Rio

Data collection period:
2025-02 to 2025-04

Geographic extent:
Tijuana River Estuary, Boca Rio site: 32.559557891521855, -117.12912940705345

File format:
csv – comma separated values

File name(s):
[1] "Bottom_SN26_Sensor1IR_20250220-20250430_bpm.csv"
[2] "Bottom_SN26_Sensor2IR_20250220-20250430_bpm.csv"
[3] "Bottom_SN26_Sensor3IR_20250220-20250430_bpm.csv"
[4] "Bottom_SN26_Sensor4IR_20250220-20250430_bpm.csv"
[5] "Bottom_SN26_Sensor5IR_20250220-20250430_bpm.csv"
[6] "Bottom_SN26_Sensor6IR_20250220-20250430_bpm.csv"
[7] "Bottom_SN26_Sensor7IR_20250220-20250430_bpm.csv"
[8] "Bottom_SN26_Sensor8IR_20250220-20250430_bpm.csv"

Data access and archival:
This dataset is publicly available at the following link: https://doi.org/10.5281/zenodo.15549056

Dataset 3: Dissolved oxygen data for Tijuana River Estuary Boca Rio site, 2025-02 to 2025-04

Data overview:
Dissolved oxygen and temperature data collected from a surface mooring and near-bottom mooring in the Tijuana River Estuary

More about the data:
Dissolved oxygen and water temperature data are provided from two sensor locations on a floating mooring deployed in the center of the estuary channel at the Boca Rio site in Tijuana River National Estuarine Research Reserve, for the period 2025-02-25 to 2025-04-30. Data were collected using MiniDOT sensor from Precision Measurement Engineering.

Keywords:
Dissolved oxygen, water temperature, Tijuana River Estuary

Data collection period:
2025-02 to 2025-04

Geographic extent:
Tijuana River Estuary, Boca Rio site: 32.559557891521855, -117.12912940705345

File format:
csv – comma separated values

File name(s):
TJ_BOTTOM_MINIDOT_20250225-20250501.csv
TJ_SURFACE_MINIDOT_20250225-20250501.csv

Data access and archival:
This dataset is publicly available at the following link: https://doi.org/10.5281/zenodo.15532720

1.

Dataset 4: FLUPSY bivalve heart rate data, San Diego Bay, 2024-01 to 2024-12

Data overview:
Estimates of heart rate for *Mytilus galloprovincialis* mussels and *Magallana [Crassostrea] gigas* oysters deployed in San Diego Bay

More about the data:
Groups of *Mytilus galloprovincialis* mussels and *Magallana [Crassostrea] gigas* oysters obtained from San Diego Bay at the Tuna Harbor site were outfitted with a MAX30101 pulse oximeter, glued to the exterior of the shell near the shell valve margin, in order to record movement of the heart using reflected infrared light. Groups of mussels and oysters were suspended on rope lines from the FLUPSY (floating upwelling system) at a depth of 30 cm (surface group) and 4 meters (bottom group). The surface deployment began on 2024-01-02 and remained active through 2024-12-19. The bottom deployment began on 2024-05-08 and remained active through 2024-10-18. The raw recorded values from the infrared sensor were subsequently converted into an estimate of heart rate in beats per minute.

Keywords:
Mytilus californianus, Magallana gigas, Pacific oyster, Bay mussel, heart rate, San Diego Bay

Data collection period:
2024-01 to 2024-12

Geographic extent:
San Diego Bay, Tuna Harbor, FLUPSY site: 32.71035896908462, -117.17380560841141

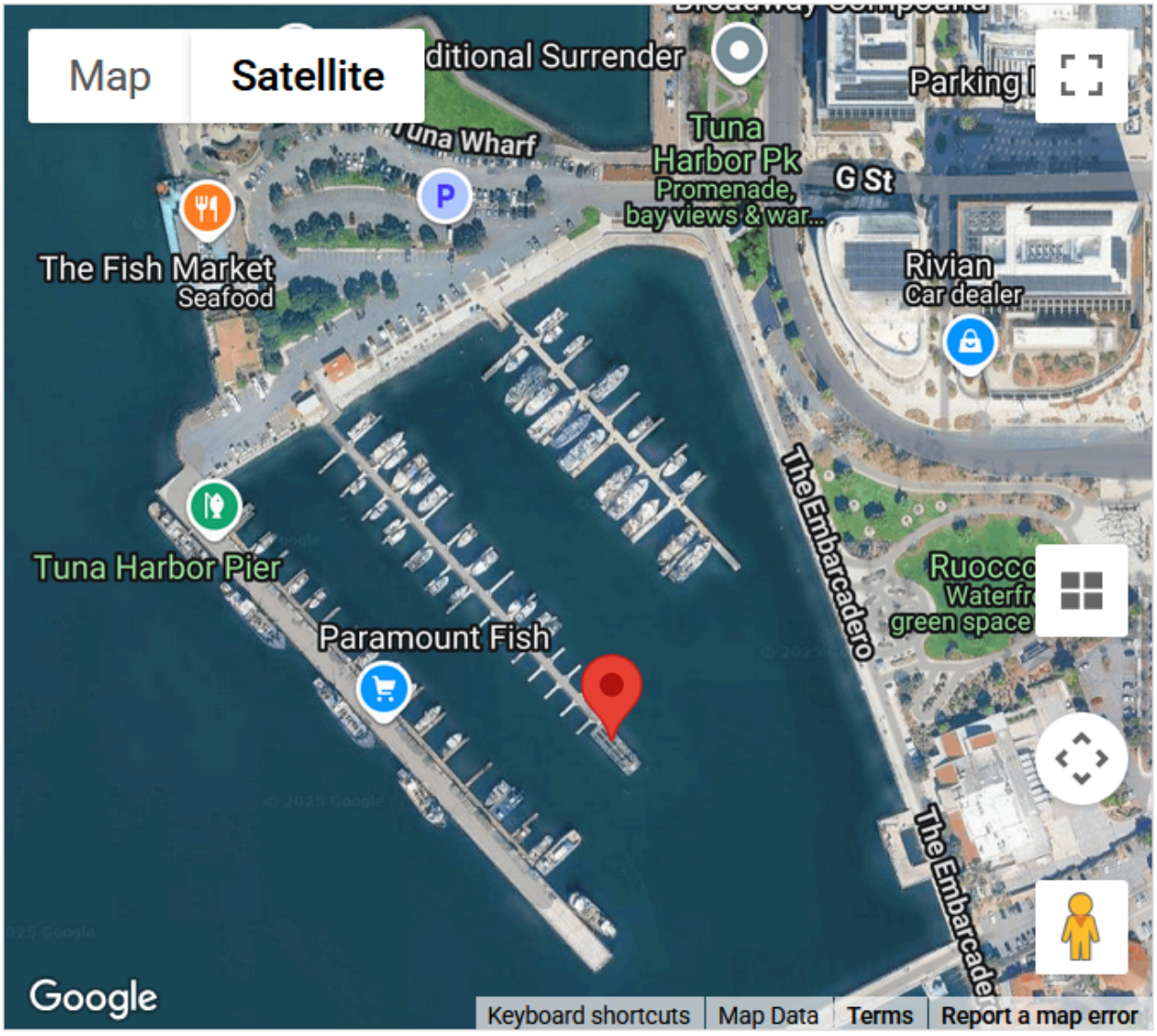
File format:
csv – comma separated values

File name(s):
[1] "Bottom_SN14_Sensor1IR_20240508-20240603_bpm.csv"
[2] "Bottom_SN14_Sensor2IR_20240508-20241018_bpm.csv"
[3] "Bottom_SN14_Sensor3IR_20240508-20241018_bpm.csv"
[4] "Bottom_SN14_Sensor4IR_20240508-20241018_bpm.csv"
[5] "Bottom_SN14_Sensor5IR_20240508-20241018_bpm.csv"
[6] "Bottom_SN14_Sensor6IR_20240508-20241018_bpm.csv"
[7] "Bottom_SN14_Sensor7IR_20240508-20241018_bpm.csv"
[8] "Bottom_SN14_Sensor8IR_20240508-20241018_bpm.csv"
[9] "Surface_SN13_Sensor1IR_20240102-20241219_bpm.csv"
[10] "Surface_SN13_Sensor2IR_20240102-20241219_bpm.csv"
[11] "Surface_SN13_Sensor3IR_20240102-20241219_bpm.csv"
[12] "Surface_SN13_Sensor4IR_20240102-20241219_bpm.csv"
[13] "Surface_SN13_Sensor5IR_20240102-20241219_bpm.csv"
[14] "Surface_SN13_Sensor6IR_20240102-20241219_bpm.csv"
[15] "Surface_SN13_Sensor7IR_20240102-20241219_bpm.csv"

[16] "Surface_SN13_Sensor8IR_20240102-20241219_bpm.csv"

Data access and archival:
This dataset is publicly available at the following link: https://doi.org/10.5281/zenodo.15549839

Maps and schematics for data collection:



Dataset 5: FLUPSY bivalve shell gape data, San Diego Bay, 2024-01 to 2024-12

Data overview:
Estimates of shell opening and closing for *Mytilus galloprovincialis* mussels and *Magallana [Crassostrea] gigas* oysters deployed in San Diego Bay

More about the data:
Mytilus galloprovincialis mussels and Magallana [Crassostrea] gigas oysters were obtained from Tuna Harbor in San Diego Bay. A Hall effect sensor and magnet were attached to the exterior of the shell at the posterior end of the shell margin. Raw data were recorded on an 8-channel data logger as voltage read by an analog-to-digital converter and recorded as counts. The raw gape values were quality checked and then converted into a 0-100 percent scale where 0 represents a fully-closed shell and 100 represents the widest opening observed during the observation period. The animals were deployed on hanging lines off the side of the FLUPSY (floating upwelling system) docked at Tuna Harbor, on the bay-side of the platform. A group of mussels and oysters was suspended near the surface at a depth of 30 centimeters, from 2024-01 through 2025-05. A second group of mussels and oysters was suspended near the bottom on a 4 meter line from 2024-05 through 2025-05.

Keywords:
Mytilus californianus, Magallana gigas, Pacific oyster, Bay mussel, valve gape, shell opening, San Diego Bay

Data collection period:
2024-01 to 2024-12

Geographic extent:
San Diego Bay, Tuna Harbor, FLUPSY site: 32.71035896908462, -117.17380560841141

File format:
csv – comma separated values

File name(s):
[1] "FLUPSY_2024-2025_gape_metadata.csv"
[2] "FLUPSY_BOTTOM_2024-2025_Crassostrea_gigas_Oyster-FLUPSY1223_13bluewhite.csv"
[3] "FLUPSY_BOTTOM_2024-2025_Crassostrea_gigas_Oyster-FLUPSY1223_14purplewhite.csv"
[4] "FLUPSY_BOTTOM_2024-2025_Crassostrea_gigas_Oyster-FLUPSY1223_15brownwhite.csv"
[5] "FLUPSY_BOTTOM_2024-2025_Crassostrea_gigas_Oyster-FLUPSY1223_16redblue.csv"
[6] "FLUPSY_BOTTOM_2024-2025_Mytilus_galloprovincialis_Mytilus-FLUPSY1223_05blue.csv"
[7]"FLUPSY_BOTTOM_2024-2025_Mytilus_galloprovincialis_Mytilus-FLUPSY1223_06purple.csv"
[8] "FLUPSY_BOTTOM_2024-2025_Mytilus_galloprovincialis_Mytilus-FLUPSY1223_07white.csv"
[9]"FLUPSY_BOTTOM_2024-2025_Mytilus_galloprovincialis_Mytilus-FLUPSY1223_08brown.csv"
[10] "FLUPSY_SURFACE_2024-2025_Crassostrea_gigas_Oyster-FLUPSY1223_09red.csv"
[11] "FLUPSY_SURFACE_2024-2025_Crassostrea_gigas_Oyster-FLUPSY1223_10orange.csv"
[12] "FLUPSY_SURFACE_2024-2025_Crassostrea_gigas_Oyster-FLUPSY1223_11yellow.csv"

[13] "FLUPSY_SURFACE_2024-2025_Crassostrea_gigas_Oyster-FLUPSY1223_12green.csv"
[14]"FLUPSY_SURFACE_2024-2025_Mytilus_galloprovincialis_Mytilus-FLUPSY1223_01redwhite.csv"
[15]"FLUPSY_SURFACE_2024-2025_Mytilus_galloprovincialis_Mytilus-FLUPSY1223_02orangewhite.csv"
[16]"FLUPSY_SURFACE_2024-2025_Mytilus_galloprovincialis_Mytilus-FLUPSY1223_03yellowwhite.csv"
[17]"FLUPSY_SURFACE_2024-2025_Mytilus_galloprovincialis_Mytilus-FLUPSY1223_04greenwhite.csv"
[18]"FLUPSY_SURFACE_2024-2025_Mytilus_galloprovincialis_Mytilus-FLUPSY1223_17greenwhite.csv"

Data access and archival:

This dataset is publicly available at the following link: https://doi.org/10.5281/zenodo.15549937

Dataset 6: FLUPSY dissolved oxygen and temperature data, 2024-01 to 2025-04

Data overview:
Dissolved oxygen and water temperature data for two depths in Tuna Harbor, San Diego Bay

More about the data:
Dissolved oxygen and water temperature data are provided from two sensor locations on hanging rope lines from the FLUPSY (floating upwelling system) platform docked at Tuna Harbor, San Diego Bay, off the bay-side of platform. The Surface sensor was hung from a line at a depth of 30 cm below the water surface. The Bottom sensor was suspended from the mooring line near the bottom at a depth of approximately 4 meters. Data were collected using MiniDOT sensor from Precision Measurement Engineering.

Keywords:
Dissolved oxygen, water temperature, San Diego Bay

Data collection period:
2024-01 to 2025-04

Geographic extent:
San Diego Bay, Tuna Harbor, FLUPSY site: 32.71035896908462, -117.17380560841141

File format:
csv – comma separated values

File name(s):
[1] "FLUPSY_Bottom_DO_20240508-20250415.csv"
[2] "FLUPSY_Surface_DO_20240102-20250123.csv"

Data access and archival:
This dataset is publicly available at the following link: https://doi.org/10.5281/zenodo.15557794

Dataset 7: Los Peñasquitos Lagoon bivalve heart rate estimates 2024-10 to 2025-05

Data overview:
Estimates of heart rate for *Mytilus galloprovincialis* mussels and *Magallana [Crassostrea] gigas* oysters deployed in Los Peñasquitos Lagoon, San Diego.

More about the data:
Groups of Mytilus galloprovincialis mussels and Magallana [Crassostrea] gigas oysters obtained from Los Penasquitos Lagoon near the railroad bridge were outfitted with a MAX30101 pulse oximeter, glued to the exterior of the shell over the approximate location of the heart, in order to record opening movement of the heart using reflected infrared light. A floating mooring was deployed in Los Penasquitos Lagoon southwest of the railroad bridge on 2024-10-08 near the center of the channel. A group of mussels and oysters was suspended from the line near the channel bottom, approximately 50 cm above the benthos. A second group of mussels and oysters was suspended from the underside of the surface float at a depth of approximately 5 centimeters. Heart movement was recorded, and those raw values were subsequently converted into an estimate of heart rate in beats per minute. The deployment continued through 2025-05.

Keywords:
Mytilus californianus, Magallana gigas, Pacific oyster, Bay mussel, valve gape, shell opening, Los Penasquitos Lagoon

Data collection period:
2024-10 to 2025-05

Geographic extent:
Los Peñasquitos Lagoon, southwest of railroad bridge: 32.93333365465921, -117.25723500294248

File format:
csv – comma separated values

File name(s):
[1] "LPL_202410_BOTTOM_Crassostrea_gigas_LPL0624_13bluewhite.csv"
[2] "LPL_202410_BOTTOM_Crassostrea_gigas_LPL0624_14purplewhite.csv"
[3] "LPL_202410_BOTTOM_Crassostrea_gigas_LPL0624_15brownwhite.csv"
[4] "LPL_202410_BOTTOM_Crassostrea_gigas_LPL0624_16bluered.csv"
[5] "LPL_202410_BOTTOM_Mytilus_galloprovincialis_LPL0624_05blue.csv"
[6] "LPL_202410_BOTTOM_Mytilus_galloprovincialis_LPL0624_06purple.csv"
[7] "LPL_202410_BOTTOM_Mytilus_galloprovincialis_LPL0624_07white.csv"
[8] "LPL_202410_BOTTOM_Mytilus_galloprovincialis_LPL0624_08brown.csv"
[9] "LPL_202410_gape_metadata.csv"
[10] "LPL_202410_SURFACE_Crassostrea_gigas_LPL0624_09redwhite.csv"
[11] "LPL_202410_SURFACE_Crassostrea_gigas_LPL0624_10orangewhite.csv"
[12] "LPL_202410_SURFACE_Crassostrea_gigas_LPL0624_11yellowwhite.csv"

[13] "LPL_202410_SURFACE_Crassostrea_gigas_LPL0624_12greenwhite.csv"
[14] "LPL_202410_SURFACE_Mytilus_galloprovincialis_LPL0624_01red.csv"
[15] "LPL_202410_SURFACE_Mytilus_galloprovincialis_LPL0624_02orange.csv"
[16] "LPL_202410_SURFACE_Mytilus_galloprovincialis_LPL0624_03yellow.csv"
[17] "LPL_202410_SURFACE_Mytilus_galloprovincialis_LPL0624_04green.csv"

Data access and archival:
This dataset is publicly available at the following link: https://doi.org/10.5281/zenodo.15550435

Maps and schematics for data collection:

Dataset 8: Los Peñasquitos Lagoon bivalve shell gape data 2024-10 to 2025-05

Data overview:
Estimates of shell opening for *Mytilus galloprovincialis* mussels and *Magallana [Crassostrea] gigas* oysters deployed in Los Peñasquitos Lagoon, San Diego.

More about the data:
Groups of Mytilus galloprovincialis mussels and Crassostrea gigas oysters obtained from the Los Penasquitos Lagoon near the railroad bridge were outfitted with Hall effect sensors and a magnet, glued to the exterior of the shell near the shell valve margin, in order to record opening and closing of the shell valves. A floating mooring was deployed in Los Penasquitos Lagoon southwest of the railroad bridge, near the center of the channel. A group of mussels and oysters was suspended from the underside of the mooring float approximately 5cm beneath the water surface. A second group of mussels and oysters was suspended from the line near the channel bottom, approximately 50 cm above the benthos. Shell valve gaping values were recorded as raw sensor counts from the analog-to-digital converter of the data logger, and those raw counts were subsequently converted into an estimate of proportional shell opening, scaled as a percentage between 0 (fully closed) and 100 (fully open), for each individual mussel.

Keywords:
Mytilus californianus, Magallana gigas, Pacific oyster, Bay mussel, heart rate, Los Penasquitos Lagoon

Data collection period:
2024-10 to 2025-05

Geographic extent:
Los Peñasquitos Lagoon, southwest of railroad bridge: 32.93333365465921, -117.25723500294248

File format:
csv – comma separated values

File name(s):
[1] "LPL_202410_BOTTOM_Crassostrea_gigas_LPL0624_13bluewhite.csv"
[2] "LPL_202410_BOTTOM_Crassostrea_gigas_LPL0624_14purplewhite.csv"
[3] "LPL_202410_BOTTOM_Crassostrea_gigas_LPL0624_15brownwhite.csv"
[4] "LPL_202410_BOTTOM_Crassostrea_gigas_LPL0624_16bluered.csv"
[5] "LPL_202410_BOTTOM_Mytilus_galloprovincialis_LPL0624_05blue.csv"
[6] "LPL_202410_BOTTOM_Mytilus_galloprovincialis_LPL0624_06purple.csv"
[7] "LPL_202410_BOTTOM_Mytilus_galloprovincialis_LPL0624_07white.csv"
[8] "LPL_202410_BOTTOM_Mytilus_galloprovincialis_LPL0624_08brown.csv"
[9] "LPL_202410_gape_metadata.csv"
[10] "LPL_202410_SURFACE_Crassostrea_gigas_LPL0624_09redwhite.csv"
[11] "LPL_202410_SURFACE_Crassostrea_gigas_LPL0624_10orangewhite.csv"

[12] "LPL_202410_SURFACE_Crassostrea_gigas_LPL0624_11yellowwhite.csv"
[13] "LPL_202410_SURFACE_Crassostrea_gigas_LPL0624_12greenwhite.csv"
[14] "LPL_202410_SURFACE_Mytilus_galloprovincialis_LPL0624_01red.csv"
[15] "LPL_202410_SURFACE_Mytilus_galloprovincialis_LPL0624_02orange.csv"
[16] "LPL_202410_SURFACE_Mytilus_galloprovincialis_LPL0624_03yellow.csv"
[17] "LPL_202410_SURFACE_Mytilus_galloprovincialis_LPL0624_04green.csv"

Data access and archival:
This dataset is publicly available at the following link: https://doi.org/10.5281/zenodo.15551033

Dataset 9: Los Peñasquitos Lagoon bivalve shell gape data 2023-02 to 2024-01

Data overview:
Estimates of shell opening for *Magallana [Crassostrea] gigas* oysters deployed in Los Peñasquitos Lagoon, San Diego.

More about the data:
Groups of Magallana [Crassostrea] gigas oysters obtained from the Los Penasquitos Lagoon near the railroad bridge were outfitted with Hall effect sensors and a magnet, glued to the exterior of the shell near the shell valve margin, in order to record opening and closing of the shell valves. A floating mooring was deployed in Los Penasquitos Lagoon southwest of the railroad bridge, near the center of the channel. A group of oysters, and later Mytilus galloprovincialis mussels, was suspended from the underside of the mooring float approximately 5cm beneath the water surface. A second group of oysters, and later Mytilus galloprovincialis mussels, was suspended from the line near the channel bottom, approximately 50 cm above the benthos. Shell valve gaping values were recorded as raw sensor counts from the analog-to-digital converter of the data logger, and those raw counts were subsequently converted into an estimate of proportional shell opening, scaled as a percentage between 0 (fully closed) and 100 (fully open), for each individual animal. Only the oysters returned usable data from this deployment, so no Mytilus galloprovincialis data are included in this archive.

Keywords:
Magallana gigas, Pacific oyster, heart rate, Los Penasquitos Lagoon

Data collection period: 2023-02 to 2024-01

Geographic extent:
Los Peñasquitos Lagoon, southwest of railroad bridge: 32.93333365465921, -117.25723500294248

File format:
csv – comma separated values

File name(s):
[1] "LPL_202302_BOTTOM_Cgigas_Oyster11.csv"
[2] "LPL_202302_BOTTOM_Cgigas_Oyster12.csv"
[3] "LPL_202302_BOTTOM_Cgigas_Oyster13.csv"
[4] "LPL_202302_BOTTOM_Cgigas_Oyster14.csv"
[5] "LPL_202302_BOTTOM_Cgigas_Oyster15.csv"
[6] "LPL_202302_BOTTOM_Cgigas_Oyster16.csv"
[7] "LPL_202302_BOTTOM_Cgigas_Oyster17.csv"
[8] "LPL_202302_BOTTOM_Cgigas_Oyster18.csv"
[9] "LPL_202302_SURFACE_Cgigas_Oyster1.csv"
[10] "LPL_202302_SURFACE_Cgigas_Oyster2.csv"
[11] "LPL_202302_SURFACE_Cgigas_Oyster3.csv"

[12] "LPL_202302_SURFACE_Cgigas_Oyster4.csv"
[13] "LPL_202302_SURFACE_Cgigas_Oyster5.csv"
[14] "LPL_202302_SURFACE_Cgigas_Oyster6.csv"
[15] "LPL_202302_SURFACE_Cgigas_Oyster7.csv"
[16] "LPL_202302_SURFACE_Cgigas_Oyster8.csv"
[17] "LPL_gape_metadata_2023.csv"

Data access and archival

This dataset is publicly available at the following link: https://doi.org/10.5281/zenodo.15557937