CALIFORNIA COASTAL COMMISSION
NORTH COAST DISTRICT OFFICE
1385 8th STREET, SUITE 130
ARCATA, CA 95521
VOICE (707) 826-8950

W10a

MEMORANDUM

Date: May 3, 2024

To: Commissioners and Interested Persons

From: Shana Gray, Deputy Director
Peter Allen, Statewide Transportation Program Manager
Abbie Strickland, Transportation Program Analyst

Subject: Addendum to Commission Meeting for Wednesday, May 8, 2024
Item W10a, CDP Application No. 1-18-1078
(Caltrans Eureka-Arcata 101 Corridor Improvement Project)

The purpose of this addendum is to provide the Commission with the 2024 Sea Level Rise and Flooding Impact Monitoring Report prepared by Caltrans. The annual report was submitted May 1, 2024, after publication of the informational briefing.

DEPARTMENT OF TRANSPORTATION

NORTH REGION ENVIRONMENTAL
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Making Conservation a California Way of Life.

May 1, 2024

California Coastal Commission
1385 Eighth Street, Ste. 130
Arcata, CA 95521

File: Eureka-Arcata U.S. Highway 101 Corridor Improvement Project
HUM 101 / PMs 79.9 to 86.3
01-36600 / 0100000127

SUBJECT: CDP 1-18-1078 Special Condition 1, 2024 Annual Report

Special Condition 1. Sea Level Rise and Flooding Impact Monitoring and Reporting

The California Coastal Commission issued to the California Department of Transportation (Caltrans) a Coastal Development Permit (CDP), 1-18-1078, on September 12, 2019. The permit covers the Eureka-Arcata U.S. Highway 101 Corridor Improvement Project (aka the Corridor), which consists of five component projects within a six-mile segment of U.S. Highway 101 along the east side of Humboldt Bay. In accordance with CDP 1-18-1078, Special Condition 1, Caltrans is submitting the Sea Level Rise and Flooding Impact Monitoring Annual Report. This 2024 Annual Report references the Baseline Report, which was submitted to California Coastal Commission staff on May 1, 2020, the 2021 Annual Report submitted on May 1, 2021, the 2022 Annual Report submitted on May 10, 2022, and the 2023 Annual Report submitted May 10, 2023.

The Baseline Report and the 2021-2023 Annual Reports identify existing water elevation conditions in Humboldt Bay from the North Spit Tide Gauge, which provides data applicable to the Corridor Project. The Baseline Report and Annual Reports are referenced In this 2024 Annual Report to identify changes in water elevation conditions over time.

The Baseline Report established locations from which to take reference photographs to annually document King Tides and other extreme tidal events along the Corridor. The reference photographs and photographs of King Tide events from winter 2019/2020, winter 2020/2021, winter 2021/2022, winter 2022/2023, and winter 2023/2024 are included in Appendix C of the 2024 Annual Report.

Annual Reports also document any highway closures due to flooding and include a brief discussion of any coastal hazards impacts to highway infrastructure along the Corridor during the reporting period. No flooding or coastal hazards impacted the highway during the 2024 reporting period. The 2024 Annual Report also provides an update on progress made in developing the Comprehensive Adaptation and Implementation Plan (CAIP) required by CDP 1-18-1078, Special Condition 2.

If you have questions or need additional information, please contact Felicia Zimmerman at **Felicia.Zimmerman@dot.ca.gov** or (707) 815-5994.

Sincerely,

Jason Meyer
Senior Environmental Scientist
Branch Chief E3

Attachment: Sea Level Rise and Flooding Impact Monitoring
2024 Annual Report

A. Baseline Report

A.1. Water Elevation

The Baseline Report was provided to the California Coastal Commission on May 1, 2020. Water elevation baseline data for the Baseline Report was accessed for the North Spit Tide Gauge from the National Oceanic and Atmospheric Administration (NOAA) website and referenced to NAVD88 (Appendix A). The reporting period for the Baseline Report is April 1, 2019, to March 31, 2020. Monthly maximum water elevations ranged from 7.67 feet to 8.86 feet. The mean monthly maximum water elevation for the baseline reporting period was 8.07 feet (Figure 1). Monthly mean sea level for the baseline reporting period ranged from 3.44 feet to 4.33 feet with a mean of 3.80 feet for the reporting period (Figure 2).

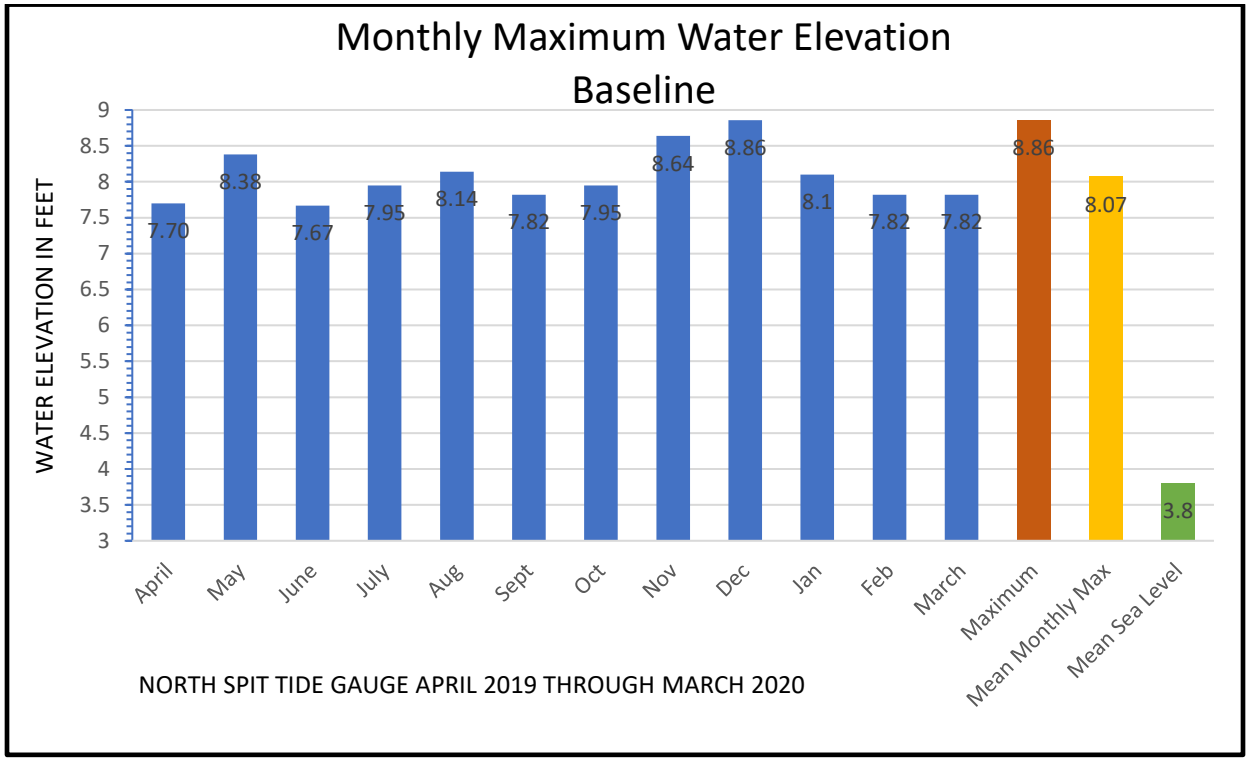

Figure 1. Monthly Maximum Water Elevation. Baseline shows the maximum water elevation by month at the North Spit Tide Gauge from April 1, 2019, to March 31, 2020. Monthly maximum and monthly mean sea level data were accessed from the NOAA Tides and Currents webpage. Mean Monthly Maximum and Mean Sea Level were calculated using the NOAA data.

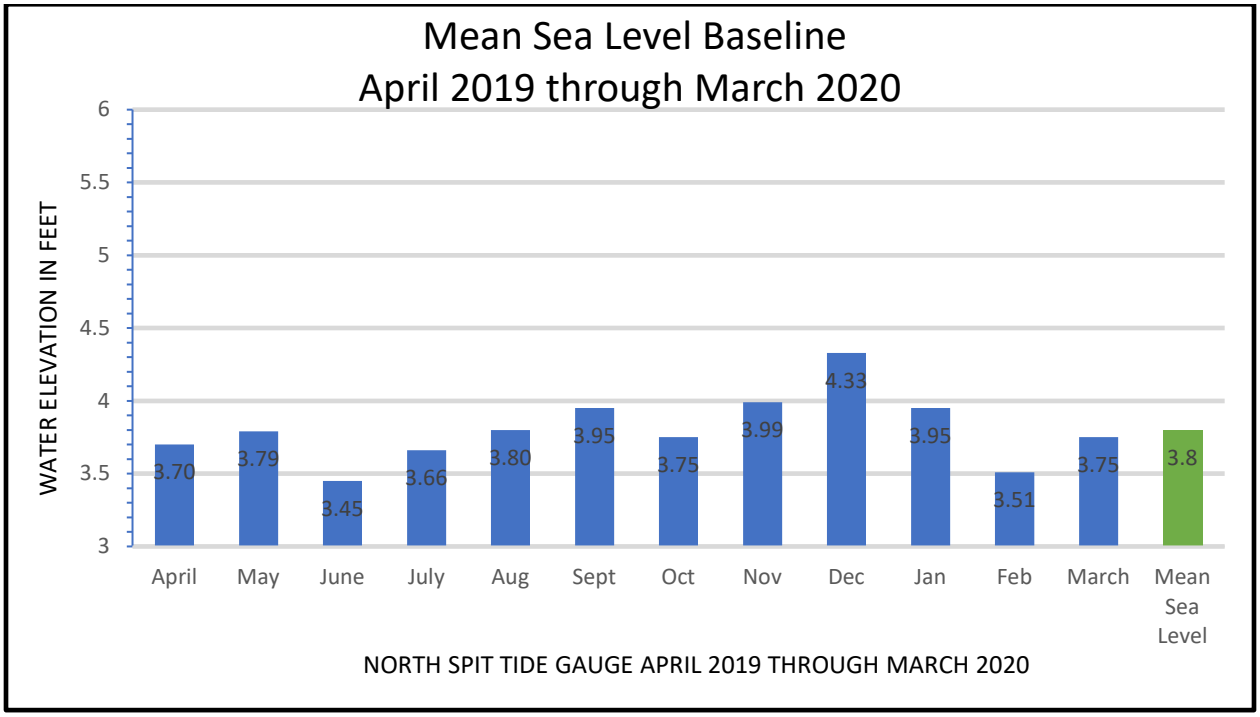

Figure 2. Mean Sea Level. Baseline at the North Spit Tide Gauge for April 1, 2019, through March 31, 2020, was calculated from available monthly mean sea levels from the NOAA Tides and Currents webpage.

A.2. Reference Photograph Locations

Reference locations for photographing annual King Tide and extreme tidal events along the Eureka-Arcata Corridor (Corridor) were established for the Baseline Report and were organized to easily facilitate replicating photos for the Annual Reports (Appendix B). Photograph location selection criteria included accessibility and safety, vulnerability to flooding (Caltrans Eureka-Arcata Corridor: Sea Level Rise Vulnerabilities and Adaptation Solutions 2019), and locations representing various shoreline cover and land use.

Two to four specific photo sites were established at each of the ten selected reference locations: Gannon Slough, Fay Slough, Jacoby Creek, North Bracut, South Bracut, Indianola, California Redwood Company, Jacobs Tide Gate, Eureka Slough, and Cole Avenue.

Site reference photos for Gannon Slough, Jacoby Creek, North Bracut, South Bracut, Indianola, California Redwood Company, Jacobs Tide Gate, Eureka Slough, and Cole Avenue were taken close to high tide on December 23, 2019. The National Weather Service (NWS) Daily Climate Report reported December 23, 2019, weather conditions as clear with an average wind speed of 2.8 miles per hour and no precipitation. The previous day saw 1.23 inches of precipitation. Site reference photos for Fay Slough were taken during the King Tide event on January 10, 2020. NWS reported cloudy weather conditions with an average wind speed of 4.6 miles per hour and minimal precipitation of 0.12 inch. Light precipitation of 0.28 inch was recorded for the previous day.

B. Annual Report 2024

B.1. Water Elevation

Water elevation data for the 2024 Annual Report for the North Spit Tide Gauge was accessed from the NOAA Tides and Currents website (NOAA April 2024) and referenced to NAVD88 (Appendix A). The reporting period for the 2024 Annual Report is April 1, 2023, through March 31, 2024. Monthly maximum water elevations ranged from 7.47 feet to 8.96 feet (Figure 3). The highest reported water elevation of 8.96 feet was observed on December 27, 2023. This monthly maximum elevation is the same as the highest monthly maximum elevation from the 2023 Annual Report, 0.42 feet lower than the 2022 Annual Report, 0.31 feet higher than the 2021 Annual Report, and 0.10 feet higher than the monthly maximum elevation from the Baseline Report. The mean monthly maximum water elevation for the 2024 reporting period was 8.33 feet (Figure 3). This is 0.04 feet higher than the mean monthly maximum from the 2023 Annual Report, 0.17 feet higher than the 2022 Annual Report, 0.23 feet higher than the 2023 Annual Report and 0.26 feet higher than the mean monthly maximum from the Baseline Report (Figure 4).

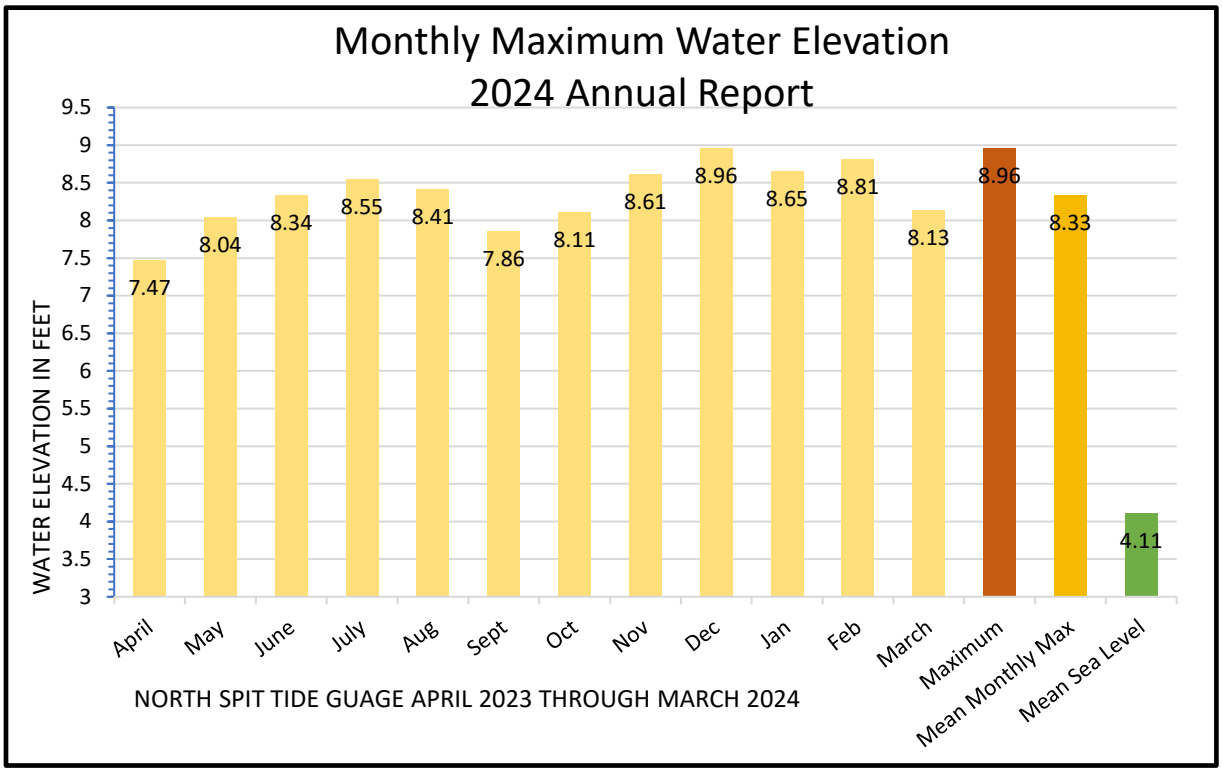

Figure 3. Monthly Maximum Water Elevation. 2024 Annual Report shows the maximum water elevation by month at the North Spit Tide Gauge from April 1, 2023, to March 31, 2024. Mean Monthly Maximum and Mean Sea Level data were accessed from the NOAA Tides and Currents webpage.

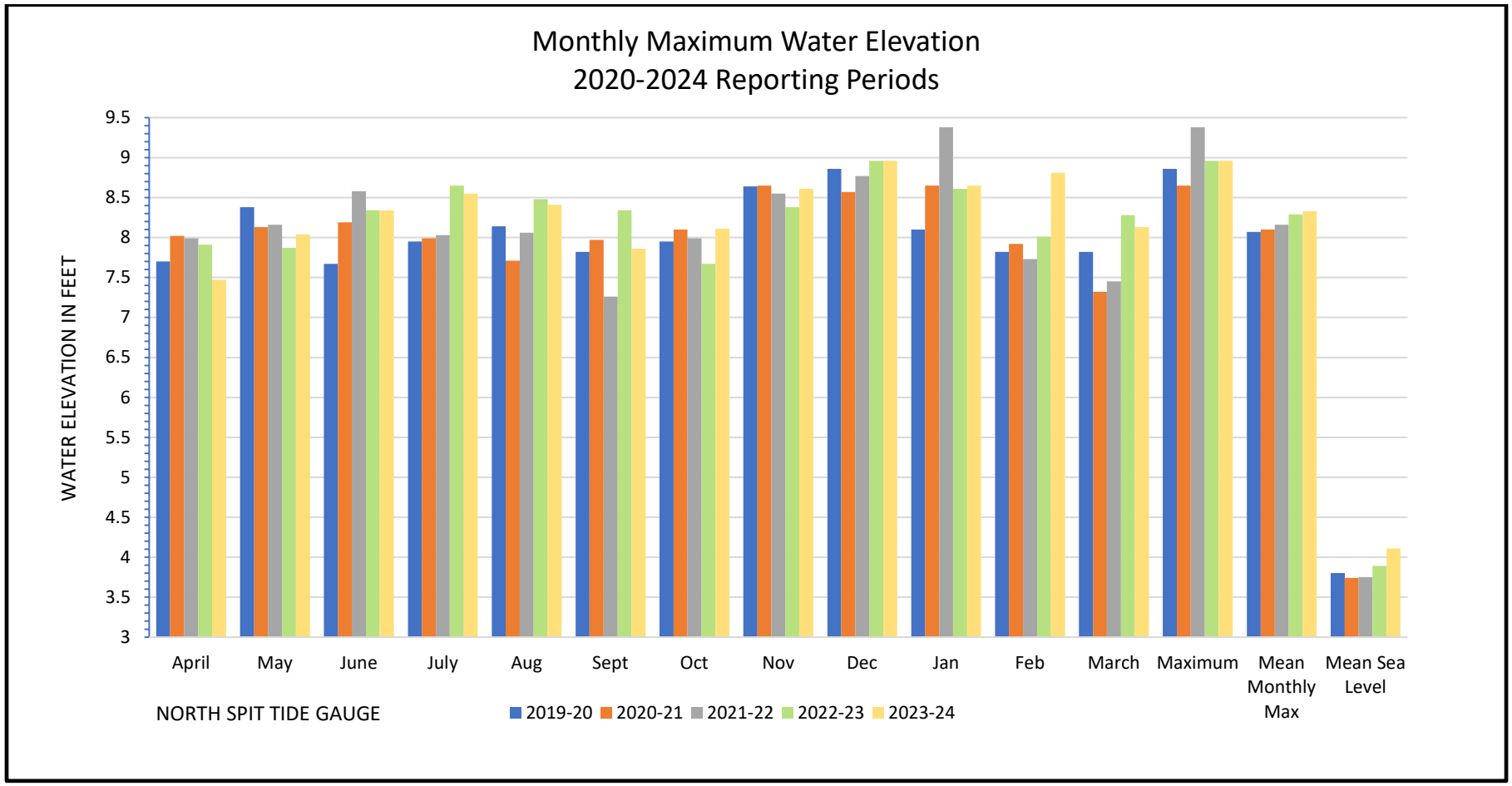

Figure 4. **Monthly Maximum Water Elevation 2020-2024 reports the maximum water elevation by month at the North Spit Tide Gauge for the Baseline Report (April 1, 2019, to March 31, 2020), the 2021 Annual Report (April 1, 2020, through March 31, 2021), the 2022 Annual Report (April 1, 2021, through March 31, 2022), the 2023 Annual Report (April 1, 2022, through March 31, 2023), and the 2024 Annual Report (April 2023 through March 31, 2024). The maximum water elevation, mean monthly maximum, and mean sea level for the five reporting periods is also represented in the figure.**

B. Annual Report 2024 (continued)

B.1. Water Elevation (continued)

Monthly mean sea level for the 2024 reporting period ranged from 3.68 feet to 4.47 feet. Mean sea level for the 2024 Annual Report is 4.11 feet (Figure 5). The mean sea level for the 2023 and 2022 reporting periods was 3.89 feet and 3.75 feet respectively. The mean sea level for the 2021 reporting period was 3.74 feet. The Baseline Report mean sea level was 3.80 feet; 0.31 feet lower than the 2024 Annual Report (Figure 6).

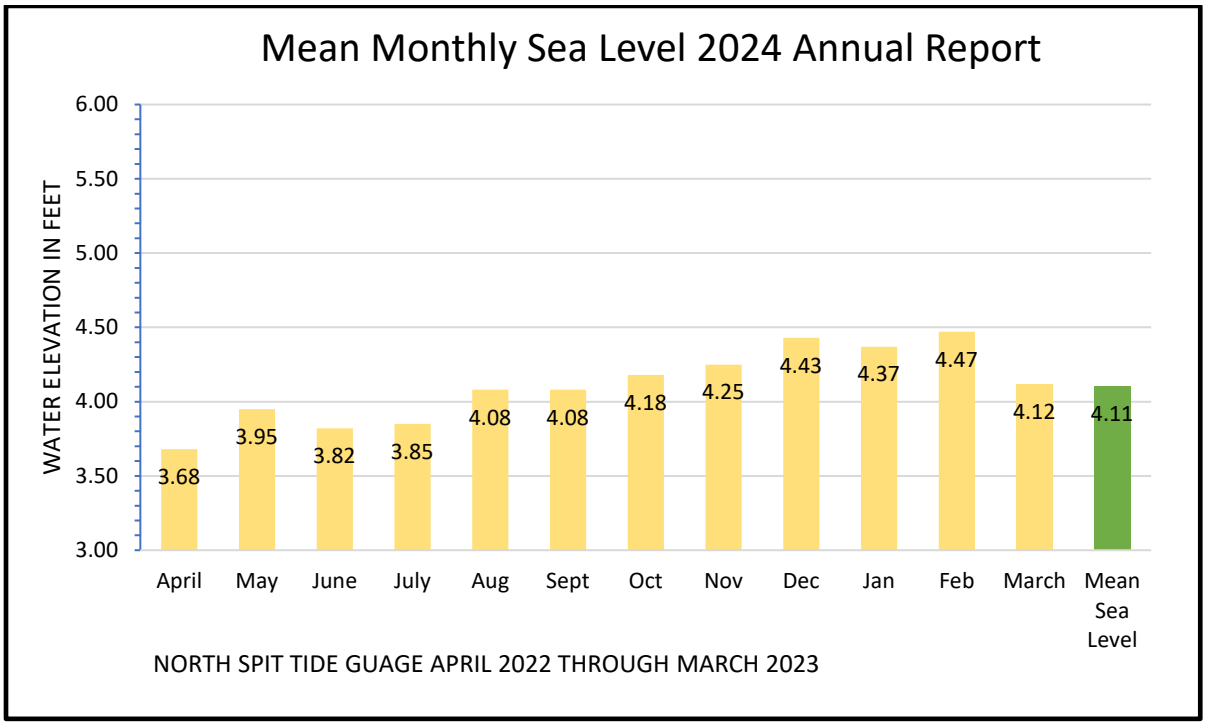

Figure 5. Mean Sea Level at the North Spit Tide Gauge for April 1, 2022, through March 31, 2023, was calculated from available monthly mean sea levels from the NOAA Tides and Currents webpage.

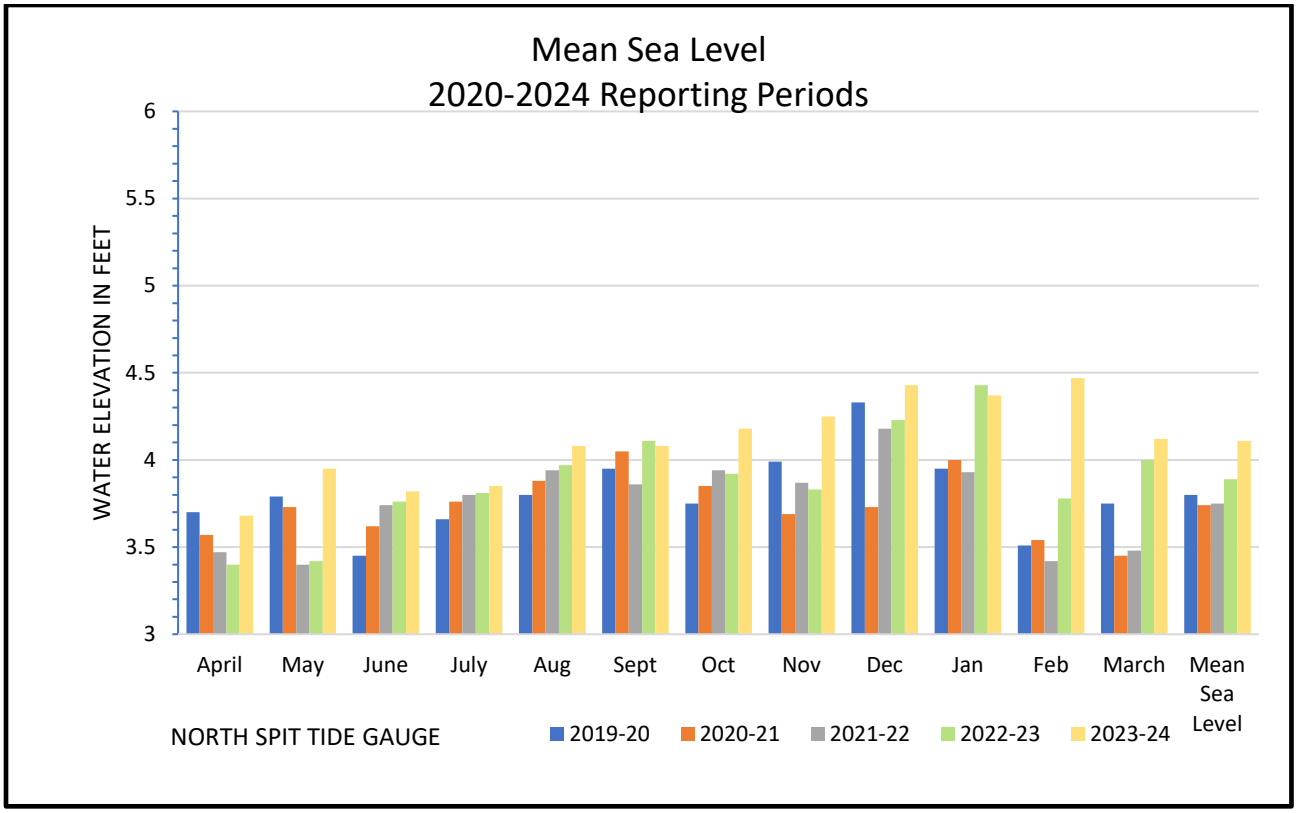

Figure 6. Mean Sea Level for the Baseline Report (2020) through the 2024 Annual Report at the North Spit Tide Gauge. The Baseline Report and the 2021 through 2024 Annual Reports show monthly mean sea levels from April 1 through March 31. Mean sea level for the reporting period was calculated from available monthly sea level data from the NOAA Tides and Currents webpage.

B.2. Coastal Hazard Impacts

No coastal hazard impacts to highway infrastructure within the U.S. Highway 101 Corridor occurred during the 2024 reporting period. No temporary or ongoing flooding was observed and no weather-related incidents (such as erosion, overtopping of dikes, or tide gate failures) impacted the Corridor.

King Tides for winter 2023/2024 took place January 11 and 12, 2024, and February 9, 2024. Caltrans staff photographed King Tide conditions from established reference locations along the Corridor during January and February King Tide occurrences (Appendix C). Using the daily tide prediction tables published on the NOAA website, three-hour work windows were identified for when to best document King Tide conditions to capture the highest water elevations for each day.

Weather on January 11, 2024, included mostly clear conditions with an average wind speed of 2.0 miles per hour and 0.02 inches of precipitation for the day. Previous day precipitation was measured at 0.65 inch (Appendix A—National Weather Service Climate Data). Maximum January 11, 2024, high tide at the North Spit Tide Gauge was 8.35 feet (NOAA).

Weather conditions on January 12, 2024, were cloudy with an average wind speed of 5.4 miles per hour and 0.21 inches of precipitation for the day and 0.02 inch for the previous day (NWS). Maximum high tide on January 12, 2023, was 8.37 feet.

Weather conditions on February 9, 2024, were mostly cloudy with an average wind speed of 2.5 miles per hour and no precipitation. Previous day precipitation was 0.02 inch (Appendix A—National Weather Service Climate Data). Maximum February 9, 2024, high tide was 8.39 feet.

B.3. Adaption and Hazards Response

During the reporting period, Caltrans did not implement any weather- or flood-related closures within the Corridor.

Additionally, no repair or maintenance was performed by Caltrans or other entities on dikes or berms that protect the highway. No impacts have been identified that would require a planned response, an amendment to CDP 1-18-1078, or a separate CDP application before the next monitoring cycle.

B.4. Adaptation Plan Progress

Progress made on the CAIP since the last update includes establishment of a contracted partnership with Cal Poly Humboldt (Cal Poly–formerly known as Humboldt State University [HSU])) to complete technical studies, increase participation with community groups, and increase outreach and local coordination. Most significantly, the Climate Change Adaptation Branch has grown to three (3) full-time employees with the additions of Lorna McFarlane, Climate Change Adaptation Branch Supervisor, and Kaitlin Woolling, Environmental Scientist (Hydrologist). A Sea Level Rise Engineer position has also been added to the Maintenance Hydraulics unit.

Two internal working groups were established in 2021: the District 1 Climate Change Working Group (CCWG) and the Sea Level Rise Technical Working Group (SLR TWG). The CCWG's mission is to develop a collaborative strategy for addressing climate change utilizing adaptive framework encompassing resources from long-range planning through maintenance. The goals and values of the CCWG are to lead on climate action planning through partnership, collaboration, and innovation on climate action. Specifically, the CCWG will engage stakeholders and the public, and will prioritize equity in planning and decision-making. Responsibilities and tasks include the following: (1) coordinate climate change activities across all functional units; (2) identify and provide support for implementation and updates of climate change adaptation policy and strategies; (3) provide review and assistance; (4) develop and implement outreach and education activities; and (5) provide and/or participate in training needs related to climate change.

The SLR TWG is specifically focused on addressing all needs related to Special Condition 2 of CDP 1-18-1078, also known as the Comprehensive Adaptation and Implementation Plan (CAIP) for the Eureka-Arcata Corridor. The SLR TWG is currently developing the CAIP to include the following: (1) SLR analysis based on updated, best available science and monitoring reports; (2) evaluation of adaptation alternatives (accommodation, protection, and relocation) and their consistency with Coastal Act policies; (3) a timetable for implementation; and (4) coordination with local governments, stakeholders, and public interest groups.

Staff are working diligently on the CAIP. District 1 has also applied for PROTECT (Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation, part of the Infrastructure Investment and Jobs Act Federal Aid Program) Program 2% Planning Set-Aside for Climate Adaptation and Resilience Planning Studies for fiscal year(s) 23/24 and 24/25 to provide support resources for the CAIP. The resources from the PROTECT Program will provide the needed internal support resources for the remainder of the CAIP process, and we are awaiting the evaluation and award process that is being run by Caltrans HQ Office of Air Quality and Climate Change.

In the fall of 2023, a California Model Agreement (CMA) between District 1 Caltrans and Cal Poly Humboldt for Subject Matter Expert and technical study needs of the CAIP was finalized. The CMA between Cal Poly Humboldt will involve two major CAIP-related tasks: Task 1 – Evaluate Existing and Anticipated Conditions and Task 2 – Review of Conceptual Adaptation Strategies and Develop Strategies for Analysis and Assessment.

Task 1 will include Cal Poly Humboldt evaluation of existing and determination of anticipated conditions including:

- Compiling and summarizing existing long-term planning and assessment efforts by Caltrans and other experts.

- Defining existing and projected hydrological hazards including groundwater assessment, Humboldt Bay stillwater levels, local wind setup and wave runup, shoreline/coastal geomorphology, and riverine flood impacts.

- Defining existing geologic hazards such as subsidence, seismic hazards related to earthquakes, liquefaction, and tsunami hazards.

- Identification of potential land use and infrastructure impacts.

Task 2 work consists of Cal Poly Humboldt’s review of conceptual adaptation strategies, development of analysis and assessment strategies, and provisional design guidance for natural armoring systems.

The CMA with Cal Poly Humboldt will run through February 2025. District 1 staff (Lorna McFarlane and Kaitlin Woolling) will work with Cal Poly Humboldt; the contract manager is Clancy DeSmet.

Staff worked with a consultant to develop a public engagement plan (PEP) and additional public workshops will be held. Through the Planning and Public Engagement (PPEC) support services, District 1 also launched a website to help communicate with the public—North Coast Climate Action. On the website, the public will find information about planning and projects along the U.S. Highway 101 Corridor and in each of the four counties covered by District 1. We have also launched Clancy's Climate Change Corner (a video series) to provide the latest news and updates on projects and opportunities to get involved with the process. We are currently in the process of re-engaging with the PPEC support services to provide public engagement support for the CAIP process.

District 1 staff continue to participate as a member in several groups related to climate change in the area, including: (1) Cal Poly Humboldt's Sea Level Rise Initiative (SLRI); (2) Cascadia Coastlines and Peoples Hazards Research Hub (CoPes Hub); and (3) Humboldt Bay Initiative.

Finally, the CAIP team members have been identified and monthly meetings are occurring. The Technical Advisory Committee (TAC) has also been established and includes representation from local technical experts, the cities of Eureka and Arcata, the County of Humboldt, the Wiyot tribe, and the California Coastal Commission. Future working group and partnering meetings are being planned to include the public and regulatory agencies.

In summary, a lot has been done but there is much more work to do to complete the CAIP by the December 2025 deadline. We are working on partnering meetings, public engagement, and technical assistance with Cal Poly Humboldt (Cal Poly). The heavy lifting will come in 2024 through the end of the process. Once Cal Poly completes their technical studies, Caltrans will work to produce the final CAIP. Public and partner engagement will be the focus in the near term.

B.5. Flood Events

No flooding or road closure events occurred during the reporting period.

C. Frequent Flood Event Report

The roadway was not closed during the reporting period; therefore, no Frequent Flood Event Report is included with this Annual Report.

References

California Department of Transportation (Caltrans). 2019. *Caltrans Eureka-Arcata Corridor: Sea Level Rise Vulnerabilities and Adaptation Solutions*. May 2019.

California Department of Transportation (Caltrans). *CDP 1-18-1078 Special Condition 1, Baseline and Annual Report.* May 2020.

California Department of Transportation (Caltrans). *CDP 1-18-1078 Special Condition 1, 2021 Annual Report.* May 2021.

California Department of Transportation (Caltrans). *CDP 1-18-1078 Special Condition 1, 2022 Annual Report.* May 2022.

California Department of Transportation (Caltrans). CDP 1-18-1078 Special Condition 1, 2023 Annual Report. May 2023.

Observed Weather Reports (March 13, 2024). In *National Weather Service*. Retrieved from https://forecast.weather.gov/product.php?site=EKA&product=CLI&issuedby=EKA

Water Level Reports (April 15, 2024). In *NOAA Tides and Currents*. Retrieved from https://tidesandcurrents.noaa.gov/reports.html?type=monthlyextremes&bdate=20220401&edate=20230331&units=standard&datum=NAVD&id=9418767&retrieve=Retrieve

Appendix A

NOAA Tides and Current Data and NWS Climate Data

NOAA Tides and Currents Data

MAXIMUM, MINIMUM WATER LEVEL DATA
National Ocean Service (NOAA)

Station: 9418767 T.M.: 0 W
Name: North Spit, CA Units: Feet
Type: Mixed Datum: NAVD
Note: [] Inferred Water Level Value Quality: Verified

2019	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean	4.25	4.26	4.03	3.70	3.79	3.58	3.66	3.80	3.95	3.75	3.99	4.33	
Maximum	9.09	8.48	7.92	7.70	8.38	7.67	7.95	8.14	7.82	7.95	8.64	8.86	
Max Day	20	3	25	20	19	16	31	1	30	29	27	25	
Max Time	18:24	18:24	10:42	07:48	07:24	06:12	05:54	06:48	20:36	20:06	19:24	18:24	
Minimum	-2.09	-1.97	-0.58	-1.32	-0.99	-1.75	-1.93	-1.76	-0.54	-1.31	-1.36	-1.24	
Min Day	23	20	18	21	20	5	5	2	1	31	26	27	
Min Time	02:48	01:48	23:54	15:00	14:48	15:00	15:30	14:30	14:54	03:24	01:00	02:18	

2020	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean	3.95	3.51	3.75	3.57	3.73	3.62	3.76	3.88	4.05	3.85	3.69	3.73	
Maximum	8.10	7.82	7.82	8.02	8.13	8.19	7.99	7.71	7.97	8.10	8.65	8.57	
Max Day	21	8	13	10	9	5	22	19	20	18	16	13	
Max Time	16:36	18:30	10:12	08:54	08:18	06:24	07:54	07:06	21:36	20:18	19:36	17:54	
Minimum	-1.83	-2.05	-1.11	-1.10	-1.66	-1.85	-1.72	-1.26	-0.32	-1.35	-1.88	-2.37	
Min Day	12	10	10	10	8	7	5	3	16	20	16	16	
Min Time	02:42	02:06	01:42	15:24	14:18	14:48	13:48	13:30	12:42	03:54	01:54	02:24	

2021	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean	4.00	3.54	3.45	3.47	3.40	3.74	3.80	3.94	3.86	3.94	3.87	4.18	
Maximum	8.65	7.92	7.32	7.99	8.16	8.58	8.03	8.06	7.26	7.99	8.55	8.77	
Max Day	12	11	4	28	27	25	24	22	7	24	5	4	
Max Time	18:36	19:06	11:12	07:48	07:18	07:00	06:42	06:42	07:12	21:00	19:18	18:36	
Minimum	-1.84	-1.70	-1.13	-1.98	-2.41	-2.00	-1.92	-0.92	-0.30	-1.05	-1.75	-2.48	
Min Day	14	28	1	29	27	25	23	20	6	10	7	6	
Min Time	02:18	02:00	02:36	15:18	14:12	14:06	13:00	12:06	13:06	04:00	03:00	02:36	

2022	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean	3.93	3.42	3.48	3.40	3.42	3.76	3.81	3.97	4.11	3.92	3.83	4.23	
Maximum	9.38	7.73	7.45	7.91	7.87	8.34	8.65	8.48	8.34	7.67	8.38	8.96	
Max Day	3	1	2	19	17	16	13	12	10	27	24	23	
Max Time	19:30	19:06	19:18	08:36	07:30	08:06	06:06	06:48	06:48	20:12	19:06	18:42	
Minimum	-2.03	-2.54	-1.50	-1.13	-2.42	-2.28	-2.20	-1.63	-0.72	-1.26	-2.03	-2.25	
Min Day	2	2	2	19	18	15	14	12	8	29	26	25	
Min Time	00:48	02:12	01:06	15:36	15:06	14:18	14:06	13:48	12:00	04:00	03:00	02:42	

2023	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean	4.43	3.78	4.00	3.68	3.95	3.82	3.85	4.08	4.08	4.18	4.25	4.43	
Maximum	8.61	8.01	8.28	7.47	8.04	8.34	8.55	8.41	7.86	8.11	8.61	8.96	
Max Day	4	19	21	10	18	6	4	2	30	29	15	27	
Max Time	17:30	18:30	19:24	09:36	06:00	08:12	07:06	07:06	20:00	19:24	19:54	19:12	
Minimum	-2.55	-1.99	-0.43	-1.20	-1.04	-1.63	-1.65	-1.83	-0.56	-1.18	-1.03	-1.38	
Min Day	23	20	25	21	20	5	4	2	1	31	28	15	
Min Time	02:24	01:24	16:30	14:30	14:12	14:42	14:30	14:06	14:18	02:54	01:54	03:00	

2024	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean	4.37	4.47	4.12										
Maximum	8.65	8.81	8.13										
Max Day	10	7	12										
Max Time	17:54	16:36	09:00										
Minimum	-2.06	-1.76	-1.20										
Min Day	13	10	9										
Min Time	02:42	01:36	00:24										

*The monthly max/min report information is based on high/low tides only.

National Weather Service Daily Climate Data for Eureka

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000
CXUS56 KEKA 080608
CF6EKA

PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6)

                                          STATION:   EUREKA CA
                                          MONTH:     JANUARY
                                          YEAR:      2024
                                          LATITUDE:   40 47 N
                                          LONGITUDE: 124 10 W

  TEMPERATURE IN F:       :PCPN:    SNOW:  WIND      :SUNSHINE: SKY     :PK WND
================================================================================
1   2   3   4   5  6A  6B    7    8   9   10  11  12  13   14  15   16   17  18
                                    12Z  AVG MX 2MIN
DY MAX MIN AVG DEP HDD CDD  WTR  SNW DPTH SPD SPD DIR MIN PSBL S-S WX    SPD DR
================================================================================

 1  58  40  49   2  16   0 0.00  0.0    0  2.0  8   M   M    M   4        8   M
 2  57  44  51   4  14   0 0.49  0.0    0  8.8 15 150   M    M  10 1     37   M
 3  52  44  48   1  17   0 0.61  0.0    0  2.8  8 230   M    M   9 1     12   M
 4  58  44  51   4  14   0 0.05  0.0    0  1.8  6  16   M    M   9 18     6   M
 5  54  43  49   1  16   0 0.04  0.0    0  2.4  7   4   M    M   7 18    12   M
 6  53  37  45  -3  20   0 0.55  0.0    0  6.5 16 350   M    M   7 3     30   M
 7  50  34  42  -6  23   0 0.01  0.0    0  2.3  8 320   M    M   6       10   M
 8  54  41  48   0  17   0    T  0.0    0  2.5 10 170   M    M  10       12   M
 9  53  44  49   1  16   0 0.65  0.0    0  6.4 14 320   M    M   8 18    25   M
10  51  37  44  -4  21   0 0.65  0.0    0  9.3 17 300   M    M  10 1     28   M
11  51  32  42  -6  23   0 0.02  0.0    0  2.0  6 290   M    M   6        6   M
12  51  41  46  -2  19   0 0.21  0.0    0  5.4  9 180   M    M  10       16   M
13  56  49  53   5  12   0 2.45  0.0    0 10.4 21 200   M    M   9 1     28 200
14  55  47  51   3  14   0 0.11  0.0    0  2.3  9 280   M    M   9 1      9   M
15  51  43  47  -1  18   0 0.00  0.0    0  2.3  6 270   M    M  10 2      6   M
16  55  45  50   2  15   0 0.25  0.0    0  4.8 12 180   M    M  10 1     18 180
17  58  48  53   5  12   0 0.03  0.0    0  6.7 12 170   M    M   9       18   M
18  64  48  56   8   9   0 0.00  0.0    0  4.0  8 210   M    M  10       13   M
19  68  48  58  10   7   0    T  0.0    0  5.9 15 170   M    M   9       26   M
20  58  50  54   6  11   0 1.89  0.0    0  8.6 18 170   M    M  10 1     32   M
21  58  53  56   8   9   0 0.19  0.0    0  7.8 13 170   M    M  10 8     25   M
22  61  51  56   8   9   0 0.31  0.0    0  3.1 10 250   M    M   9 1     10   M
23  56  50  53   5  12   0 0.16  0.0    0  3.9 10 270   M    M  10 1     10   M
24  60  50  55   7  10   0 0.68  0.0    0  7.6 14 150   M    M  10       21   M
25  60  46  53   5  12   0 0.01  0.0    0  4.1 10 250   M    M   7       13   M
26  62  50  56   8   9   0 0.08  0.0    0  9.1 16 140   M    M  10       23   M
27  63  55  59  11   6   0 0.24  0.0    0  9.0 15 150   M    M  10       26   M
28  67  51  59  11   6   0 0.00  0.0    0  2.5  8 300   M    M   4 1      8   M
29  69  49  59  11   6   0 0.00  0.0    0  4.6 10  90   M    M   9 18    10  90
30  71  54  63  15   2   0    T  0.0    0  9.9 21 170   M    M  10       40 170
31  66  49  58  10   7   0 2.17  0.0    0  9.8 14 190   M    M  10 1     28 190
================================================================================
SM 1800 1417       402   0 11.85  0.0    168.6          M      271
================================================================================
AV 58.1 45.7                                5.4 FASTST   M    M   9    MAX(MPH)
                                  MISC ---->  # 21 200                40 170
================================================================================
```

000
CXUS56 KEKA 050222
CF6EKA

PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6)

STATION: EUREKA CA
MONTH: FEBRUARY
YEAR: 2024
LATITUDE: 40 47 N
LONGITUDE: 124 10 W

TEMPERATURE IN F:							:PCPN:		SNOW:	WIND			:SUNSHINE:		SKY		:PK WND	
1	2	3	4	5	6A	6B	7	8	9	10	11	12	13	14	15	16	17	18
									12Z	AVG	MX	2MIN						
DY	MAX	MIN	AVG	DEP	HDD	CDD	WTR	SNW	DPTH	SPD	SPD	DIR	MIN	PSBL	S-S	WX	SPD	DR
1	55	47	51	3	14	0	0.53	0.0	0	7.2	12	180	M	M	9		21	M
2	55	42	49	1	16	0	0.46	0.0	0	7.0	14	260	M	M	8	1	16	M
3	56	40	48	0	17	0	0.01	0.0	0	5.4	10	170	M	M	4		16	M
4	57	40	49	1	16	0	0.53	0.0	0	4.8	15	40	M	M	9		21	M
5	53	46	50	2	15	0	1.85	0.0	0	7.1	17	160	M	M	10		37	M
6	54	43	49	1	16	0	0.08	0.0	0	6.4	14	40	M	M	8	1	17	M
7	51	38	45	-3	20	0	0.37	0.0	0	4.3	10	30	M	M	8		17	M
8	53	36	45	-3	20	0	0.02	0.0	0	3.8	14	360	M	M	3		17	M
9	53	40	47	-1	18	0	0.00	0.0	0	2.5	9	10	M	M	9		10	M
10	55	40	48	0	17	0	0.00	0.0	0	2.2	M	320	M	M	4	1	10	M
11	56	44	50	2	15	0	0.00	0.0	0	2.8	7	250	M	M	10	1	7	M
12	56	48	52	4	13	0	0.00	0.0	0	2.5	7	320	M	M	9		7	M
13	56	43	50	2	15	0	0.02	0.0	0	3.8	9	270	M	M	7		9	M
14	53	47	50	2	15	0	1.12	0.0	0	6.6	10	160	M	M	10		18	M
15	57	47	52	4	13	0	0.16	0.0	0	4.0	9	160	M	M	10	1	9	M
16	62	47	55	7	10	0	0.00	0.0	0	4.4	10	160	M	M	10		22	M
17	60	49	55	7	10	0	1.07	0.0	0	8.0	15	160	M	M	10		23	M
18	55	46	51	3	14	0	0.50	0.0	0	5.2	13	130	M	M	10	1	17	M
19	55	47	51	3	14	0	0.58	0.0	0	7.5	13	150	M	M	9		22	M
20	61	47	54	6	11	0	0.23	0.0	0	7.1	12	180	M	M	7		18	M
21	59	45	52	4	13	0	0.17	0.0	0	6.8	13	250	M	M	8		14	M
22	63	40	52	4	13	0	0.00	0.0	0	3.3	12	180	M	M	6		17	M
23	58	40	49	1	16	0	0.00	0.0	0	2.2	7	10	M	M	4		8	M
24	62	41	52	4	13	0	0.00	0.0	0	2.2	4	340	M	M	3	1	7	M
25	57	42	50	2	15	0	0.00	0.0	0	2.2	6	30	M	M	8	12	6	M
26	53	44	49	1	16	0	0.11	0.0	0	8.0	13	20	M	M	10	1	21	M
27	53	34	44	-4	21	0	0.00	0.0	0	4.5	13	360	M	M	3		16	M
28	57	38	48	0	17	0	0.00	0.0	0	4.8	12	240	M	M	9		14	M
29	54	42	48	-1	17	0	1.04	T	0	8.9	17	260	M	M	10	135	35	M
SM	1629	1243		440		0	8.85	T		145.5			M		225			
AV	56.2	42.9								5.0	FASTST		M	M	8		MAX(MPH)	
									MISC ---->	# 17	160						37 9999	

Note: An "M" in any column means the data are Missing for that element.

Column		
1	**DY**	The **day** of the month.
2	**MAX**	The **highest** temperature for the day in degrees Fahrenheit (F).
3	**MIN**	The **lowest** temperature for the day in degrees Fahrenheit (F).
4	**AVG**	The **average** temperature for the day, computed by finding the average of the values in columns 2 and 3, then rounding (if necessary). Example; 55.5 rounds up to 56, 55.4 rounds down to 55 degrees.
5	**DEP**	**Departure** from normal. The difference between column 4 and the 30 year normal temperature for this date. A minus (-) is number of degrees below normal. A zero (0) indicates that the average for that day was the Normal.
6a & 6b	**HDD & CDD**	**Degree Day:** A gauge of the amount of heating or cooling needed for a building using 65 degrees as a baseline. To compute heating/cooling degree-days, take the average temperature for a day and subtract the reference temperature of 65 degrees. If the difference is positive, it is called a "**Cooling Degree Day**". If the difference is negative, it is called a "**Heating Degree Day**". The magnitude of the difference is the number of days. For example, if your average temperature for a day is 50 degrees in September, the difference of the average temperature for that day and the reference temperature of 65 degrees would yield a minus 15. Therefore, you have 15 Heating Degree Days that day. If the average temperature is 77 degrees for a day, you would have 12 Cooling Degree Days (77-65). If the average temperature for the day is 65 degrees, there are no Heating or Cooling degree days. Electrical, natural gas, power, and heating, and air conditioning industries utilize heating and cooling degree information to calculate their energy needs. The Heating season runs from July 1st through June 30th. The Cooling season runs from Jan 1st through Dec 31st.
7	**WTR**	Total **precipitation** for the day to the nearest hundredth of an inch. This includes all forms of precipitation, both liquid and water equivalent of any snow or ice that occurred (T = Trace, some precipitation fell but not enough to measure).
8	**SNW**	Total **snowfall** for the day to the nearest tenth of an inch.
9	**DPTH**	Snow **depth** on the ground to the nearest inch at 1200UTC. 7am EST., 6am CST, 5am MST, 4am PST, 3am AST, etc.
10	**AVG SPD**	**Average wind speed** for the day in miles per hour (mph).

11	**MX SPD**	The **highest wind speed** in mph averaged over a 2 minute period.
12	**2MIN DIR**	The **direction** (in compass degrees divided by 10) from which the wind speed in column 11 came from. (N=36 S=18 W=27 E=09, etc.)
13	**MIN**	The number of **minutes** of sunshine received at the station. Not reported at all locations.
14	**PSBL**	The percentage of **possible** sunshine. Computed by dividing the minutes of sunshine in column 13 by the total possible minutes. Not reported at all locations.
15	**S-S**	The average sky cover between sunrise and sunset in tenths of sky covered. The minimum of "0" means no clouds observed, "10" means clouds covered the entire sky for that day.
16	**WX**	A coded number representing certain types of **weather** observed during the day. 1 = Fog 2 = Fog reducing visibility to 1/4 mile or less 3 = Thunder 4 = Ice pellets 5 = Hail 6 = Glaze or rime 7 = Blowing dust or sand: visibility 1/2 mile or less 8 = Smoke or haze 9 = Blowing snow X = Tornado In the example above on the 12th, you see "138" coded for the day. That means Fog, Thunder and Smoke or Haze were observed at some time during that day.
17	**SPD**	Peak wind **speed** for the day in mph. The highest wind speed observed at the station.
18	**DR**	The compass **direction** from which the peak wind speed came.

Appendix B

Photo Documentation Locations

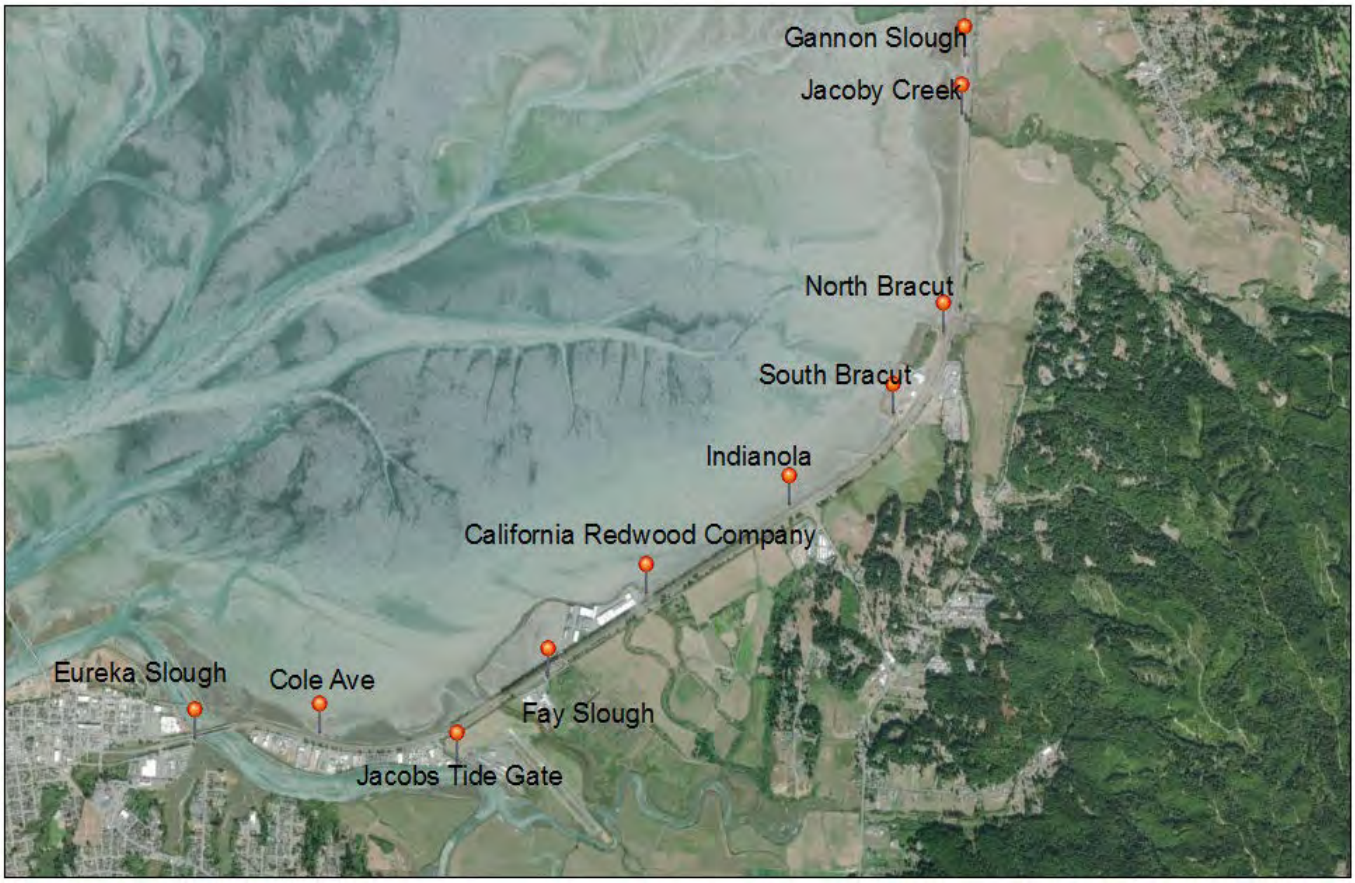


Figure 1 ***Reference Photograph Locations*** *for documenting King Tides and extreme weather events along the Eureka-Arcata 101 Corridor.*

Table 1 ***Location Selection Criteria***

	Accessibility and Safety	**Vulnerability to Flooding**	**Shoreline Cover**	**Adjacent Land Use / Zoning**
Gannon Slough	Good, *Bay Trail*	moderate-high	Salt marsh, slough channel	Trail/Natural Resources (NR)
Jacoby Creek	Good, *Bay Trail*	moderate-high	Salt marsh, creek channel	Trail/NR
North Bracut	Fair, *behind Bayside Garden Supply*	moderate-high	Bracut dike, railroad grade, vegetation	Businesses/NR and Industrial General
South Bracut	Fair, *near California Trailers*	moderate	Bracut dike, railroad grade, salt marsh	Businesses/NR and Industrial General
Indianola	Caution, *shoulder*	moderate	Railroad grade, rock, exposed with areas of erosion	Future Trail/NR
California Redwood Company	Fair, *entrance to CRC*	moderate-high	Railroad grade, salt marsh, rock, CRC levee to the south	Future Trail/ NR, Industrial General
Jacobs Tide Gate	Fair, *Airport Rd*	low-moderate	Jacobs Ave south side levee, rock protection	Businesses/Service Commercial
Eureka Slough	Good, *Eureka Waterfront Trail*	high	Bank of Eureka Slough, rock, vegetation	Trail/Service Commercial/NR
Cole Ave	Caution, *shoulder*	high	Railroad grade, rock, erosion bound by salt marsh to north and south	Future Trail/NR
Fay Slough	Fair, *CDFW parking lot*, *shoulder*	subject to inland flooding from Fay Slough	Roadside ditch paralleling Highway 101 north	Businesses/Service Commercial/ Coastal Agricultural

Appendix C

Photo Documentation

King Tide and Extreme Tidal Event Photo Documentation

Reference Photos

December 23, 2019:

Gannon Slough, Jacoby Creek, North Bracut, South Bracut, Indianola, California Redwood Company, Jacobs Tide Gate, Eureka Slough, and Cole Ave

January 10, 2020:

Fay Slough

2020 Baseline and Annual Report, Winter 2019/2020 King Tide Photos

January 10 and 11, 2020:

All locations

February 8, 2020:

All locations

2021 Annual Report, Winter 2020/21 King Tide Photos

December 14, 2020:

All locations

January 12, 2021:

All locations

2022 Annual Report, Winter 2021/22 King Tide Photos

December 4, 2021:

All locations

January 3, 2022:

All locations

2023 Annual Report, Winter 2022/23 King Tide Photos

December 23, 2022:

All locations

January 21, 2023:

All locations

2024 Annual Report, Winter 2023/24 King Tide Photos

January 11, 2024:

South Bracut, Indianola, California Redwood Company, Jacobs Tide Gate, Eureka Slough, and Cole Ave, Fay Slough

January 12, 2024:

Gannon Slough, Jacoby Creek, North Bracut

February 9, 2024:

All locations

Gannon Slough Photos

Gannon Slough South Reference

Gannon Slough South 2020 Annual Report

1/10/20

1/11/20

2/8/20

Gannon Slough South 2021 Annual Report

12/14/20

1/12/21

Gannon Slough South 2022 Annual Report

12/4/22 1/3/22

Gannon Slough South 2023 Annual Report

12/23/22 *1/21/23*

Gannon Slough South 2024 Annual Report

1/12/24

Gannon Slough North Reference

Gannon Slough North 2020 Annual Report

1/10/20

1/11/20

2/8/20

Gannon Slough North 2021 Annual Report

12/14/20

1/12/21

Gannon Slough North 2022 Annual Report

12/4/21

1/3/22

Gannon Slough North 2023 Annual Report

12/23/22

1/21/23

Gannon Slough North 2024 Annual Report

1/12/24

Gannon Slough Bay Reference

Gannon Slough Bay 2020 Annual Report

1/10/20

1/11/20

2/8/20

Gannon Slough Bay 2021 Annual Report

12/14/20

1/12/21

Gannon Slough Bay 2022 Annual Report

12/4/21

1/3/22

Gannon Slough Bay 2023 Annual Report

12/23/22

1/21/23

Gannon Slough Bay 2024 Annual Report

1/12/24

Jacoby Creek Photos

Jacoby Creek Left Reference

Jacoby Creek Left 2020 Annual Report

1/10/20

1/11/20

2/8/20

Jacoby Creek Left 2021 Annual Report

12/14/20

1/12/21

Jacoby Creek Left 2022 Annual Report

12/4/21

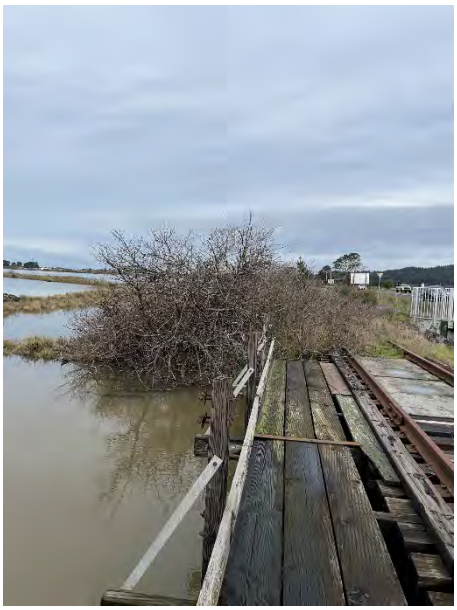
1/3/22

Jacoby Creek Left 2023 Annual Report

12/23/22

1/21/23

Jacoby Creek Left 2024 Annual Report



2/9/2024

Jacoby Creek Right Reference

Jacoby Creek Right 2020 Annual Report

1/10/20 *1/11/20* *2/8/20*

Jacoby Creek Right 2021 Annual Report

12/14/20 *1/12/21*

12/4/21

1/3/22

Jacoby Creek Right 2023 Annual Report

12/23/22

1/21/23

Jacoby Creek Right 2024 Annual Report

1/12/24

Jacoby Creek RR Reference

Jacoby Creek RR 2020 Annual Report

1/10/20

1/11/20

2/8/20 (Jacoby Creek RR 2020 Annual Report)

Jacoby Creek RR 2021 Annual Report

12/14/20

1/12/21

Jacoby Creek RR 2022 Annual Report

12/4/22

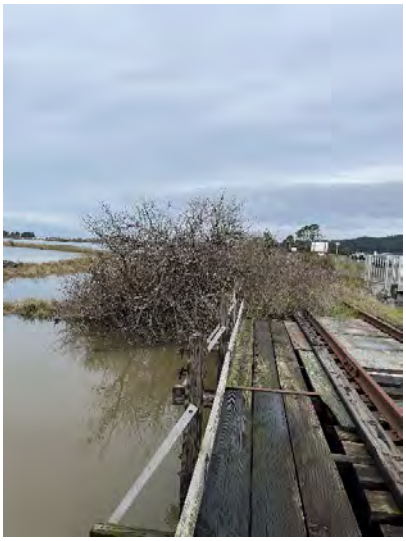
1/3/22

Jacoby Creek RR 2023 Annual Report

12/23/22

1/21/23

Jacoby Creek RR 2024 Annual Report



1/12/24

Jacoby Creek Bay Reference

1/10/20

1/11/20

2/8/20

12/14/20

Jacoby Creek Bay 2022 Annual report

12/4/21 *1/3/22*

Jacoby Creek Kayaker 2022 Annual Report

12/4/21

Jacoby Creek Bay 2023 Annual Report

12/23/22

1/21/23

Jacoby Creek Bay 2024 Annual Report

1/12/24

North Bracut Photos

North Bracut Full Reference

North Bracut Full 2020 Annual Report

1/10/20

1/11/20

2/8/20

North Bracut Full 2021 Annual Report

12/14/20

1/12/21

North Bracut Full 2022 Annual Report

12/4/21

1/3/22

North Bracut Full 2023 Annual Report

12/23/22

1/21/23

North Bracut Full 2024 Annual Report

1/12/24

North Bracut Zoom Reference

North Bracut Zoom 2020 Annual Report

1/10/20

1/11/20

2/8/20

12/14/20

1/12/21

North Bracut Zoom 2022 Annual Report

12/4/21

1/3/22

North Bracut Railroad 2022 Annual Report

1/3/22

North Bracut Zoom 2023 Annual Report

12/23/22

1/21/23

North Bracut Zoom 2024 Annual Report

1/12/24

South Bracut Photos

South Bracut Full Reference

South Bracut Full 2020 Annual Report

1/10/20

1/11/20

2/8/20

South Bracut Full 2021 Annual Report

12/14/20

1/12/21

South Bracut Full 2022 Annual Report

12/4/21

1/3/22

South Bracut Full 2024 Annual Report

1/12/24

South Bracut Zoom Reference

South Bracut Zoom 2020 Annual Report

1/10/20

1/11/20

2/8/20

South Bracut Zoom 2021 Annual Report

12/14/20

1/12/21

South Bracut Zoom 2022 Annual Report

12/4/21

1/3/22

South Bracut (trail base in place) 2024 Annual Report

Indianola Photos

Indianola North Reference

Indianola North 2020 Annual Report

1/10/20

1/11/20

Indianola Erosion 2020 Annual Report

2/8/20

Indianola North 2021 Annual Report

12/14/20

1/12/21

Indianola North 2022 Annual Report

12/4/21

1/3/22

Indianola North 2023 Annual Report

12/23/22

1/21/23

Indianola Erosion 2023 Annual Report

12/23/22

1/21/23

Indianola North 2024 Annual Report

1/11/24

California Redwood Company Photos

CRC Full Reference

CRC Full 2020 Annual Report

1/10/20

1/11/20

CRC Full 2021 Annual Report

12/14/20 *1/12/21*

CRC Full 2022 Annual Report

12/4/21 *1/3/22*

CRC Full 2023 Annual Report

12/23/22 *1/21/23*

CRC Full 2024 Annual Report

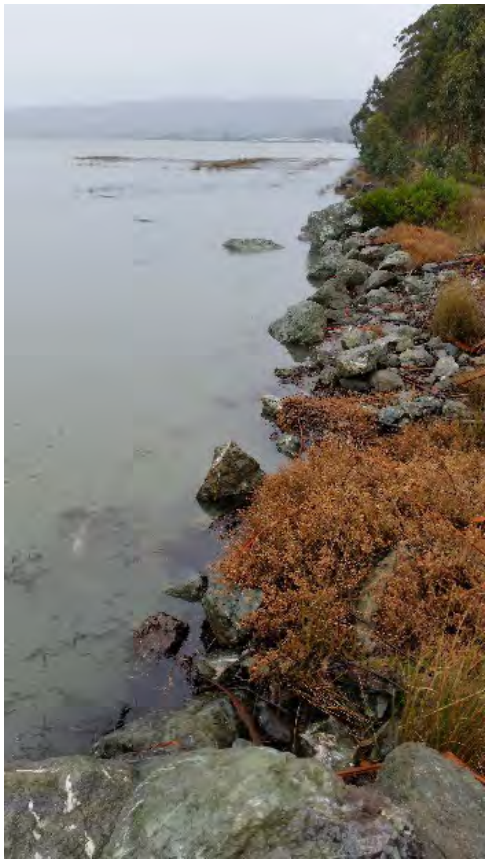
1/11/24

CRC Zoom Reference

CRC Zoom 2020 Annual Report

1/10/20 *1/11/20*

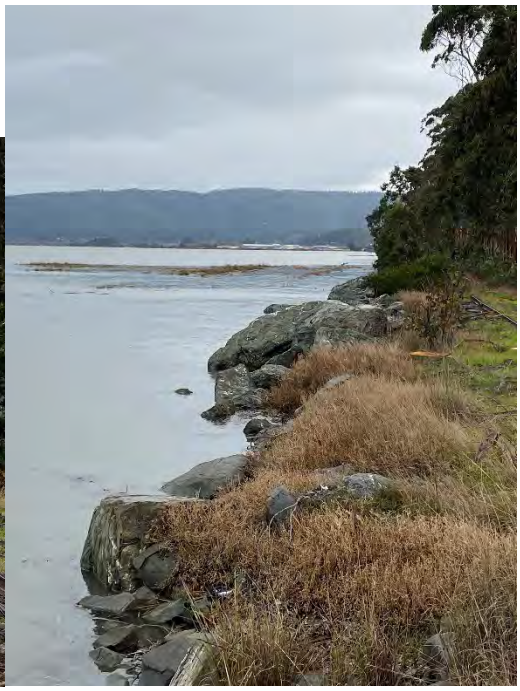
CRC Zoom 2021 Annual Report



12/14/20 *1/12/21*

CRC Zoom 2022 Annual Report

12/14/21



1/3/22

CRC Zoom 2023 Annual Report

12/23/22

1/21/23

1/11/24

Eureka Slough Photos

Eureka Slough Zoom Reference

Eureka Slough Zoom 2020 Annual Report

1/10/20

1/11/20

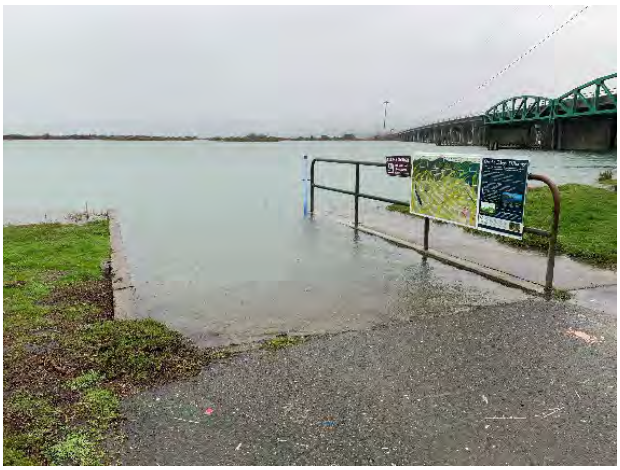
2/8/20

Eureka Slough Zoom 2021 Annual Report

12/14/20

1/12/21

Eureka Slough Bridge Boat Ramp 2021 Annual Report



1/12/21

1/12/21

Eureka Slough Zoom 2022 Annual Report

12/4/21

Eureka Slough Bridge Boat Ramp 2022 Annual Report

12/4/21

1/3/22

1/3/22

Eureka Slough Boat Ramp Gauge 2022 Annual Report

12/4/21

1/3/22

Eureka Slough Zoom 2023 Annual Report

12/23/22

1/21/23

Eureka Slough Bridge Boat Ramp 2023 Annual Report

12/23/22

1/21/23

Eureka Slough Boat Ramp Gauge 2023 Annual Report

12/23/22

1/21/23

Eureka Slough Zoom 2024 Annual Report

1/11/24

Jacobs Tide Gate Photos

Jacobs Tide Gate East Zoom Reference

1/10/20

1/11/20

2/8/20

Jacobs Tide Gate East Zoom 2021 Annual Report

12/14/20

1/12/21

Jacobs Tide Gate East Zoom 2022 Annual Report

12/4/21

1/3/22

Jacobs Tide Gate East Zoom 2023 Annual Report

12/23/22

1/21/23

Jacobs Tide Gate East Zoom 2024 Annual Report

2/9/24

Jacobs Tide Gate East Reference

Jacobs Tide Gate East 2020 Annual Report

1/10/20

1/11/20

2/8/20

Jacobs Tide Gate East 2021 Annual Report

1/12/21

Jacobs Tide Gate East 2022 Annual Report

12/4/21

1/3/22

Jacobs Tide Gate East 2023 Annual Report

12/23/22

1/21/23

Jacobs Tide Gate East 2024 Annual Report

2/9/24

Jacobs Tide Gate West Reference

Jacobs Tide Gate West 2020 Annual Report

1/10/20

1/11/20

2/8/20

Jacobs Tide Gate West 2021 Annual Report

12/14/20

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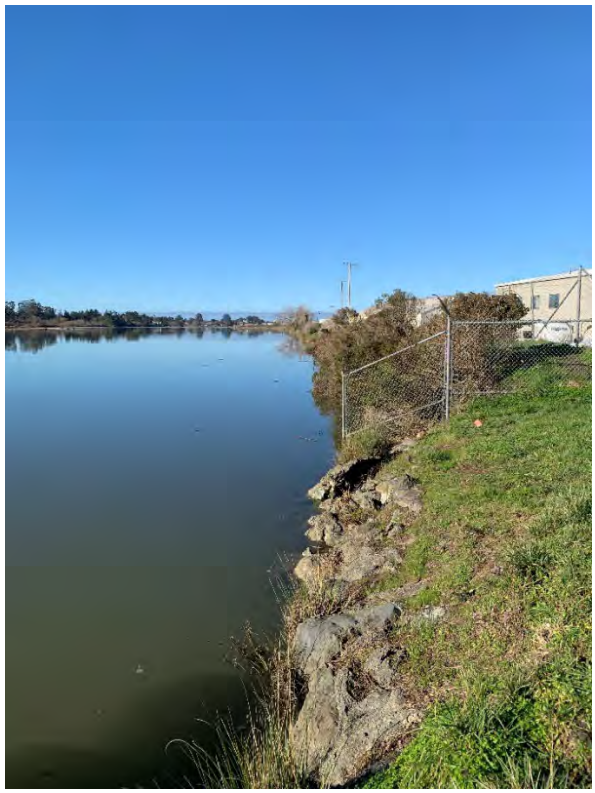
12/4/21

1/3/22

Jacobs Tide Gate West 2023 Annual Report

12/23/22



1/21/23

Jacobs Tide Gate West 2024 Annual Report

2/9/24

Cole Ave Photos

Cole Ave North Reference

Cole Ave North 2020 Annual Report

1/10/20

1/11/20

2/8/20

Cole Ave North 2021 Annual Report

12/14/20

1/12/21

Cole Ave North 2022 Annual Report

12/4/21

1/3/22

Cole Ave North 2023 Annual Report

12/23/22

1/21/23

Cole Ave North 2024 Annual Report

2/9/24

Cole Ave South Reference

1/10/20

1/11/20

2/8/20

Cole Ave South 2021 Annual Report

12/14/20

1/12/21

Cole Ave South 2022 Annual Report

12/4/21

1/3/22

Cole Ave South 2023 Annual Report

12/23/22

1/21/23

Cole Ave South 2024 Annual Report

2/9/24

Fay Slough Photos

Fay Slough Mid City South Reference/2020 Annual Report

Fay Slough Mid City South Reference/2020 Annual Report

1/10/20

1/11/20

2/8/20

Fay Slough Mid City South 2021 Annual Report

12/14/20

Fay Slough Mid City South 2022 Annual Report

12/4/21

1/3/22

Fay Slough Mid City South 2023 Annual Report

12/23/22

1/21/23

Fay Slough Mid City South 2024 Annual Report

2/9/24

Fay Slough North Reference/2020 Annual Report

1/11/20 *2/8/20*

Fay Slough North 2021 Annual Report

12/14/20

Fay Slough North 2022 Annual Report

12/4/21

1/3/22

12/4/21

1/3/22

12/23/22

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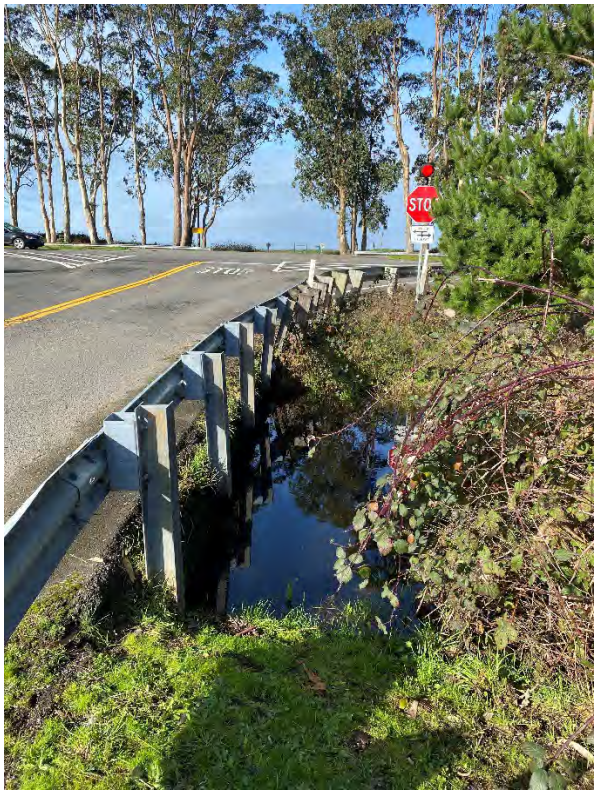

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