Everett Marina and Edgewater Beach Water Quality Report Card Addendum

Snohomish County Marine Resources Committee

November, 2025

Purpose:

The purpose of this addendum is to explain the methods of analysis for data from two water quality sensors from the Ocean College Research Academy (ORCA) and to outline some of the limitations of the analysis. The result of this analysis was presented on the Possession Sound marine water quality report cards.

Background:

The Washington State Department of Ecology (WDOE) monitors water quality in Puget Sound. It sets standards for two of the many possible water quality parameters, temperature (T) and dissolved oxygen (DO). The methodology for how water quality parameters are assessed can be found in WDOE's Water Quality Program Policy 1-11, Chapter 1. These report cards evaluate only T and DO.

WDOE has classified different areas of Puget Sound into categories of Excellent, Good, Fair, and Poor, based on how aquatic life uses the area. The Everett Marina and Edgewater Beach stations are both classified as "Excellent" (WAC 173-201A-612) where water quality shall meet or exceed the requirements for all uses including, but not limited to, salmonid migration and rearing; other fish migration, rearing, and spawning; clam, oyster, and mussel rearing and spawning; crustaceans and other shellfish (crabs, shrimp, crayfish, scallops, etc.) rearing and spawning.

As WDOE monitors seasonal conditions each year, it compares T and DO conditions to those long-term standards. Specifically, it monitors the percentage of days on which a given site meets or fails to meet the WDOE standards for T and DO conditions for the category of water body in which it is classified. For a water body in the “Excellent” category, T must not exceed 16ºC (60.8º F), and DO must not fall below 6 mg/liter on a given day to meet the standards.

For the Possession Sound Report cards, the methods of analysis follow these WDOE protocols; however, the data were collected by ORCA.

Report Card Methodology:

The pie charts in the report cards show the number of days during the 5-year data record from the ORCA moorings that T was above and below the 16ºC standard. Temperatures above the standard fail to achieve “Excellent” water quality for that day.

The pie charts in the report cards also show the number of days during the 5-year data record that DO was above and below the 6 mg/L standard. Dissolved oxygen values below that standard fail to achieve “Excellent” water quality for that day.

There are gaps in the data records at the two locations, resulting from equipment maintenance and failure. Figure 1 below shows when data were present or absent at the two locations over the 5-year study period. At times, these gaps were extended because of repair delays caused by the COVID-19 pandemic.

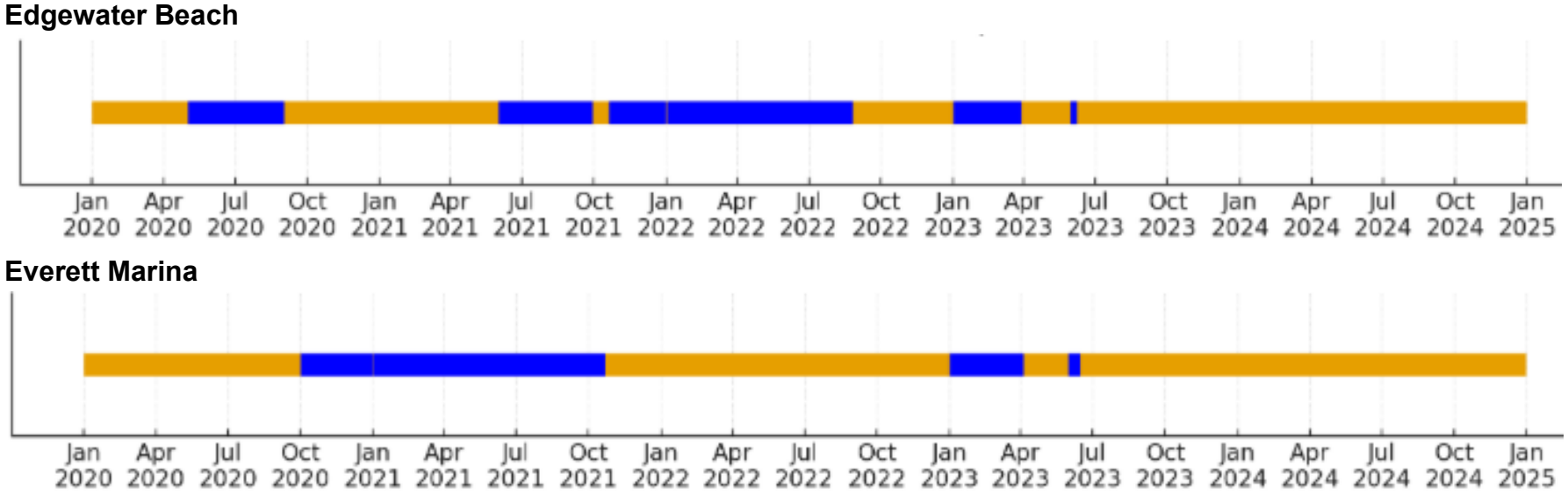

Figure 1. Presence (yellow) and absence (blue) of temperature and dissolved oxygen data from ORCA moorings at Edgewater Beach and Everett Marina, 2020–2024.

For T, WDOE methodology says to analyze only data collected during the critical period of June 15 - September 15, when Ts are likely to exceed the standard. This results in a higher percentage of violations because it includes only the warm season. In addition, for the analysis on these report cards, data were included only for years in which a full 3 months of data were collected (2023 and 2024 at Edgewater Beach, 2020 and 2022-2024 at Everett Marina). Including years when data were available for only a part of the 3-month interval could bias the results toward lower or higher temperatures. Figure 2 below shows the number of full months of data available for both T and DO at Edgewater Beach and Everett Marina, 2020–2024.

For DO, WDOE analyzes data collected during the entire year. The later summer is typically when low DO occurs, but the state still does not limit the scope of analysis to a certain period as it does for T. For the analysis of these report cards, all data collected were included. Further analysis would be needed to determine whether this method may have introduced any bias, especially in DO for Edgewater Beach of 2020 and 2022, when a majority of the earlier part of the year does not have data available (Figures 2 and 5).

Edgewater Beach

Months Available	2020	2021	2022	2023	2024
Temperature (Critical Period: 6/15-9/15)	0.5/3	0/3	1/3	3/3	3/3
Dissolved Oxygen (Full year)	8/12	7/12	4/12	8/12	12/12

Everett Marina

Months Available	2020	2021	2022	2023	2024
Temperature (Critical Period: 6/15-9/15)	3/3	0/3	3/3	3/3	3/3
Dissolved Oxygen (Full year)	9/12	2/12	12/12	8/12	12/12

Figure 2. Number of full months of data available for both T and DO from ORCA moorings at Edgewater Beach and Everett Marina, 2020–2024.

Conclusions:

The report cards do not attempt to explain the results nor judge their impacts, other than to note that T and DO do not meet the “Excellent” standards for noteworthy periods of time.

Everett Marina Ts were elevated above the standard on 67% of days analyzed compared to 9% at Edgewater Beach. The water depth is shallower at this location, and the sensor was moored closer to the water surface. The Marina is an embayment with reduced water exchange, and it experiences a persistent stratified layer of fresh water from the Snohomish River. All these factors contribute to heating. In addition, a greater volume of data is available from the Marina during the critical period – especially from 2020 – 2022.

Edgewater Beach DO concentrations fell below the standard on 36% of days analyzed, compared to 8% at Everett Marina. The sensor at this location was moored closer to the bottom in deeper water, where DO concentrations are generally lower because of subsurface respiration and decay, and lack of contact with the atmosphere. The lengths of the DO data records between the two locations are similar, so data gaps are likely not a factor.

Data are available to show differences between years at the two mooring locations. Figures 3-6 below show differences between years (2020–2024) in percent of days monitored on which temperature and DO meet or fail to meet state water quality standards at Edgewater Beach and Everett Marina. The causes and impacts of any differences between years have not been examined and could be due to missing data rather than environmental changes.

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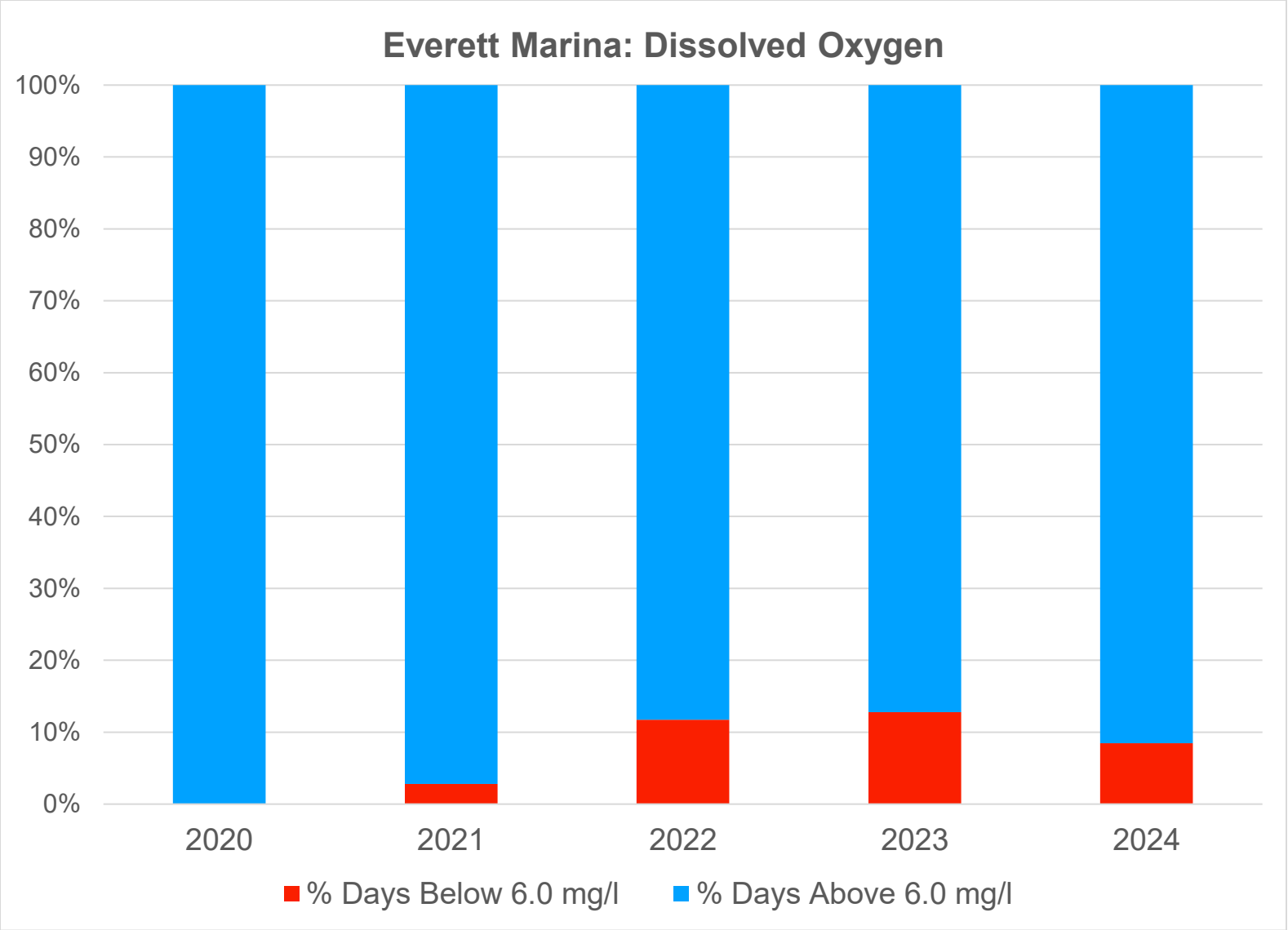

Figure 3. The percentage of days monitored that DO is above or below the 6.0 mg/l standard for January 1- December 31 of 2020 through 2024 at Everett Marina.

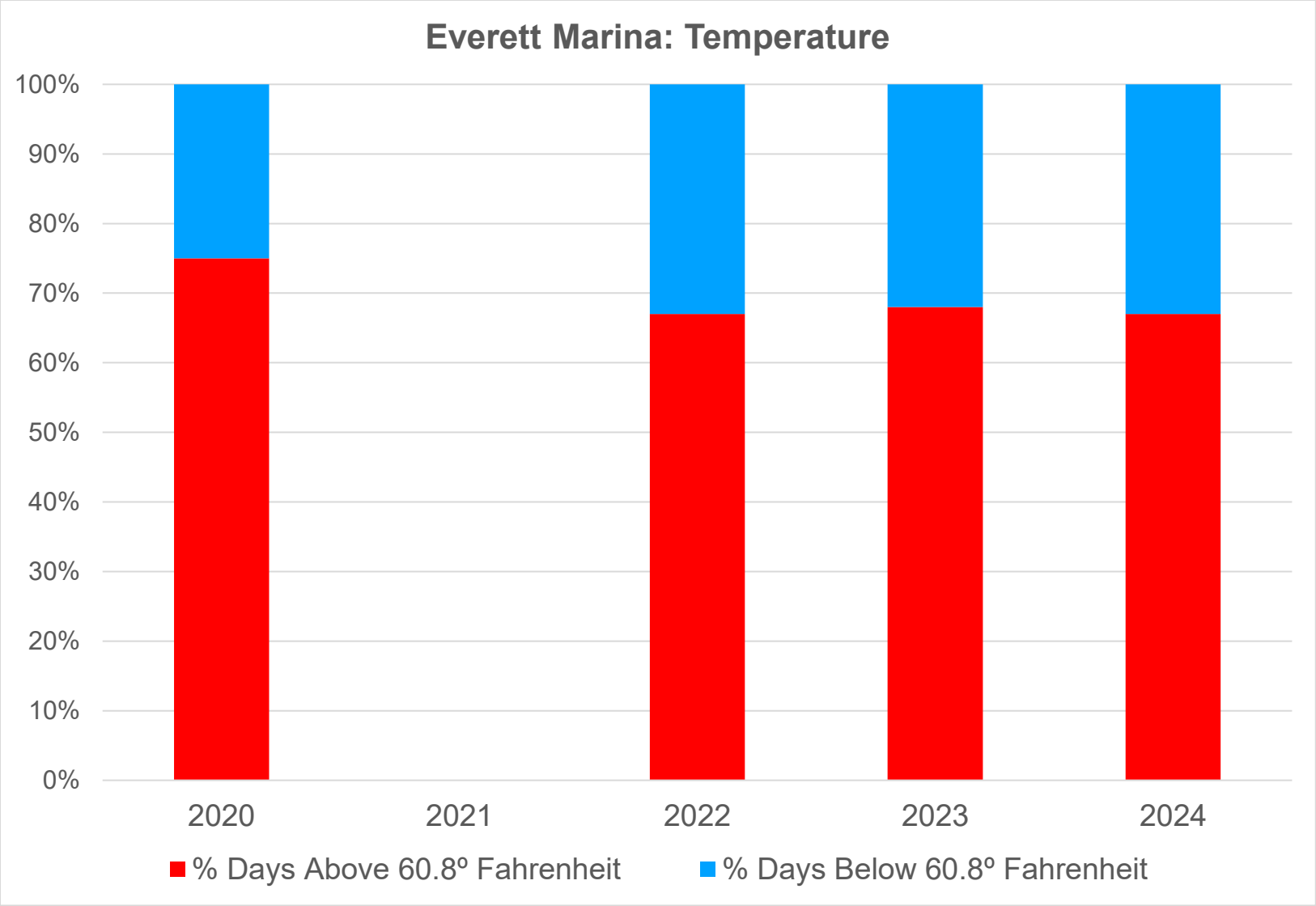

Figure 4. The percentage of days monitored that the T is above or below 60.8º Fahrenheit *for June 15 - September 15 of 2020 through 2024 at Everett Marina.*

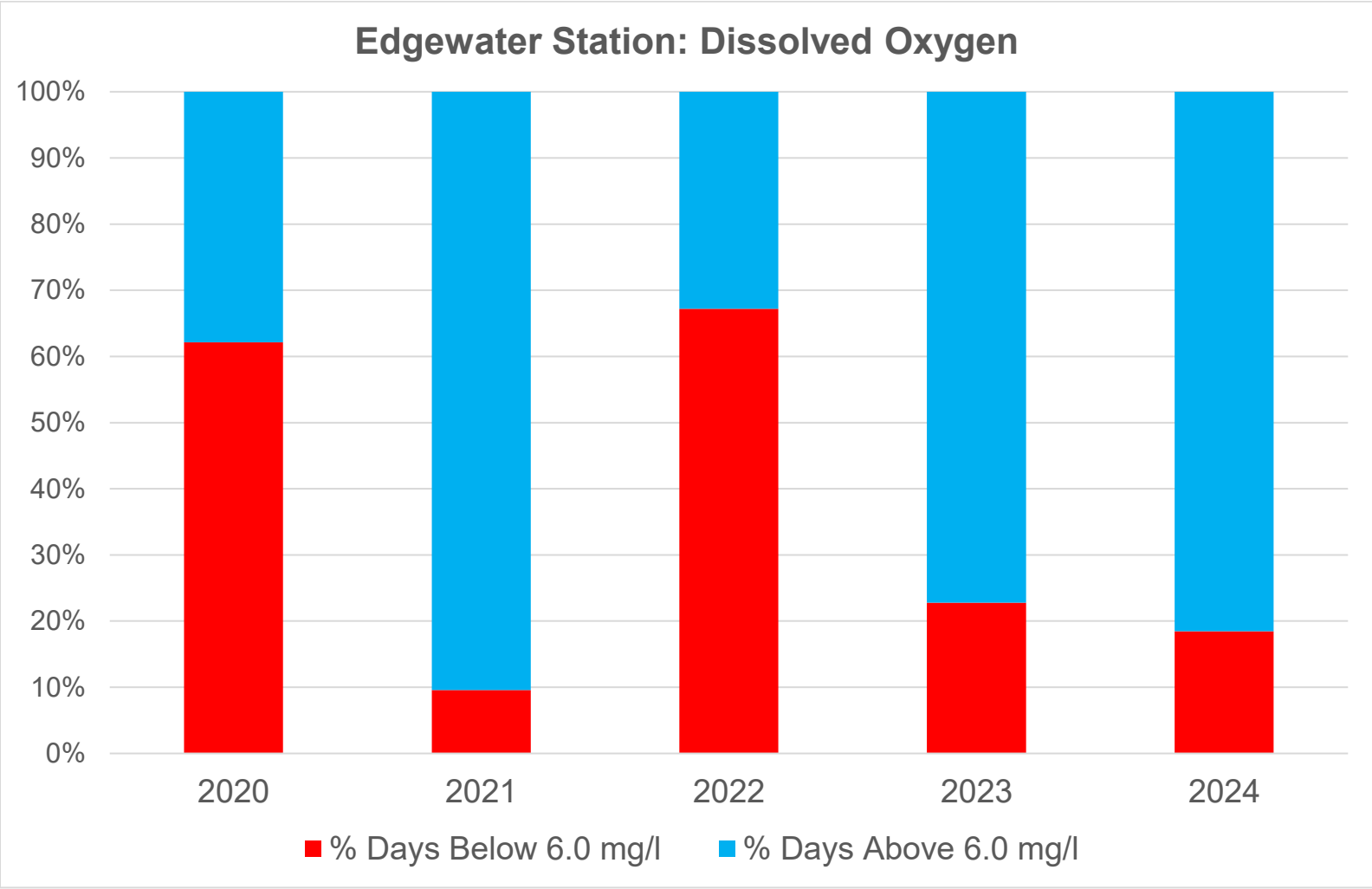

Figure 5. The percentage of days monitored that DO is above or below the 6.0 mg/l standard for January 1- December 31 of 2020 through 2024 at Edgewater Beach.

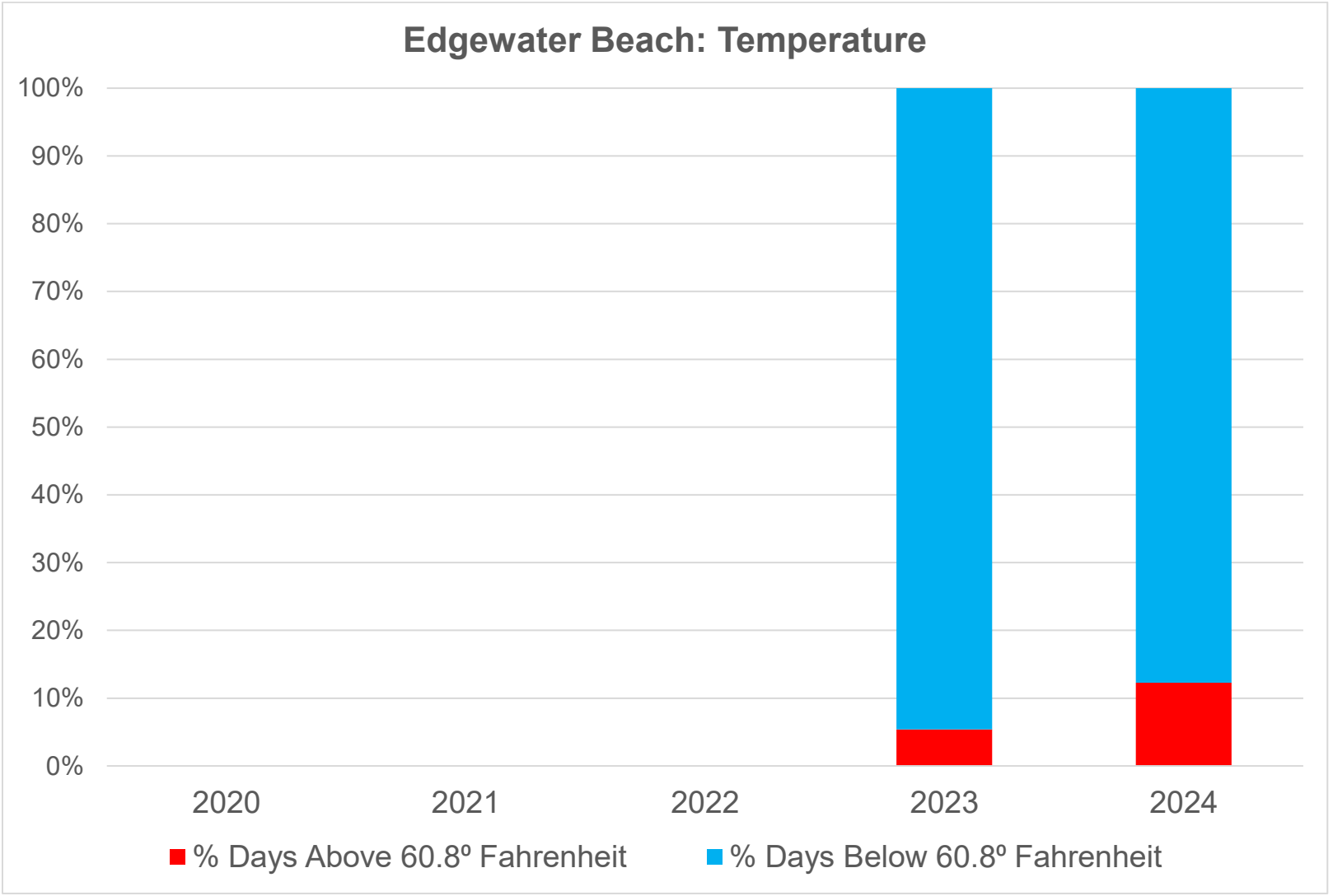

Figure 6. The percentage of days monitored that the T is above or below 60.8º Fahrenheit *for June 15 - September 15 of 2020 through 2024 at Edgewater Beach.*