UNIVERSITY OF CALIFORNIA SCRIPPS INSTITUTION OF OCEANOGRAPHY

data report

SURFACE WATER TEMPERATURES AND
SALINITIES AT SHORE STATIONS

California – United States

2021

SIO Reference
September 2022

UNIVERSITY OF CALIFORNIA, SAN DIEGO
SCRIPPS INSTITUTION OF OCEANOGRAPHY
LA JOLLA, CALIFORNIA 92093-0218

SURFACE WATER TEMPERATURES AND SALINITIES AT SHORE STATIONS
Including five-meter temperatures and salinities at Scripps Pier

California - United States

2021

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J. A. McGowan, E. Terrill, and R. E. Flick

SIO Reference
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INTRODUCTION

This report presents temperature and salinity data observed during 2021 at shoreline stations along the California coast from La Jolla to Trinidad. The data consist of daily temperature and salinity values when available with monthly means and ranges based on these observations. The data are also shown in plots, along with a climatological mean calculated from all the available historical data at each location.

This program is made possible through the cooperation of many groups and individuals who collect samples, process data, and provide financial support. Various agencies and individuals volunteer to make daily observations that are sent to the Coastal Ocean Observing Laboratory, Integrative Oceanography Division, Scripps Institution of Oceanography (SIO), for the preparation of this data report and to update computer records of the historical shore stations database. The agencies are: University of California at San Diego, University of California at Davis, Stanford University, Cal Poly Humboldt, Harbor Patrol for the City of Santa Barbara, Point Blue Conservation Science, Los Angeles County, the cities of Santa Barbara, San Clemente, and Newport Beach, California. Prior to 1994, financial support for data processing was provided by the State of California through SIO (1916-1949), then through the Marine Life Research Group at SIO (1949-1993). Starting in 1989, partial support was provided by both the State of California through the Marine Life Research Group (SIO) and the National Oceanic and Atmospheric Administration through the National Ocean Survey (1989-1993). Support for data processing was provided by the Joint Institute for Marine Observations, a cooperative agreement between SIO and the National Oceanic and Atmospheric Administration, from 1993-1995. SIO provided funding for basic observations during a ten-year funding gap from 1995 to 2005. Since 2005, support for program management and data processing is provided by the California Department of Parks and Recreation, Natural Resources and Divisions of Boating and Waterways.

Daily temperature values are collected by hand using an insulated bucket at 0.5 m from the ocean surface. Immediately after collection, a calibrated digital thermometer is immersed in the water and allowed to stabilize before recording to 0.01° C. Temperature measurements are rounded to 0.1° C and reported with data quality flags to indicate potential observer or instrument errors. Additionally, occasional suspect extreme values may also be flagged to indicate that the value is uncertain.

Salinities from Trinidad Beach, Southeast Farallon Island, Granite Canyon, Newport Beach, San Clemente, and La Jolla are obtained from the analyses of sea water collected in glass salinity bottles supplied by SIO. Seawater samples are forwarded to SIO at the end of each month for laboratory processing of each sample to determine salt concentration by measuring electrical conductivity using a GuildLine Instruments 8410A Portasal high precision conducting salinometer. Routine calibrations of the laboratory salinometer and secondary seawater standards are performed using IAPSO P35 Standard Seawater. IAPSO P35 and secondary seawater standards of known salt concentration are used as a reference for accurate determination of salinity. Salinities are reported to hundredths of a part per thousand based on the Practical Salinity Scale (PSS-78). Values of maximum salinities may possibly be in error due to evaporation or contamination of the samples, and may be flagged with a data quality flag to indicate a leaky bottle or uncertainty.

Reported salinities exceeding 34 PSU may represent freshly upwelled water, or they may be due to faulty sampling techniques, or to loosely sealed sample bottles. Salinity data are also compared to local rainfall data sets, available through the National Oceanic and Atmospheric Administration, National Climatic Data Center, to verify low salinity values. Generally, salinities less than 33 PSU are due to local precipitation or freshwater runoff. All salinities higher than 35 PSU have been omitted.

Data quality checks include elimination of gross errors and transcription errors, inclusion of calibration data, and verification of range and precision limits (0.1° C for temperature and 0.01 PSU for salinity). The data quality assurance and control routines are employed on a monthly basis for temperature data and on a quarterly basis for salinity. Data flags are employed to indicate data quality issues for archived temperature and salinity. Data flags are defined as follows: 0 = good, 1= illegible entry, 2 = information on datasheet differs from salinity bottle label, 3 = uncertain, 4 = leaky bottle, 5 = sample collected as part of the SIO Pier Chlorophyll Program, 6 = data collected at slightly different location than normal.

The year's daily observations are shown on a parameter-versus-time plot for each station and parameter. Data flagged with 1, 3, and 4 are not included in any computations or plots. A climatological mean of all of the available daily historical data is also shown on each plot. The climatological mean for each julian day is a mean value calculated from all historical data at each location within an 11-day window, including 5 days prior and 5 days after the day of interest. Climatology is further smoothed with a 30-day running average. A table of climatological means and the current year's monthly means are presented below the plot for each station. Annual mean, maximum, minimum and percentage of days sampled and flagged are presented at the bottom of the table. Annual statistics are calculated using daily data for the year of interest. Percentage of days sampled includes all data and data flags, while days flagged represents the percentage of days with data flags of 1, 3, and 4, which are considered in error.

Data from active shore stations can be accessed online through the program website: https://shorestations.ucsd.edu. The header of each file contains a brief description of the station, data, and any long-term sampling changes.

STATION DESCRIPTIONS

The paragraphs that follow provide information about the active stations listed in geographical order as they occur from south to north. Many of the agencies and participants are volunteers, people seriously interested in the sea at their doorstep; it is these people to whom we owe the success of this long-range program, and we thank them for their help.

La Jolla, California   *32° 52.017´N, 117° 15.428´W*   Scripps Institution of Oceanography
1916-2021 (Surface)   University of California, San Diego
1926-2021 (Bottom)

   Shore Station staff take daily temperature and salinity samples from the end of the Scripps Pier at the sea surface and near the bottom at a depth of about 5 meters. The proximity of Scripps Pier to the deep waters at the head of La Jolla submarine canyon results in data quite representative of oceanic conditions. Scripps Pier is a total of 1084 ft. long (330.4 M) and 22.5 ft. wide for most of its length. However it is 46.0 ft. wide at the end where the lab/pump house structure is situated with the west wall standing 88.0 ft. from the end of the pier (=996 ft. from the shore). The orientation is 277/97 degrees magnetic, 14 degrees east variation. The deck of the pier is 33.5 ft. above Mean Low Low Water (MLLW).

San Clemente, California   *33° 25.143´N, 117° 37.262´W*   City of San Clemente
1955, 1965-2021

   Personnel of the City of San Clemente, Department of Marine Safety take daily temperature and salinity samples from the San Clemente pier. Salinity samples are returned to Scripps once a month for analysis by salinometer. This station was established to take over the temperature monitoring of this section of the coast from the old Dana Point station (1955-1970), and the site is so similar that the long record for this area is still preserved.

Newport Beach, California   *33° 36.402´N, 117° 54.812´W*   City of Newport Beach
1924-2021

   City of Newport Beach lifeguards take daily temperature and salinity samples from the Newport Beach Pier, and return them to Scripps once a month for analysis. The waters surrounding the Newport Pier are located about two miles from the mouth of the Santa Ana River. Analysis of these salinity samples indicates that they reflect oceanic conditions except during winter storms when the salinity is strongly affected by runoff from the river. During the first half of this century, these data were recorded predominantly from the Balboa Pier, which is located just 1.7 miles southeast of the Newport Pier. For the last several decades, however, the data has been collected almost exclusively from the Newport Pier. These 2 pier stations are so similar that the data collected from either location are consistent with the long-term record.

Point Dume, Zuma Beach California   *34° 01.075´N, 118° 49.637´W*   Los Angeles County
1956-2021

   To reduce the effects of solar warming on the waters near the beach, water temperatures are taken in the surf early each morning by the Los Angeles County Lifeguards at Zuma Beach County Park. Temperatures at this site west of Point Dume, are therefore thought to be representative of nearshore waters.
Santa Barbara, California   *34° 24.232´N, 119° 41.567´W*   City of Santa Barbara

1955-2021

Each morning Santa Barbara Harbor Patrol personnel record the surface water temperature from their boat dock at the west end of the harbor. Exchange from tidal circulation in the harbor is high, and the sample is taken before solar warming is evident, so the recorded temperatures should be representative of coastal waters.

Granite Canyon, California   *36° 26.345´N, 121° 55.352´W*   Marine Pollution Studies Laboratory
1971-2021   University of California, Davis

Personnel of the Marine Pollution Studies Laboratory take daily temperature and salinity samples off the rocks near the water intake for the laboratory, and return the salinity samples to Scripps once a month for analysis. This sampling site is considered to be a good representation of spring-summer upwelling that is typical of the central California coast.

Pacific Grove, California   *36° 37.220´N, 121° 54.202´W*   Hopkins Marine Station
1919-39, 41-74, 77-2021   Stanford University

Staff from Stanford University's Hopkins Marine Station take daily temperature measurements from a beach on the north side of Point Cabrillo just north of their main laboratory buildings. Exposed to the northwest swell as it sweeps past Point Piños, this location is representative of coastal conditions on the south side of Monterey Bay.

Farallon Islands, California   *37° 41.787´N, 122° 59.990´W*   Point Blue Conservation Science
1925-43, 55-2021

The Farallon Islands, seven rocky islands comprising the Farallon Islands National Wildlife Refuge, are the breeding grounds for more than one-quarter of all California seabirds and home to populations of seals and sea lions. The largest seabird colony south of Alaska, this critical habitat provides protection for 12 different species, numbering more than 200,000 individuals. Historically, data was collected from North Farallon Island (1925-43); however the sampling location changed to Southeast Farallon in 1955. As a small part of their ongoing studies, Point Blue Conservation Science researchers stationed on Southeast Farallon take daily temperature and salinity samples and return the salinity samples to Scripps once a month for analysis. Because of their location 26 miles west of the Golden Gate Bridge, where they catch the full force of winter storms and the strong summer northwesters, data collection can be interrupted from time to time. The sampling site at the boat landing on the southeast side of the island is steep and rocky, so measurements are representative of the oceanic waters around the islands.

Trinidad Beach, California   *41° 03.605´N, 124° 08.940´W*   Telonicher Marine Laboratory
Trinidad Bay, California   *41° 03.345´N, 124° 08.830´W*   California Polytechnic Humboldt
1975-2021 (Beach)
1973-2021 (Bay)

Student lab technicians and staff from Cal Poly Humboldt Telonicher Marine Laboratory collect daily temperature and salinity samples from the northwest side of Trinidad State Beach which is located on the rocky headland between the Pacific Ocean and Trinidad Bay. Bay temperature is also measured from the fishing pier on the lee or southeast side of the headland and if surf conditions are too rough for Trinidad

Beach, salinity samples are collected at the bay location. Salinity samples are returned to Scripps once a month for analysis. Except during periods of heavy runoff, salinity values from the coast and the bay are nearly identical.

STATION LOCATION CHART

SIO (Surface) La Jolla, CA

2021

Climatology period
1916 – 2021
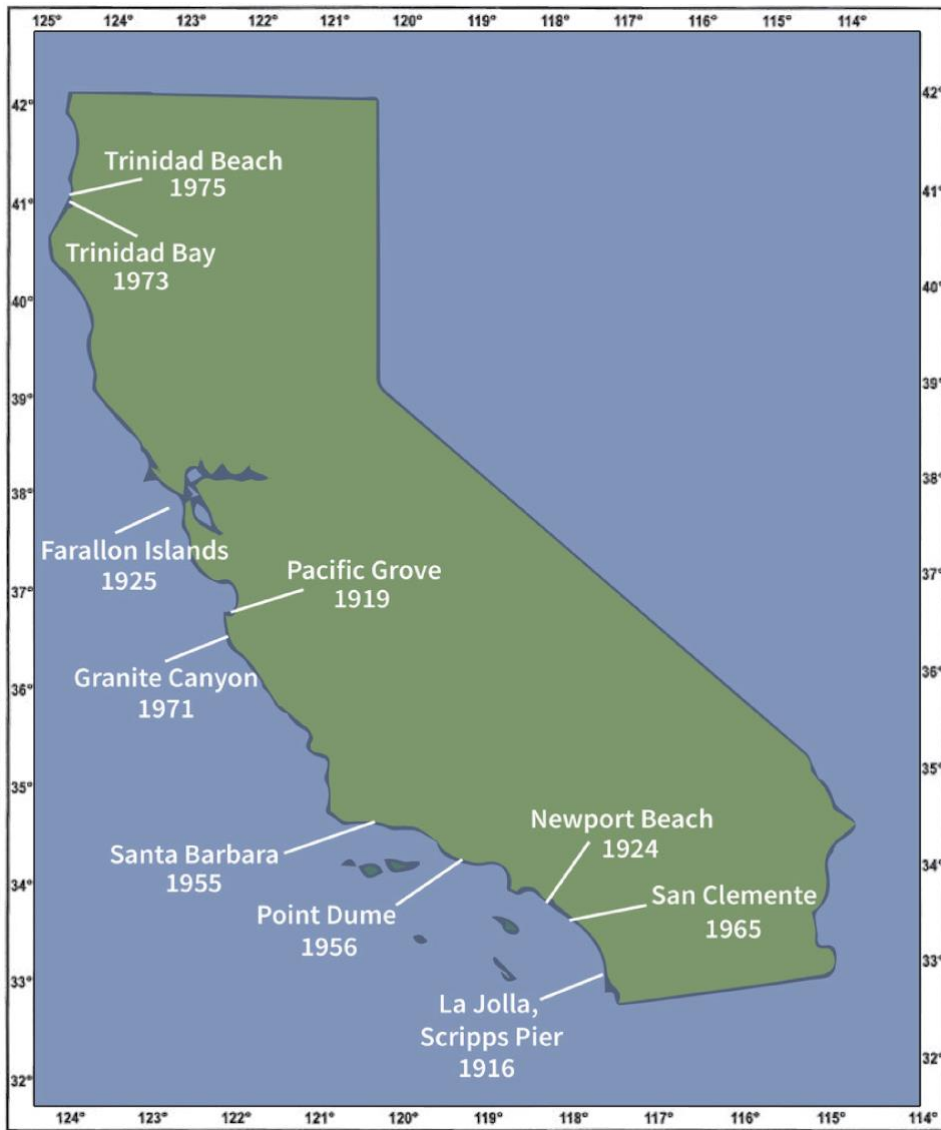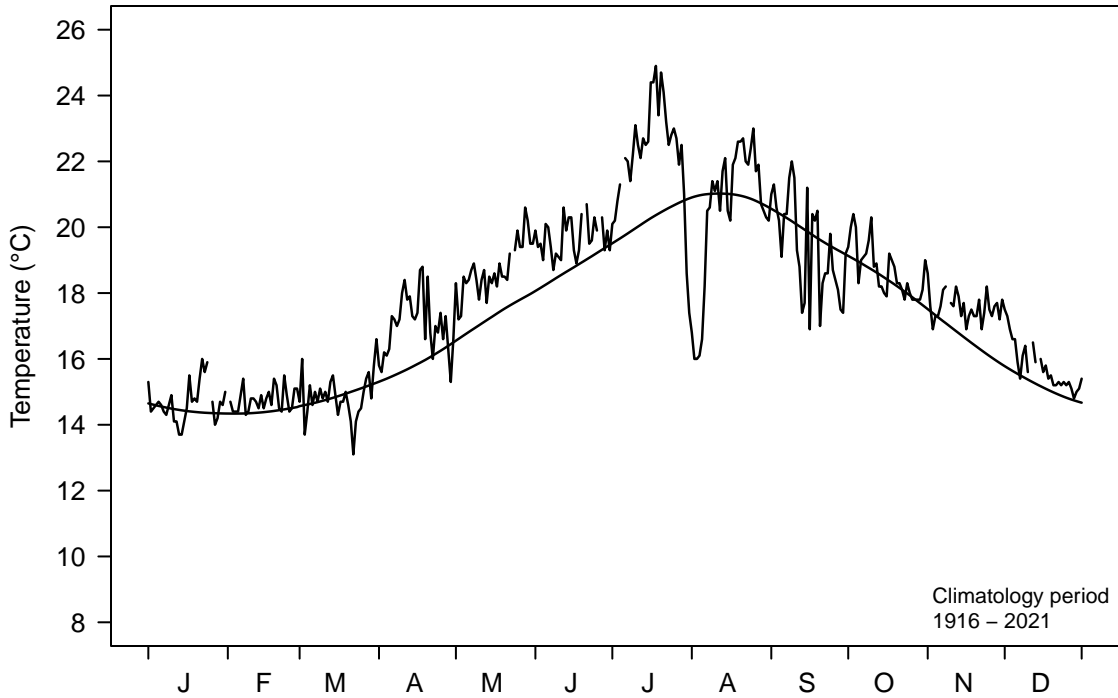
	Climatological			2021		
	Mean	Max	Min	Mean	Max	Min
Jan	14.4	18.1	11.2	14.7	16.0	13.7
Feb	14.4	19.4	10.8	14.8	15.5	14.3
Mar	14.9	20.0	10.1	14.8	16.6	13.1
Apr	15.8	22.0	11.0	17.0	18.8	15.3
May	17.3	23.0	10.8	18.7	20.6	17.2
Jun	18.8	23.7	12.7	19.7	20.7	18.7
Jul	20.3	25.8	12.9	22.2	24.9	17.4
Aug	21.0	26.4	14.2	20.5	23.0	16.0
Sep	19.8	25.7	13.9	19.4	22.0	16.9
Oct	18.4	24.4	13.5	18.7	20.4	17.8
Nov	16.6	21.1	12.5	17.6	18.6	16.9
Dec	15.1	18.9	10.6	15.8	17.5	14.8

Annual Mean
17.9

Annual Max
24.9

Annual Min
13.1

Days Sampled
356/365 (97.5%)

Days Flagged
0/365 (0.0%)

SIO (Surface) La Jolla, CA
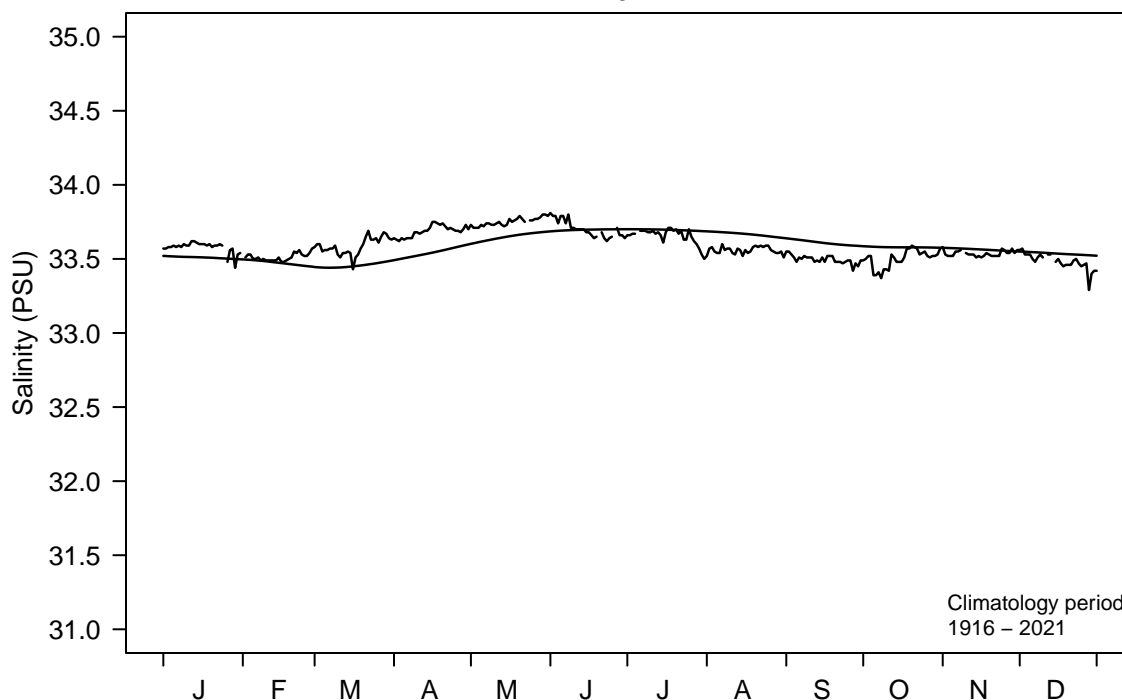
2021

	Climatological			2021		
	Mean	Max	Min	Mean	Max	Min
Jan	33.51	34.22	31.42	33.58	33.62	33.44
Feb	33.47	34.09	30.31	33.51	33.57	33.48
Mar	33.45	34.04	31.65	33.59	33.69	33.43
Apr	33.54	34.11	27.93	33.69	33.75	33.62
May	33.65	34.18	32.82	33.75	33.80	33.71
Jun	33.70	34.29	32.67	33.70	33.81	33.62
Jul	33.70	34.38	33.22	33.66	33.71	33.50
Aug	33.67	34.17	33.28	33.56	33.60	33.51
Sep	33.61	34.14	29.64	33.50	33.55	33.42
Oct	33.58	34.86	31.08	33.50	33.59	33.37
Nov	33.56	34.60	32.51	33.54	33.58	33.51
Dec	33.54	34.80	32.14	33.48	33.57	33.29

Annual Mean
33.60

Annual Max
33.80

Annual Min
33.30

Days Sampled
356/365 (97.5%)

Days Flagged
0/365 (0.0%)

SIO (Bottom) La Jolla, CA
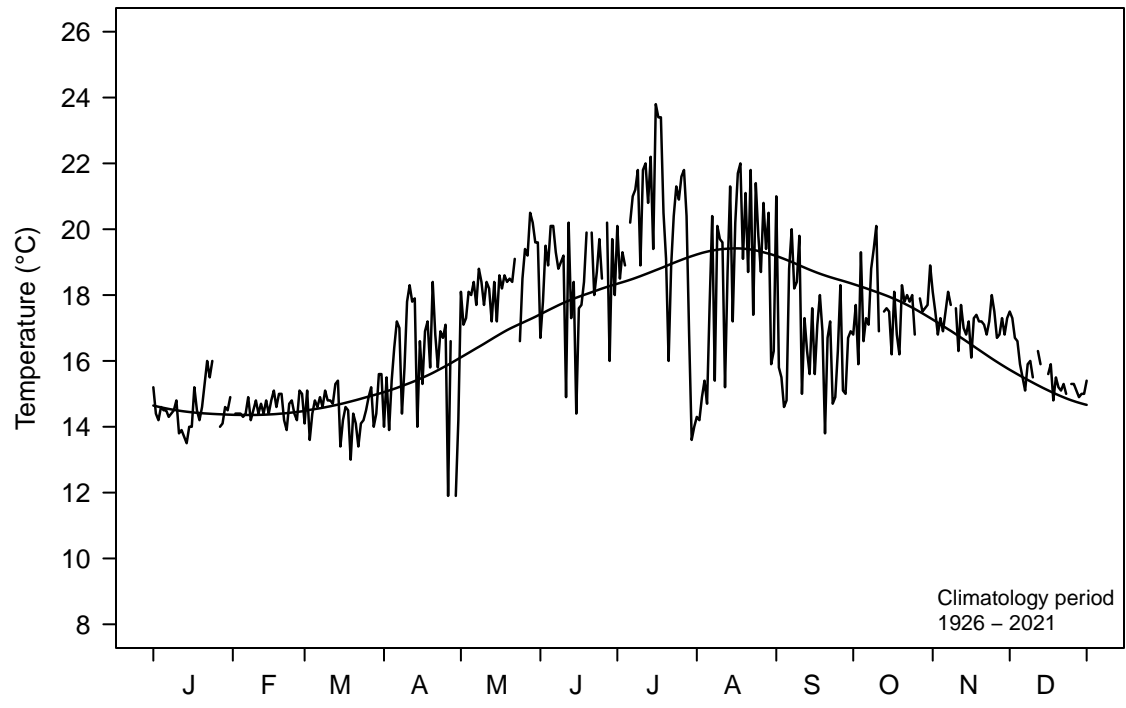
2021

	Climatological			2021		
	Mean	Max	Min	Mean	Max	Min
Jan	14.4	18.3	11.3	14.5	16.0	13.5
Feb	14.4	17.9	10.7	14.6	15.1	13.9
Mar	14.7	19.3	10.0	14.5	15.6	13.0
Apr	15.5	20.9	11.0	16.0	18.4	11.9
May	16.8	22.5	10.7	18.4	20.5	16.6
Jun	17.9	23.2	11.1	18.5	20.2	14.4
Jul	18.8	25.0	11.0	20.1	23.8	13.6
Aug	19.4	26.0	12.6	18.5	22.0	14.2
Sep	18.7	24.6	12.1	16.7	21.0	13.8
Oct	17.9	24.6	12.7	17.7	20.1	15.9
Nov	16.5	21.1	12.3	17.2	18.1	16.1
Dec	15.1	18.9	10.6	15.7	17.5	14.8

Annual Mean
16.9

Annual Max
23.8

Annual Min
11.9

Days Sampled
350/365 (95.9%)

Days Flagged
0/365 (0.0%)

SIO (Bottom) La Jolla, CA
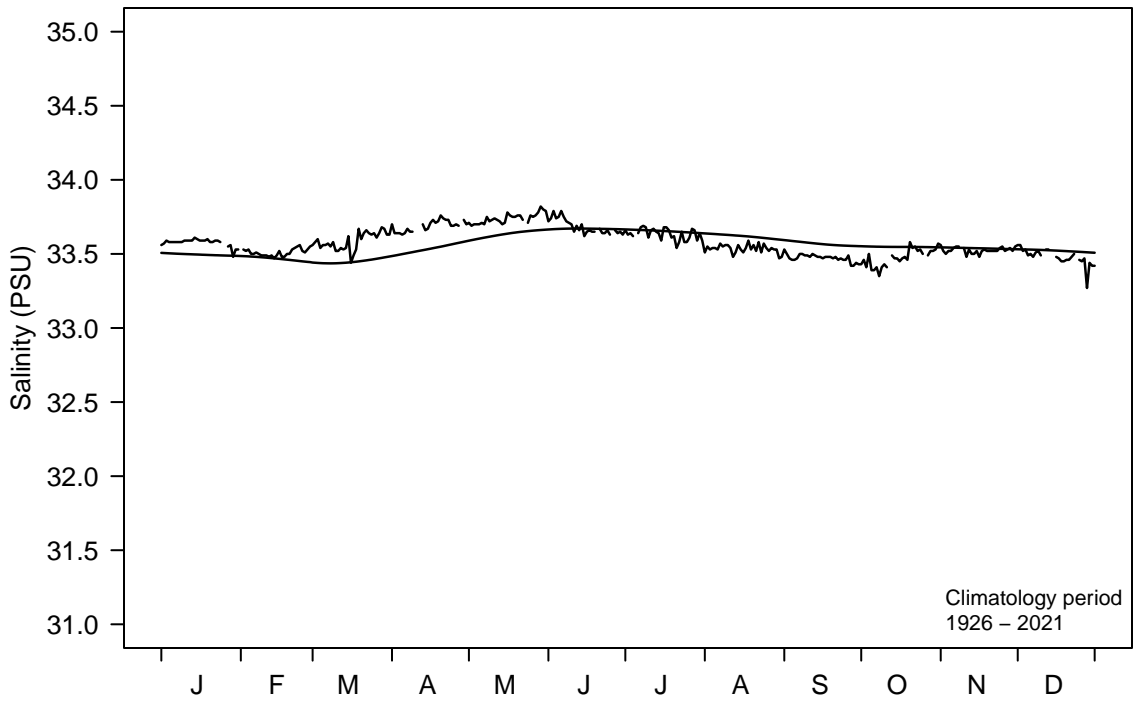
2021

	Climatological			2021		
	Mean	Max	Min	Mean	Max	Min
Jan	33.50	34.31	30.40	33.58	33.61	33.48
Feb	33.47	34.21	31.36	33.51	33.56	33.47
Mar	33.44	34.07	31.72	33.59	33.68	33.44
Apr	33.53	33.94	32.07	33.69	33.76	33.63
May	33.64	34.33	32.98	33.74	33.82	33.69
Jun	33.67	34.10	33.02	33.68	33.79	33.62
Jul	33.65	34.20	33.23	33.63	33.69	33.54
Aug	33.62	34.28	33.11	33.53	33.59	33.47
Sep	33.57	34.06	33.21	33.47	33.53	33.42
Oct	33.55	34.12	32.92	33.47	33.58	33.35
Nov	33.54	33.99	33.06	33.52	33.56	33.48
Dec	33.52	34.10	32.65	33.48	33.56	33.27

Annual Mean
33.60

Annual Max
33.80

Annual Min
33.30

Days Sampled
349/365 (95.6%)

Days Flagged
1/365 (0.3%)

San Clemente, CA

2021
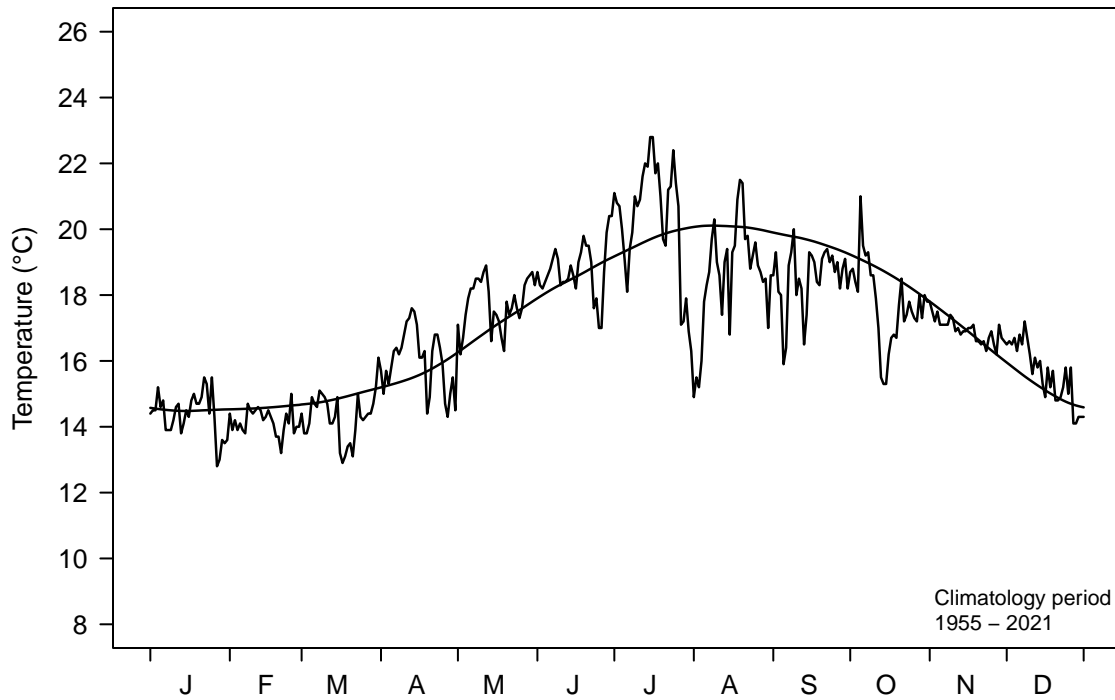
	Climatological			2021		
	Mean	Max	Min	Mean	Max	Min
Jan	14.5	17.6	10.5	14.4	15.5	12.8
Feb	14.6	17.4	10.8	14.2	15.0	13.2
Mar	14.9	18.3	9.8	14.3	16.1	12.9
Apr	15.5	20.6	10.8	16.0	17.6	14.3
May	17.1	25.4	11.0	17.7	18.9	16.2
Jun	18.5	22.8	13.5	18.8	20.4	17.0
Jul	19.7	25.1	13.0	20.3	22.8	16.3
Aug	20.1	26.2	14.0	18.6	21.5	14.9
Sep	19.7	24.7	14.3	18.5	20.0	15.9
Oct	18.6	23.1	14.0	17.7	21.0	15.3
Nov	16.9	21.6	11.8	16.9	17.8	16.2
Dec	15.1	19.5	10.6	15.6	17.2	14.1

Annual Mean   Annual Max   Annual Min
16.9   22.8   12.8

Days Sampled   Days Flagged
365/365 (100.0%)   0/365 (0.0%)

San Clemente, CA

2021
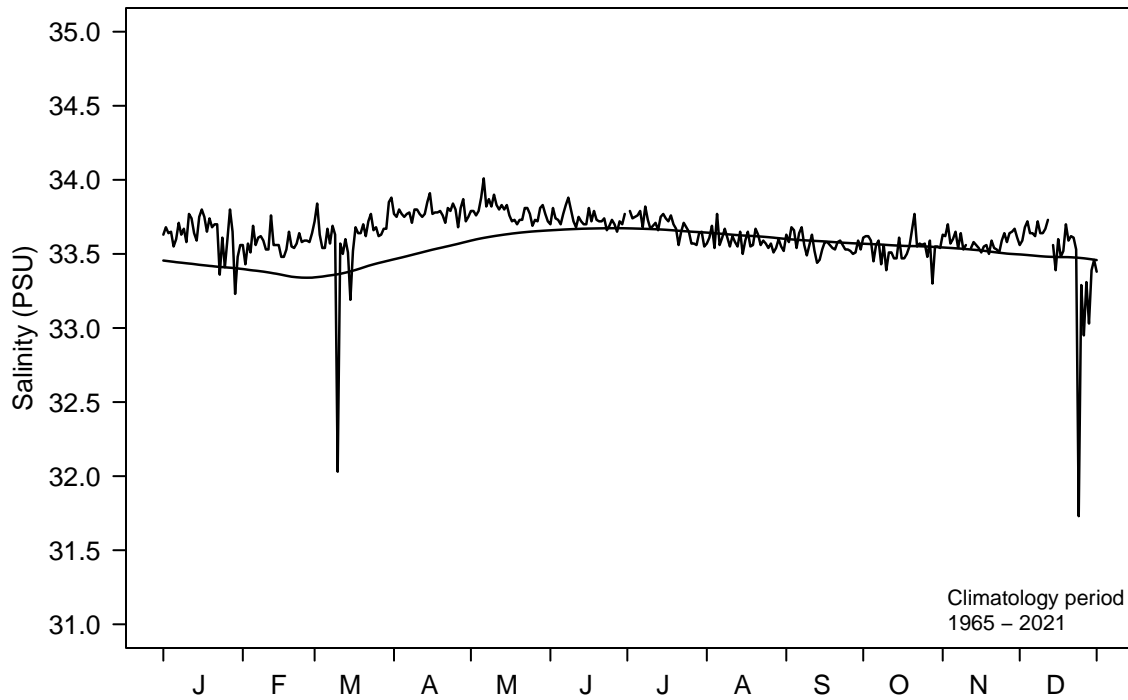
	Climatological			2021		
	Mean	Max	Min	Mean	Max	Min
Jan	33.43	34.26	27.86	33.63	33.80	33.23
Feb	33.37	34.78	22.82	33.57	33.76	33.43
Mar	33.38	34.42	19.15	33.59	33.88	32.03
Apr	33.53	34.37	30.81	33.78	33.91	33.68
May	33.64	34.52	32.67	33.79	34.01	33.69
Jun	33.67	34.72	32.77	33.74	33.88	33.65
Jul	33.66	34.53	33.00	33.69	33.82	33.55
Aug	33.62	34.89	29.71	33.59	33.77	33.50
Sep	33.59	34.61	32.68	33.56	33.68	33.44
Oct	33.55	34.69	31.77	33.54	33.77	33.30
Nov	33.52	34.23	30.06	33.58	33.70	33.50
Dec	33.48	34.11	27.45	33.47	33.73	31.73

Annual Mean
33.60

Annual Max
34.00

Annual Min
31.70

Days Sampled
365/365 (100.0%)

Days Flagged
3/365 (0.8%)

Newport Beach, CA

2021

Climatology period
1924 – 2021
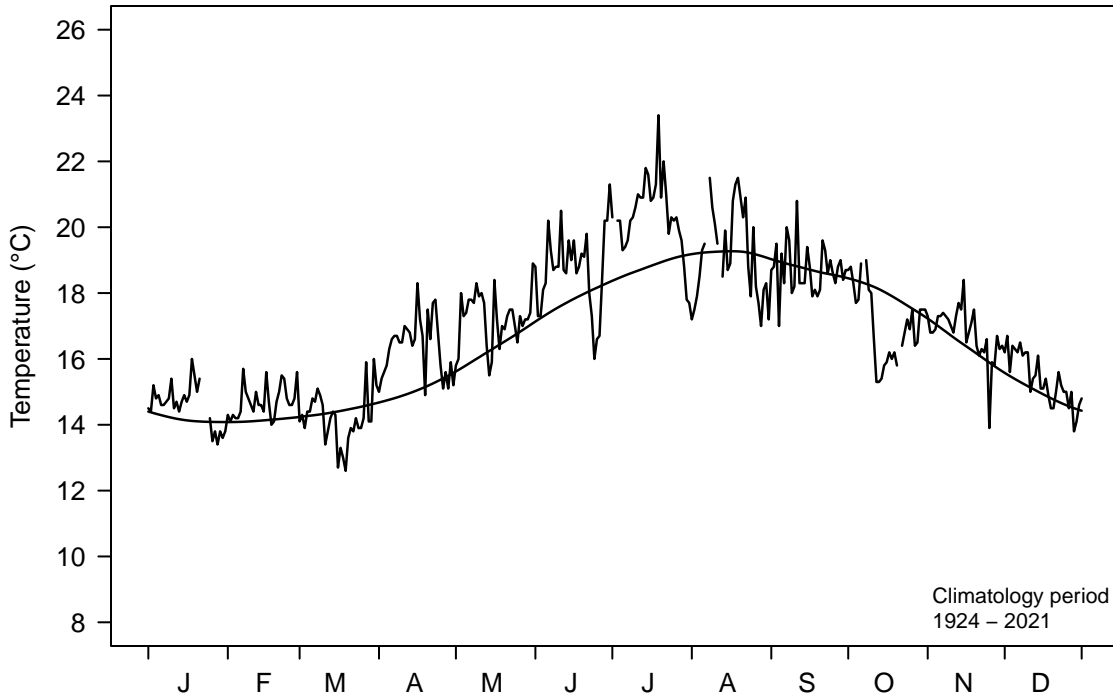
	Climatological			2021		
	Mean	Max	Min	Mean	Max	Min
Jan	14.1	17.5	10.0	14.6	16.0	13.4
Feb	14.1	18.6	10.2	14.7	15.7	14.0
Mar	14.4	18.7	9.9	14.2	16.0	12.6
Apr	15.0	19.5	10.0	16.4	18.3	14.9
May	16.3	22.5	10.4	17.2	18.9	15.5
Jun	17.8	22.9	11.5	18.7	21.3	16.0
Jul	18.8	25.0	12.0	20.4	23.4	17.7
Aug	19.3	25.2	12.3	19.2	21.5	17.0
Sep	18.7	24.1	12.2	18.7	20.8	17.0
Oct	18.0	23.3	12.2	17.0	19.0	15.3
Nov	16.4	21.1	10.2	16.8	18.4	13.9
Dec	14.9	18.7	10.6	15.4	16.7	13.8

Annual Mean
16.9

Annual Max
23.4

Annual Min
12.6

Days Sampled
359/365 (98.4%)

Days Flagged
1/365 (0.3%)

Newport Beach, CA

2021
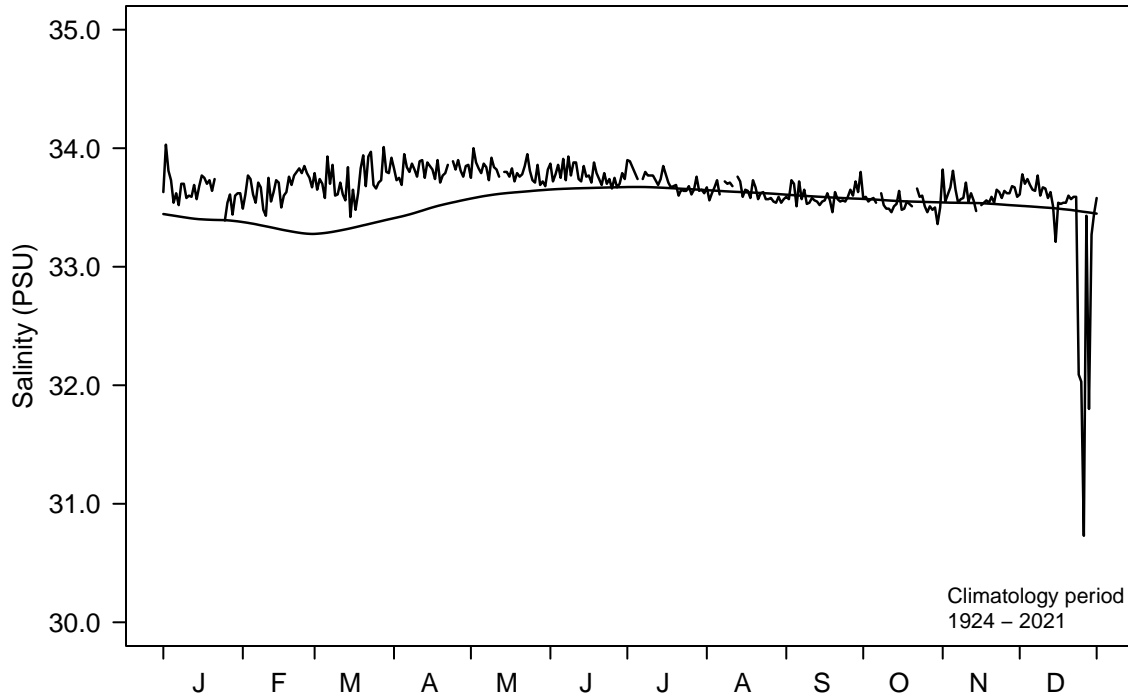
	Climatological			2021		
	Mean	Max	Min	Mean	Max	Min
Jan	33.40	34.35	23.29	33.65	34.03	33.39
Feb	33.32	34.80	15.96	33.67	33.85	33.43
Mar	33.33	34.49	22.56	33.73	34.01	33.42
Apr	33.50	34.20	26.57	33.82	33.95	33.69
May	33.62	34.89	28.28	33.80	34.00	33.68
Jun	33.66	34.45	29.51	33.78	33.93	33.66
Jul	33.67	34.68	33.17	33.72	33.90	33.60
Aug	33.63	34.55	32.21	33.63	33.76	33.54
Sep	33.59	34.87	26.76	33.60	33.80	33.46
Oct	33.55	34.81	28.27	33.53	33.66	33.36
Nov	33.54	34.36	28.41	33.61	33.82	33.47
Dec	33.49	34.43	26.71	33.33	33.78	30.73

Annual Mean
33.70

Annual Max
34.00

Annual Min
30.70

Days Sampled
356/365 (97.5%)

Days Flagged
1/365 (0.3%)

15

Point Dume, CA
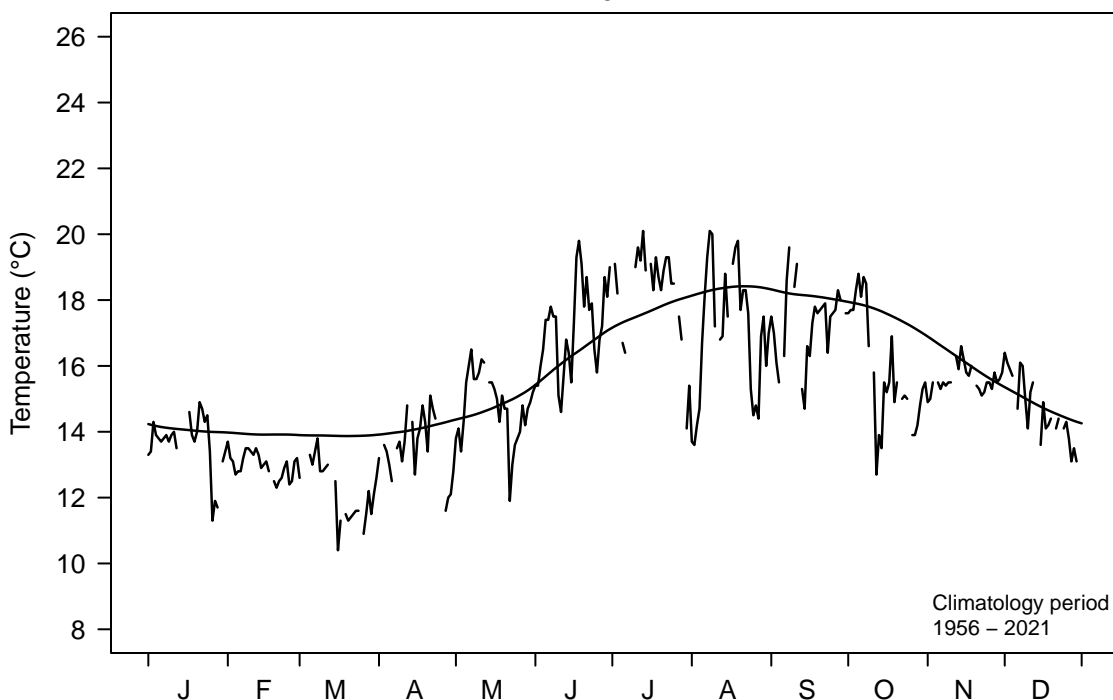
2021

	Climatological			2021		
	Mean	Max	Min	Mean	Max	Min
Jan	14.1	17.4	10.4	13.7	14.9	11.3
Feb	13.9	17.2	9.8	13.0	13.7	12.3
Mar	13.9	17.2	10.0	12.2	14.1	10.4
Apr	14.1	19.2	10.1	13.6	15.1	11.6
May	14.7	20.0	8.9	14.8	16.5	11.9
Jun	16.3	20.8	10.7	17.2	19.8	14.6
Jul	17.7	22.5	11.1	18.2	20.1	14.1
Aug	18.4	23.6	12.4	17.0	20.1	13.6
Sep	18.1	23.9	12.6	17.3	19.6	14.7
Oct	17.6	22.4	12.4	15.9	18.8	12.7
Nov	16.1	21.5	9.8	15.6	16.6	14.9
Dec	14.7	18.9	9.5	14.6	16.4	13.1

Annual Mean
15.3

Annual Max
20.1

Annual Min
10.4

Days Sampled
333/365 (91.2%)

Days Flagged
10/365 (2.7%)

Santa Barbara, CA

2021
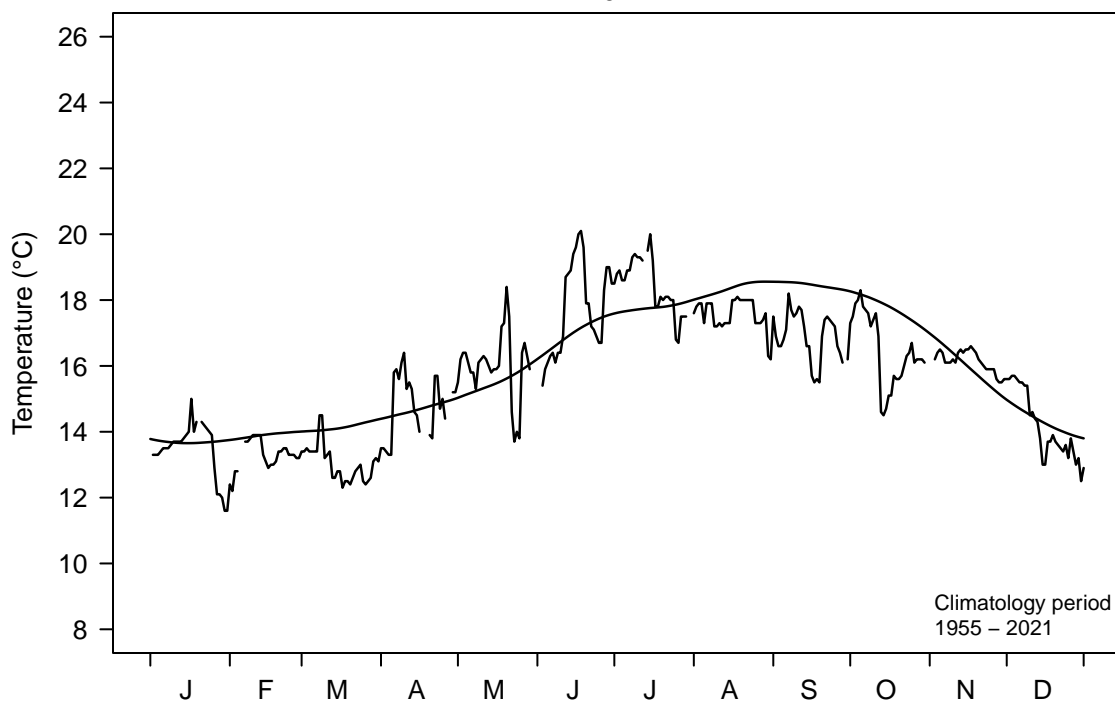
	Climatological			2021		
	Mean	Max	Min	Mean	Max	Min
Jan	13.6	17.8	10.0	13.4	15.0	11.6
Feb	13.9	17.2	10.0	13.3	13.9	12.2
Mar	14.1	18.2	10.2	13.0	14.5	12.3
Apr	14.7	18.9	10.5	14.7	16.4	13.3
May	15.5	19.4	11.1	16.0	18.4	13.7
Jun	17.0	21.6	13.2	17.7	20.1	15.4
Jul	17.8	22.2	12.7	18.4	20.0	16.7
Aug	18.4	23.4	14.3	17.6	18.1	16.2
Sep	18.5	23.2	13.6	16.9	18.2	15.5
Oct	17.8	23.2	13.9	16.5	18.3	14.5
Nov	16.0	21.0	11.5	16.1	16.6	15.5
Dec	14.3	18.5	10.1	14.2	15.7	12.5

Annual Mean
15.7

Annual Max
20.1

Annual Min
11.6

Days Sampled
351/365 (96.2%)

Days Flagged
3/365 (0.8%)

Granite Canyon, CA

2021

Climatology period
1971 – 2021
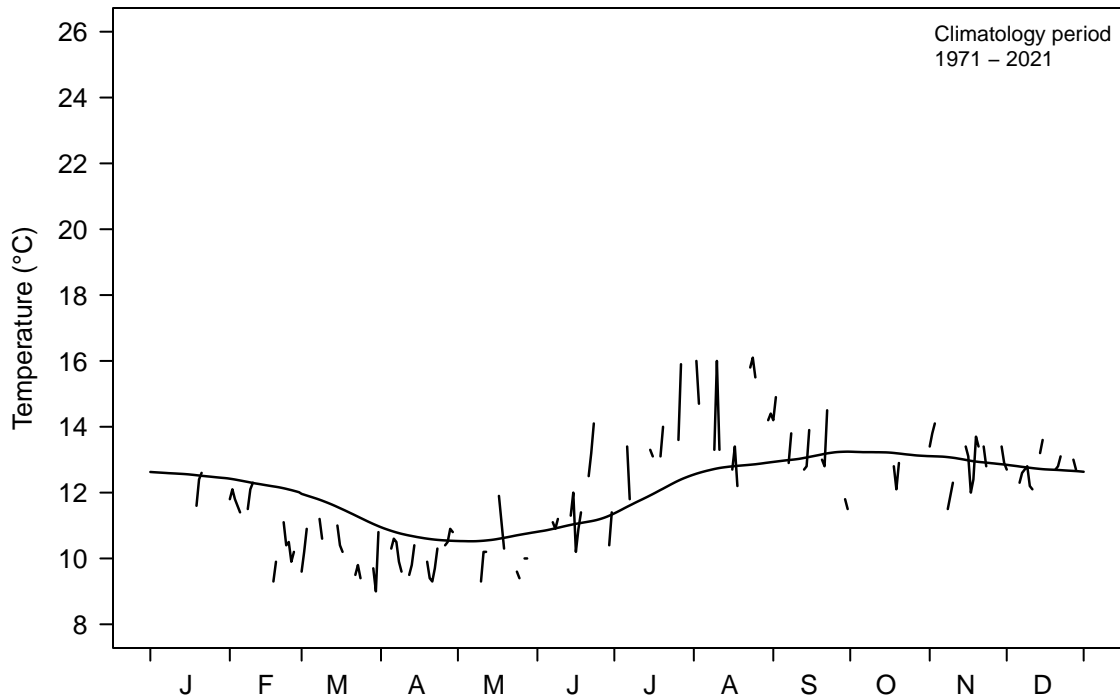
	Climatological			2021		
	Mean	Max	Min	Mean	Max	Min
Jan	12.6	15.5	9.4	12.3	13.3	11.6
Feb	12.3	15.2	8.4	11.0	12.3	9.3
Mar	11.5	15.5	8.0	10.3	11.6	9.0
Apr	10.6	14.2	8.0	10.2	11.0	9.3
May	10.6	15.5	8.1	10.0	11.9	9.1
Jun	11.1	15.5	8.4	11.7	14.1	10.2
Jul	12.0	17.9	9.0	13.3	15.9	11.8
Aug	12.8	17.1	10.0	14.4	16.1	12.2
Sep	13.1	18.1	10.3	13.2	14.9	11.5
Oct	13.2	18.7	9.5	12.7	13.2	12.1
Nov	13.0	17.5	9.3	13.0	14.1	11.5
Dec	12.7	16.5	9.2	12.8	14.1	12.1

Annual Mean
12.0

Annual Max
16.1

Annual Min
9.0

Days Sampled
162/365 (44.4%)

Days Flagged
1/365 (0.3%)

18

Granite Canyon, CA
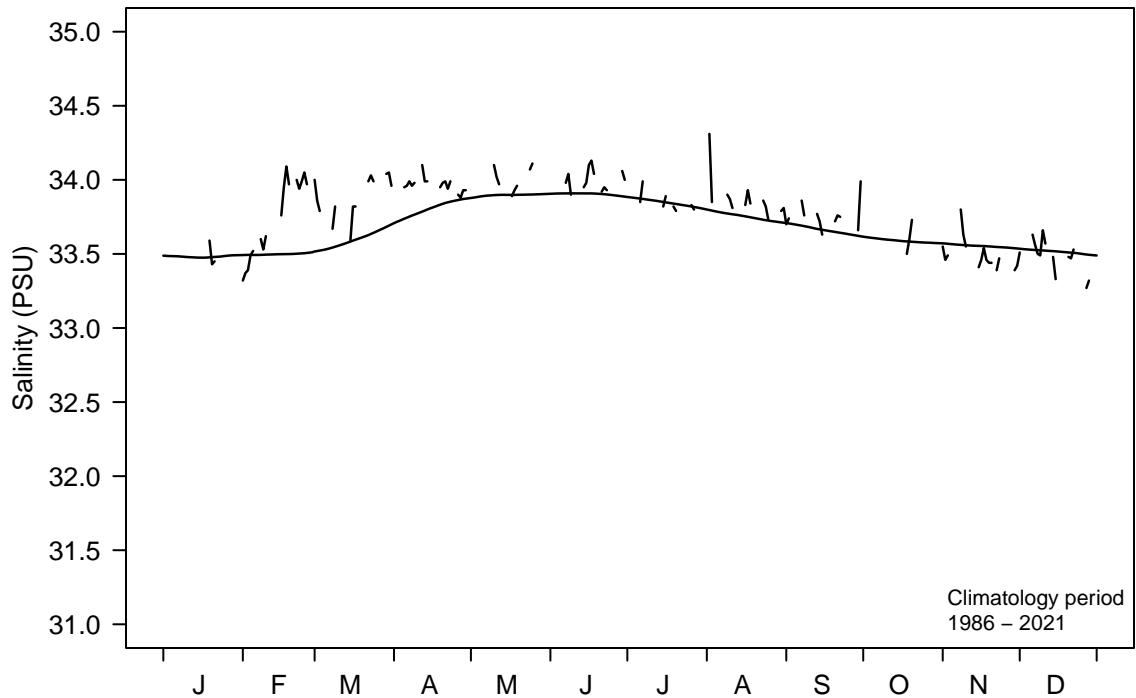
2021

	Climatological			2021		
	Mean	Max	Min	Mean	Max	Min
Jan	33.48	34.16	28.20	33.50	33.59	33.43
Feb	33.49	34.11	32.70	33.74	34.09	33.32
Mar	33.59	34.47	32.66	33.88	34.05	33.59
Apr	33.81	35.41	32.21	33.96	34.10	33.88
May	33.90	35.13	33.10	34.03	34.14	33.89
Jun	33.91	34.51	33.16	34.02	34.37	33.86
Jul	33.85	35.03	33.26	33.87	34.01	33.79
Aug	33.76	34.31	33.19	33.85	34.31	33.73
Sep	33.66	34.25	33.17	33.74	33.99	33.57
Oct	33.59	34.42	33.23	33.60	33.73	33.50
Nov	33.56	34.09	31.70	33.49	33.80	33.39
Dec	33.52	33.96	33.05	33.50	33.66	33.27

Annual Mean
33.80

Annual Max
34.40

Annual Min
33.30

Days Sampled
162/365 (44.4%)

Days Flagged
1/365 (0.3%)

Pacific Grove, CA

2021
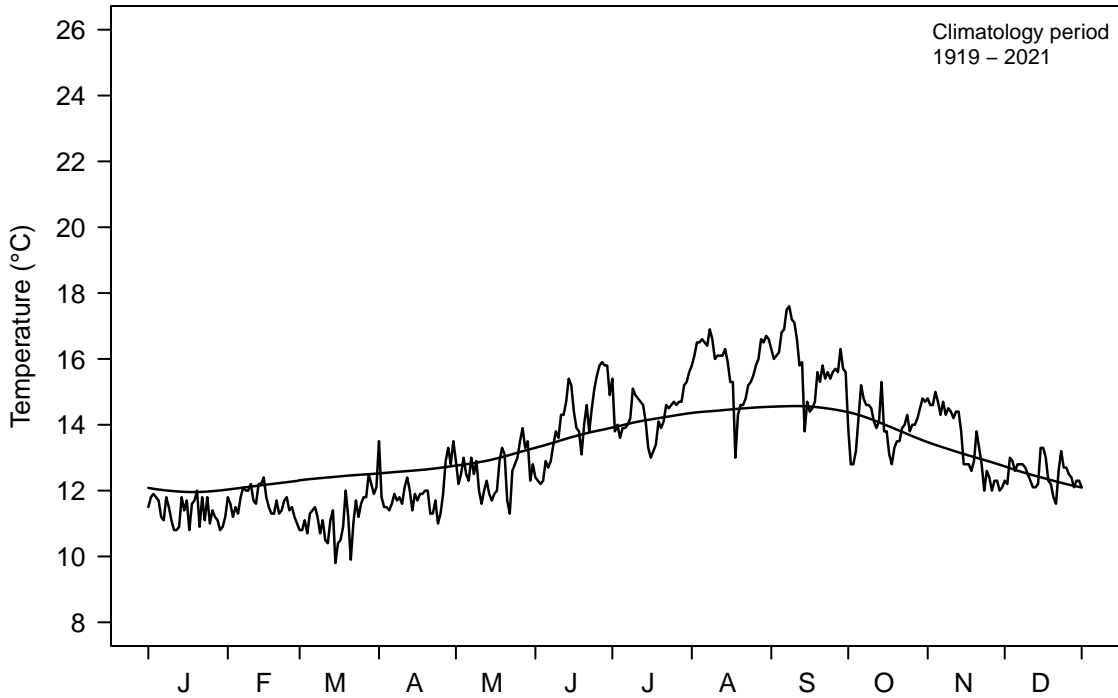
	Climatological			2021		
	Mean	Max	Min	Mean	Max	Min
Jan	12.0	15.0	8.3	11.4	12.0	10.8
Feb	12.2	15.0	8.3	11.7	12.4	11.0
Mar	12.4	17.5	9.0	11.2	12.5	9.8
Apr	12.6	16.9	9.0	12.0	13.5	11.0
May	13.0	18.0	9.4	12.6	13.9	11.3
Jun	13.6	19.0	10.0	14.1	15.9	12.2
Jul	14.2	21.0	10.8	14.3	15.6	13.0
Aug	14.5	19.0	10.6	15.8	16.9	13.0
Sep	14.6	18.9	11.1	15.9	17.6	13.8
Oct	14.0	18.5	10.5	14.0	15.3	12.8
Nov	13.1	17.0	9.1	13.5	15.0	12.0
Dec	12.4	16.0	7.0	12.5	13.3	11.6

Annual Mean
13.2

Annual Max
17.6

Annual Min
9.8

Days Sampled
365/365 (100.0%)

Days Flagged
0/365 (0.0%)

Farallon Islands, CA

2021

	Climatological			2021		
	Mean	Max	Min	Mean	Max	Min
Jan	11.9	15.5	9.4	11.4	11.9	10.9
Feb	11.9	17.1	8.1	11.2	12.4	9.9
Mar	11.8	15.0	7.8	10.2	10.6	9.8
Apr	11.3	17.1	7.6	10.3	10.8	9.8
May	11.3	18.0	8.5	10.2	10.9	9.6
Jun	11.6	18.0	8.9	12.1	14.0	10.6
Jul	12.4	17.2	9.4	12.4	13.6	11.6
Aug	13.2	19.3	9.9	14.1	15.6	12.9
Sep	13.8	18.9	10.1	14.5	15.4	13.0
Oct	13.6	18.0	10.0	13.7	15.1	12.0
Nov	13.0	17.4	8.9	14.2	14.9	13.7
Dec	12.3	16.6	8.9	12.5	13.9	11.4

Annual Mean
12.2

Annual Max
15.6

Annual Min
9.6

Days Sampled
325/365 (89.0%)

Days Flagged
0/365 (0.0%)

Farallon Islands, CA
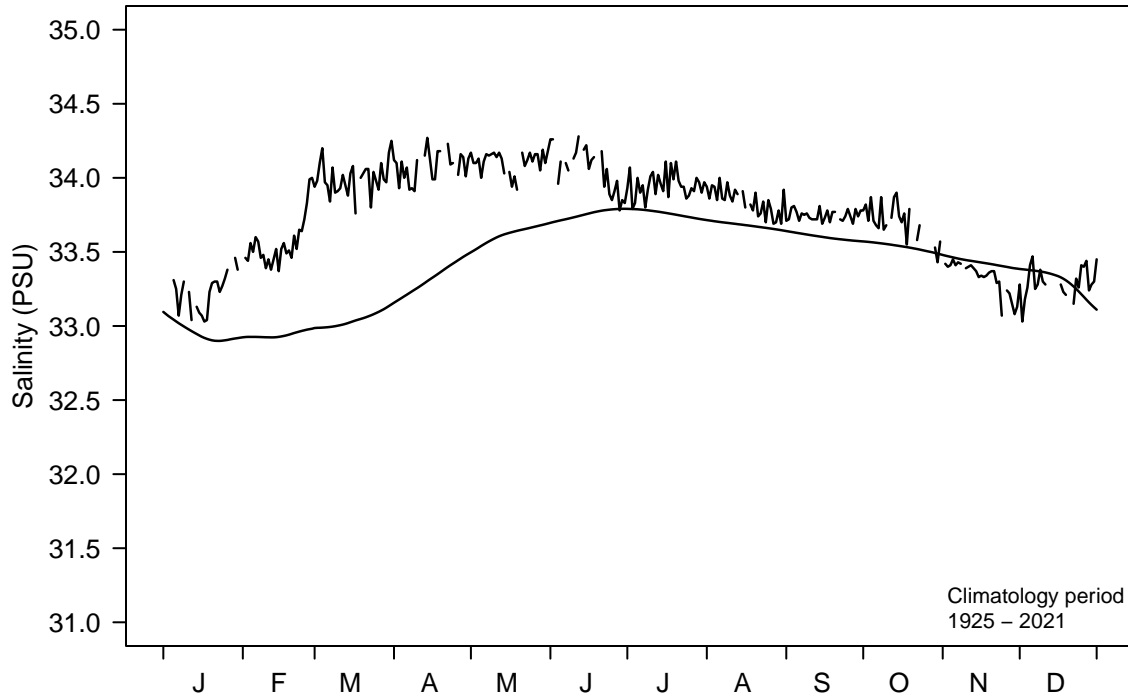
2021

	Climatological			2021		
	Mean	Max	Min	Mean	Max	Min
Jan	32.93	34.57	11.00	33.24	33.58	33.03
Feb	32.92	34.49	21.15	33.56	34.00	33.37
Mar	33.03	34.31	23.04	34.00	34.25	33.76
Apr	33.32	34.90	19.78	34.08	34.27	33.91
May	33.63	34.90	28.12	34.11	34.19	33.92
Jun	33.76	35.29	28.98	34.06	34.28	33.78
Jul	33.76	34.88	31.00	33.95	34.11	33.79
Aug	33.68	34.65	31.95	33.84	34.00	33.69
Sep	33.60	34.62	30.97	33.75	33.81	33.69
Oct	33.54	34.80	31.15	33.70	33.90	33.43
Nov	33.43	34.87	19.53	33.33	33.45	33.07
Dec	33.34	34.76	26.33	33.29	33.47	33.03

Annual Mean
33.80

Annual Max
34.30

Annual Min
33.00

Days Sampled
323/365 (88.5%)

Days Flagged
0/365 (0.0%)

Trinidad Beach, CA

2021

Climatology period
1975 – 2021
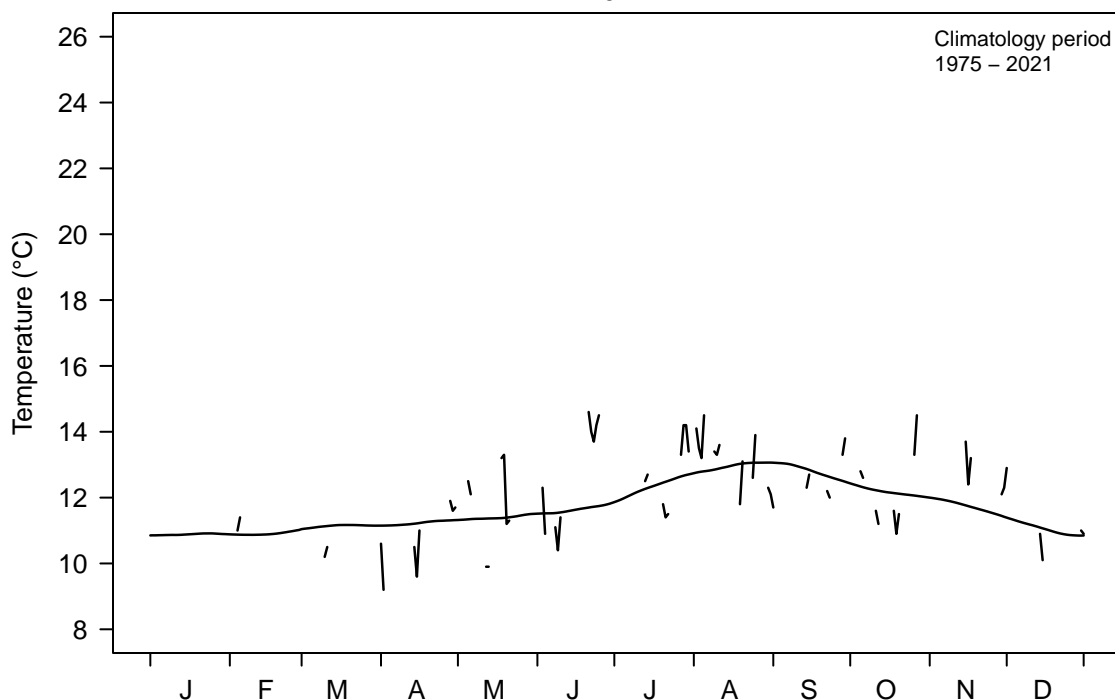
	Climatological			2021		
	Mean	Max	Min	Mean	Max	Min
Jan	10.9	14.5	6.5	10.9	10.9	10.9
Feb	10.9	16.5	5.9	11.2	11.4	11.0
Mar	11.2	17.8	7.9	10.2	10.5	9.7
Apr	11.2	15.3	7.3	10.9	11.9	9.2
May	11.4	16.8	8.0	11.5	13.3	9.9
Jun	11.6	17.1	7.9	13.3	16.4	10.4
Jul	12.4	17.1	8.2	12.8	14.2	11.4
Aug	13.0	18.8	9.2	13.1	14.5	11.8
Sep	12.8	17.7	9.6	12.7	13.9	11.7
Oct	12.2	15.9	9.2	12.5	14.5	10.9
Nov	11.8	15.8	8.2	13.4	15.0	12.1
Dec	11.2	14.7	7.6	11.2	12.9	10.1

Annual Mean
12.3

Annual Max
16.4

Annual Min
9.2

Days Sampled
118/365 (32.3%)

Days Flagged
1/365 (0.3%)

Trinidad Beach, CA

2021

Salinity (PSU)

Climatology period
1975 – 2021

J F M A M J J A S O N D
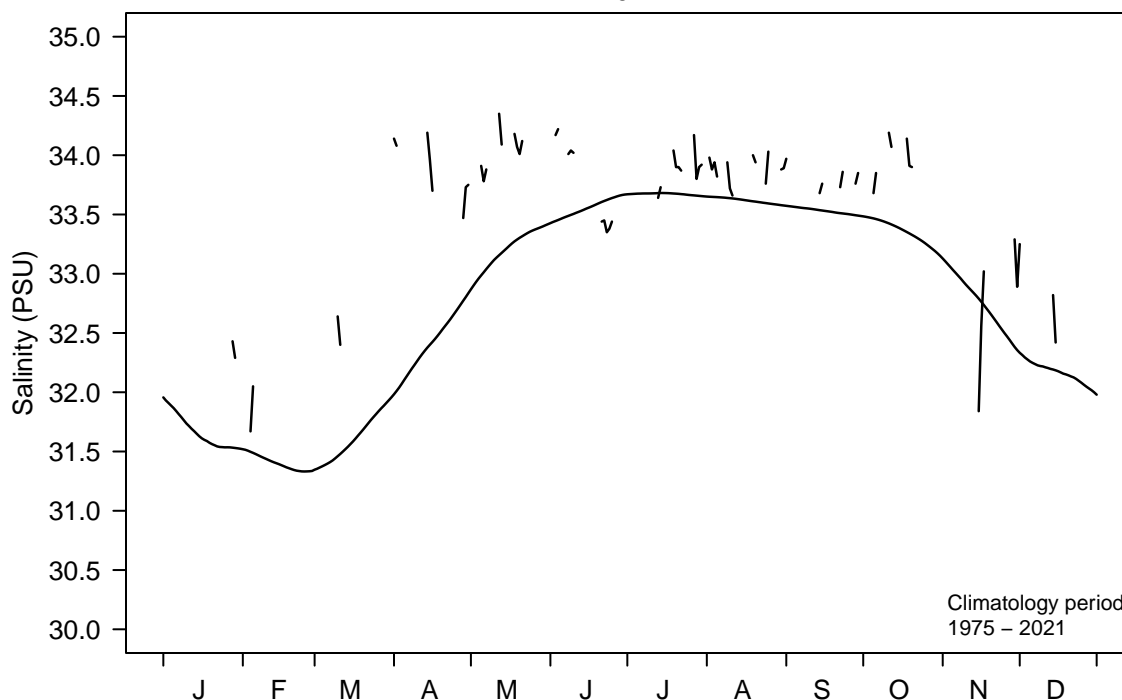
| | Climatological | | | 2021 | | |
	Mean	Max	Min	Mean	Max	Min
Jan	31.55	33.83	23.48	31.89	32.92	30.32
Feb	31.38	33.88	23.37	31.67	32.76	30.81
Mar	31.58	34.18	21.00	33.06	33.67	32.40
Apr	32.41	34.50	22.94	33.91	34.19	33.47
May	33.21	34.41	24.25	34.07	34.41	33.78
Jun	33.56	34.60	30.28	33.69	34.22	33.35
Jul	33.68	34.28	31.80	33.85	34.17	33.63
Aug	33.62	34.19	32.40	33.90	34.15	33.66
Sep	33.53	34.25	32.00	33.75	33.97	33.53
Oct	33.38	34.29	29.36	33.58	34.29	30.91
Nov	32.83	34.09	25.78	32.33	33.29	31.27
Dec	32.14	33.80	24.20	32.83	33.63	31.61

Annual Mean
33.40

Annual Max
34.40

Annual Min
30.30

Days Sampled
124/365 (34.0%)

Days Flagged
2/365 (0.5%)

Trinidad Bay, CA

2021

Climatology period
1973 – 2021
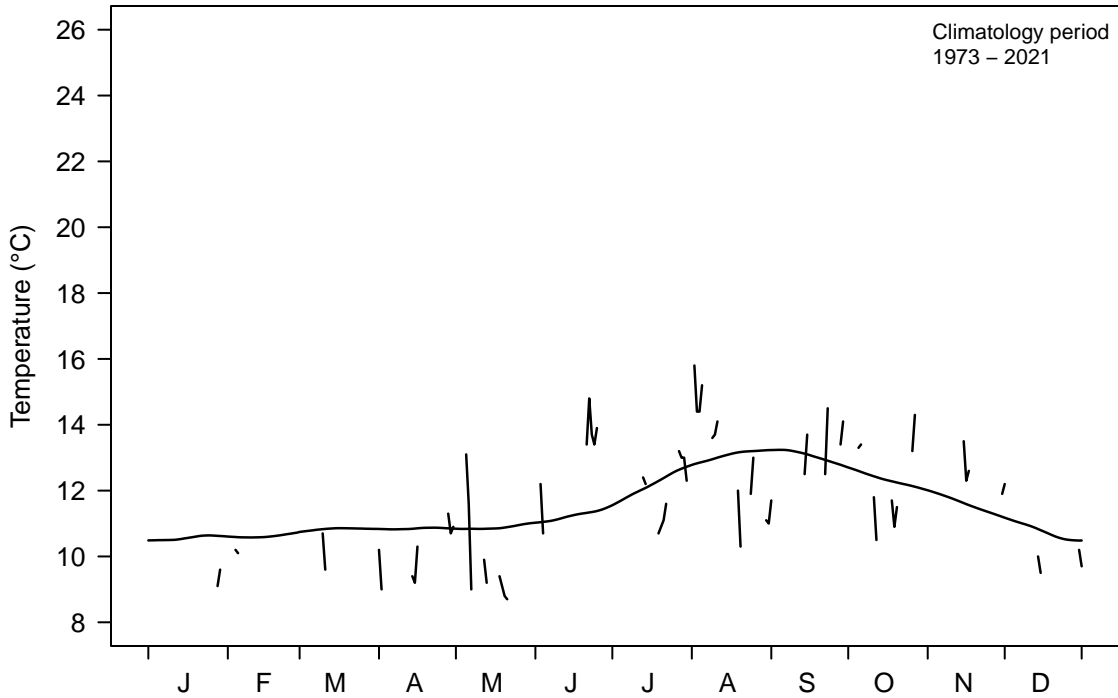
	Climatological			2021		
	Mean	Max	Min	Mean	Max	Min
Jan	10.6	14.0	6.3	10.3	11.4	9.1
Feb	10.6	14.2	5.4	10.3	10.8	10.1
Mar	10.9	15.7	7.5	9.6	10.7	8.8
Apr	10.8	15.5	7.3	9.9	11.3	8.5
May	10.9	17.0	7.2	9.8	13.1	8.7
Jun	11.3	17.0	7.5	13.4	15.6	10.5
Jul	12.2	16.9	8.3	12.2	13.3	10.7
Aug	13.2	18.2	9.0	13.0	15.8	10.3
Sep	13.1	18.0	8.9	13.2	14.5	11.5
Oct	12.3	16.3	9.3	12.4	14.3	10.5
Nov	11.7	15.5	8.0	13.3	15.3	11.9
Dec	10.9	15.5	7.3	10.6	12.2	9.5

Annual Mean
11.8

Annual Max
15.8

Annual Min
8.5

Days Sampled
123/365 (33.7%)

Days Flagged
1/365 (0.3%)

Appendix A - Station Thermometer Metadata for 2021

Station	Therm. Serial Number	Start Date	End Date	Date Calibrated	Post Calibration Date	5ºC Offset	15ºC Offset	25ºC Offset
La Jolla	DT018	8/24/20	8/31/21	3/28/19	9/29/21	-0.02	0.03	-0.02
	DT038	9/1/21	11/7/21	2/12/19	1/25/22	-0.01	0.03	-0.03
	DT029	11/8/21	in use	9/29/21	TBD	TBD	TBD	TBD
San Clemente	DT013	3/15/20	1/14/21	7/31/19	1/25/22	0.00	0.04	-0.01
	DT016	1/15/21	11/11/21	6/26/20	1/25/22	-0.01	0.03	-0.03
	DT049	11/12/21	in use	9/30/21	TBD	TBD	TBD	TBD
Newport Beach	DT034	3/25/20	11/11/21	3/28/19	1/25/22	-0.02	0.02	-0.03
	DT005	11/12/21	in use	9/30/21	TBD	TBD	TBD	TBD
Zuma Beach	DT047	1/1/21	11/14/21	10/29/19	1/25/22	-0.02	0.02	-0.03
	DT046	11/15/21	in use	9/30/21	TBD	TBD	TBD	TBD
Santa Barbara	DT043	3/1/20	1/11/21	10/29/19	2/26/21	-0.02	0.02	-0.02
	DT027	1/12/21	11/9/21	6/26/20	1/25/22	-0.01	0.02	-0.02
	DT050	11/10/21	in use	9/30/21	TBD	TBD	TBD	TBD
Granite Canyon	DT025	8/6/20	2/25/21	6/11/20	9/29/21	-0.03	0.01	-0.03
	DT046	2/26/21	3/31/21	10/29/19	9/29/21	-0.03	0.02	-0.03
	DT005	4/5/21	7/20/21	6/26/20	9/29/21	-0.01	0.02	-0.02
	DT007	7/26/21	11/14/21	2/26/21	1/25/22	-0.03	0.01	-0.04
	DT031	11/15/21	in use	9/30/21	TBD	TBD	TBD	TBD
Pacific Grove	DT048	9/16/20	1/15/21	10/29/19	2/26/21	-0.03	0.02	-0.03
	DT031	4/21/21	4/21/21	6/26/20	9/29/21	-0.02	0.01	-0.03
	DT023	1/16/21	4/20/21	6/26/20	1/25/22	-0.02	0.02	-0.02
	DT033	6/30/21	12/7/21	2/26/21	1/25/22	-0.02	0.02	-0.03
	DT041	12/8/21	in use	10/30/21	TBD	TBD	TBD	TBD
Farallon Islands	DT051	3/17/20	1/2/21	10/29/19	therm lost	N/A	N/A	N/A
	DT052	1/5/21	1/29/21	10/29/19	9/29/21	-0.03	0.02	-0.03
	DT002	1/30/21	11/22/21	6/26/20	1/25/22	-0.01	0.02	-0.03
	DT001	11/23/21	in use	9/30/21	TBD	TBD	TBD	TBD
Trinidad Beach and Bay	DT053	4/3/20	1/15/21	10/29/19	2/26/21	-0.03	0.01	-0.04
	DT011	1/21/21	11/21/21	6/26/20	1/25/22	-0.02	0.03	-0.03
	DT048	11/22/21	in use	9/30/21	TBD	TBD	TBD	TBD

TBD = To Be Determined (Post calibration not done as of publishing)
N/A = Not Applicable (Thermometer lost or broken; no post-calibration)
In use = station actively using thermometer