San José-Santa Clara
Regional Wastewater Facility
Reporting Period June 1 – October 31, 2020

Pond A18

2020 Annual Self-Monitoring Report

Order No. R2-2005-0003

Prepared for:
California Regional Water Quality Control Board
San Francisco Bay Region
1515 Clay Street, Suite 1400
Oakland, CA 94560

Prepared by:
City of San Jose, Environmental Services Department
San José-Santa Clara Regional Wastewater Facility
700 Los Esteros Road
San Jose, CA 95134

San José-Santa Clara Regional Wastewater Facility reports are posted online at
https://www.sanjoseca.gov/your-government/environment/regulatory-reports

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

I. INTRODUCTION

This report summarizes 2020 water quality monitoring for Pond A18. Monitoring began June 1 and ended October 31 as required by the Waste Discharge Requirement (WDR) Order No. R2-2005-0003 (Order) and subsequent modifications to the Order as approved by the Executive Officer of the San Francisco Bay Regional Water Quality Control Board (Water Board).

This was the sixteenth year of continuous discharge monitoring for Pond A18. Figure 1 indicates the location of Pond A18 hydraulic control structures and sampling sites in the receiving water (Artesian Slough and Coyote Creek).

A. Waste Discharge Requirements

Pond A18 circulates San Francisco Bay (Bay) water by means of two water control structures located at the northern and southern ends of the levee bounding the western edge of the pond. Discharge of pond water back into the Bay via Artesian Slough is regulated by the WDR, and the water quality of the pond must meet the discharge limitations outlined in Table 1.

Table 1. Pond A18 discharge requirements for Salinity, Dissolved Oxygen, and pH

Constituent	Instantaneous Maximum	Instantaneous Minimum	Units
Salinity	44		ppt
Dissolved Oxygen[1]		5.0	mg/L
pH	8.5	6.5	standard units

Pond A18 must also meet the following water quality requirements:

1. Discharge temperature into Artesian Slough shall not exceed the receiving water temperature by 20°F.

[1]Discharger may select station A18-D or the downstream receiving water monitoring station nearest to the A18 discharge to evaluate compliance with the dissolved oxygen limit. In cases where receiving waters do not meet the Basin Plan Objective, the Discharger must show, as described in its Operations Plan, that pond discharges are not causing low dissolved oxygen in the receiving water.

2. If pond dissolved oxygen (DO) levels at station A18-D fall below 1.0 mg/L, the discharger shall monitor, report, and take corrective actions required by Provision D.2.

B. Monitoring Requirements

Monitoring in 2020 was conducted in compliance with the Pond A18 WDR monitoring requirements on page 9, Table 2 of the "Self-Monitoring Program" of the Order, and subsequent revisions to the WDR. The City continuously monitored (15-min intervals) pond discharge from June 1 to October 31, 2020 for DO, pH, temperature, and salinity. Discrete measurements of these same parameters and chlorophyll *a* were collected between 0800 and 1000 hours once per month in the pond. Additionally, City staff conducted monthly discrete monitoring at four stations in the receiving water. A multiparameter sonde was used to record DO, pH, temperature, and salinity at the surface and bottom, while a Van Dorn bottle was used to collect discrete grab samples from just below the surface and above the bottom for laboratory analysis of turbidity.

Following the 2012 annual report, a letter from the Water Board's Executive Officer, Bruce Wolfe, dated April 9, 2013, eliminated the requirement of continuous receiving water monitoring. In 2020, receiving water was monitored with weekly discrete water column measurements in response to the pond's weekly 10^{th} percentile DO concentration falling below the 3.3 mg/L trigger threshold. The dates and results of trigger monitoring are presented on Page 11, Table 6.

Per a modification to the WDR in 2018 (Provision D.7), the previous requirement for monitoring of receiving water sediments for mercury and methyl mercury every other year was eliminated. The City demonstrated that from 2011 through 2017, Artesian Slough sediment mercury levels were consistently near the average mercury concentration in Lower San Francisco Bay, and therefore no further sediment monitoring was necessary. This monitoring was conducted for the final time in September 2017.

C. Pond Operations in 2020

Pond A18 was successfully operated in the standard southern discharge orientation throughout 2020, with no repairs or unusual operations required. Following the South Levee Repair Project, completed in 2018, City staff monitored the structural integrity of the southern structure and levee throughout the 2020 monitoring period. Staff carefully adjusted pond flow rate and water depth to balance minimizing levee stress with maximizing pond flushing.

In addition to monitoring by City staff, a geotechnical engineer from HydroScience Engineers, Inc. evaluated the structural integrity of the southern gate structure on October 21, 2020. The engineer noted that the sheet pile walls are continuing to perform well, although the baserock in some areas around the structure's bulkheads is beginning to settle and erode. City staff and HydroScience contractors will continue monitoring the southern structure, and recommended baserock additions will be implemented as deemed necessary by ongoing geotechnical assessment.

During the summer 2020 northern California wildfires, smoke covered the sky and obscured sunlight during periods of late August and early September. City staff carefully monitored Pond A18 water quality parameters and visual conditions during this time, but no fish kills or other signs of ecological impairment were observed, despite a confirmed fish kill in nearby Pond A16.

Figure 1. Pond A18 monitoring stations and hydraulic control structures- Southern Discharge. Arrows indicate the flow of water through the control structures

As the pond was operated continuously in the southern discharge orientation throughout the 2020 dry season, water quality monitoring and weekly 10th percentile DO assessments were conducted at the southern structure. Monthly discrete monitoring, as well as low-DO trigger monitoring when required, were conducted in accordance with Artesian Slough stations outlined in the southern release scenario of the WDR and Operations Plan (Figure 1). Station 1 was located just upstream of the southern structure, nearest to Facility effluent discharge, and Station 2 was located just downstream of the southern structure. Station 3 was located at the halfway point between the southern structure and Artesian Slough's confluence with Coyote Creek, and Station 4 at the downstream end of Artesian Slough, just before the confluence with Coyote Creek.

II. MONITORING METHODS AND RESULTS

San José-Santa Clara Regional Wastewater Facility (Facility) staff used water quality monitoring sondes manufactured by YSI, Inc. for general water quality monitoring (DO, pH, temperature, salinity). The EXO3 model sonde was deployed for continuous monitoring and recorded water quality measurements every 15 minutes in the pond at the southern gate structure. The EXO1 model sonde was used for discrete monitoring of surface and bottom measurements in the receiving water. All sondes were outfitted with an optical DO probe, a conductivity/temperature probe, and a pH probe. In addition, Secchi depth was measured weekly and chlorophyll *a* monthly in the pond at the southern gate structure. Temperature, salinity, pH, DO, and turbidity were also measured monthly at the surface and bottom in the receiving water (Figure 1) as part of the discrete monitoring program.

Monitoring throughout the 2020 dry season was performed following COVID-19 safety protocols. City staff responsible for Pond A18 monitoring primarily worked from home and were required to pass health screening (including temperature checks and answering questions about COVID-19 symptoms) at the Facility security gate before entering the Facility to perform field work. One biologist at a time conducted weekly sonde swaps and data evaluation on alternating weeks. While trigger monitoring and monthly discrete receiving water monitoring required two people, staff wore face coverings, maintained social distancing, and minimized time spent together indoors. Careful planning and adherence to safety protocols allowed City staff to complete all work required for Pond A18 monitoring without issue.

A. Quality Assurance/Quality Control

Facility staff calibrated and maintained sondes to ensure accuracy before deploying. After each use, staff checked sondes for their accuracy against known standards for conductivity, pH and DO. An unattended EXO3 sonde was deployed in the pond for 1 week and then replaced with another cleaned and calibrated sonde. This rotation continued throughout the duration of dry season monitoring.

Data Validation

Staff followed established acceptance criteria for sonde data with post-deployment readings within 5% of the theoretical level accepted. Data within 5 - 10% were accepted or rejected based on best professional judgment. Staff rejected data with post deployment measurements exceeding 10% of theoretical and investigated the cause of such failures.

Calibration standards used for post-deployment accuracy checks to validate sonde data were:

- DO – percent saturation in water-saturated air (theoretical of 100% saturation).
- pH – a 2-point calibration (pH 7 and pH 10) to establish a pH slope.
- Conductivity – 50,000 microSiemens standard.

While sonde DO post-deployment measurements passed QA/QC throughout the monitoring season, the continuous monitoring data from late July through August showed that the diurnal fluctuations of DO values being measured in the pond were steadily decreasing in magnitude. The two DO probes showing this trend were replaced in August and September, respectively. A subsequent increase in the diurnal variation of continuous monitoring DO readings indicated that these sensor replacements resolved this issue.

Sonde battery voltage was checked before each deployment to ensure the battery would remain above the data recording threshold, determined at the end of the 2019 monitoring season, for the entire week of deployment. Sonde batteries were replaced before deployment if their voltage read below 2.8 V when connected to the KOR software. This protocol helped yield consistent, reliable continuous monitoring data throughout the 2020 dry season.

There was only one period (September 23 through 30, 2020) of invalid data due to an error made in the KOR software deployment settings before the sonde was deployed for that week of monitoring, and precautionary trigger monitoring was performed the following week.

B. Continuous Monitoring

During the 2020 dry season monitoring period, sondes at the Pond A18 discharge point (Station A18-D, Figure 1) recorded temperature, salinity, pH, and DO every 15 minutes. Following deployment, staff uploaded these data to a computer where they were checked for accuracy and completeness, summarized, and evaluated with respect to discharge requirements and action triggers. Weekly 10^{th} percentile DO readings for pond discharge indicated the need for any adaptive management responses during the upcoming week. Such responses could include, but were not limited to, additional receiving water monitoring, aeration, reversing direction of flow, or strategic timing of pond discharges to limit low DO discharge.

Temperature

Water temperature for Pond A18, under both discharge and non-discharge conditions, is presented in Table 2.

Table 2. Temperature results – 2020 continuous monitoring (°C)

Site/Condition	Minimum	Maximum	Mean	Median	# of Measurements (n)
A18 Discharge	15.2	30.3	23.8	24.0	12,687
A18 Non-Discharge	15.5	29.2	24.4	24.6	1,336

Pond minimum temperatures in 2020 (Table 2) were approximately 2°C lower than in 2019, but maximum temperatures were consistent with the previous year during both discharge and non-discharge periods. Mean and median 2020 temperatures (Table 2) were also consistent with those in 2019. In typical fashion, temperatures showed mid-summer peaks and dropped considerably at the end of the monitoring season. Temperatures did not differ noticeably between discharge and non-discharge periods (Figure 2).

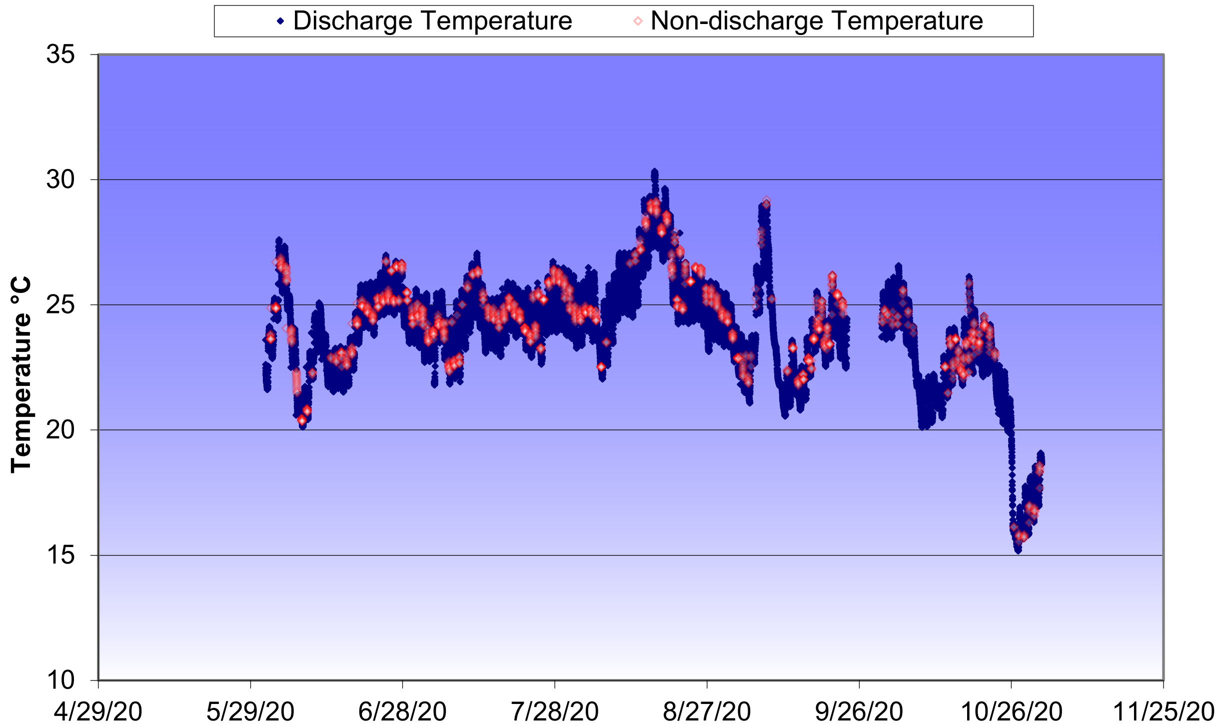

Figure 2. Temperature profile – Pond A18 2020 dry season

Salinity

Pond salinity, under both discharge and non-discharge conditions, is presented in Table 3.

Table 3. Salinity results - 2020 continuous monitoring (PSU[2])

Site/Condition	Minimum	Maximum	Mean	Median	# of Measurements (n)
A18 Discharge	24.1	40.3	32.3	32.1	12,687
A18 Non-Discharge	24.3	40.3	31.5	29.7	1,336

Discharge salinity remained below 44 PSU at all times during the 2020 monitoring period. Minimum and maximum 2020 pond salinities (Table 3) were higher than in 2019 by approximately 10 and 13 PSU, respectively. Both discharge and non-discharge salinities (Table 3)

[2]Practical Salinity Units (PSU) are a measurement of salinity from the specific conductance measured in water. An algorithm based on the ion composition of natural sea water converts specific conductance into PSU. One PSU is approximately equivalent to one part-per-thousand salinity.

were, on average, approximately 12 PSU higher than in 2019, and they were approximately 22 PSU higher than the preceding three years' mean dry season salinities. This trend reflects the change from the northern discharge orientation implemented from 2016 through late 2018, in which the southern structure was used to intake Facility effluent-rich slough water, to the southern discharge orientation implemented from late 2018 onward, in which the northern structure was used to intake more Bay-influenced water from farther downstream Artesian Slough. As in previous years, salinity increased throughout the monitoring period (Figure 3). Weekly sudden increases starting in mid-July reflect the timing of when sondes (and thus sensors) were swapped. Discharge and non-discharge salinities generally did not differ.

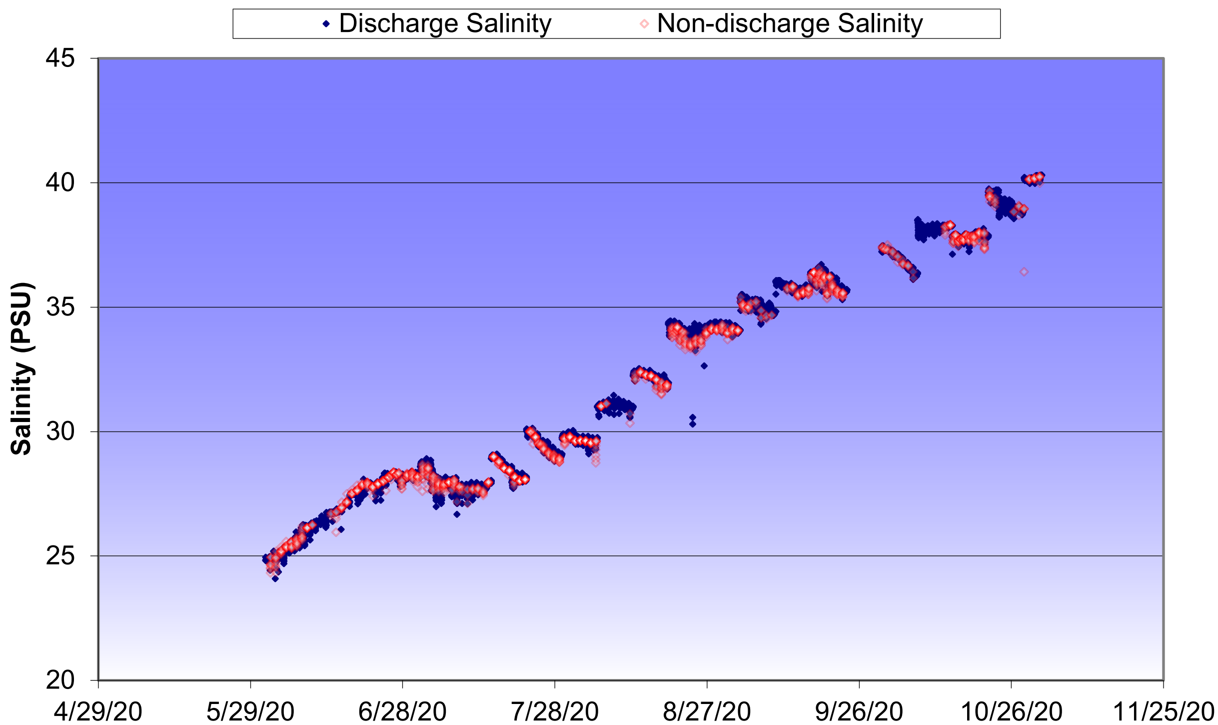

Figure 3. Salinity profile – Pond A18 2020 dry season

pH

Pond pH, under discharge and non-discharge conditions, is shown in Table 4.

Table 4. pH results – 2020 continuous monitoring

Site/Condition	Minimum	Maximum	Mean	Median	# of Measurements (n)
A18 Discharge	8.2	10.2	9.2	9.3	12,687
A18 Non-Discharge	8.2	10.1	9.3	9.3	1,336

The Basin Plan Objective for pH requires that receiving water pH remain between 6.5 and 8.5, and pond pH was above this range for most of 2020, as is typical of Pond A18 dry season conditions. While pond pH was above the range in the Basin Plan, discrete pH monitoring, performed at least monthly in the receiving water (page 15, Table 9) demonstrated that the Basin Plan Objective for pH was consistently met at the surface. In addition, previous years of continuous receiving water monitoring for pH (2005 – 2012) have demonstrated no adverse affects to receiving water pH from high pH pond discharges.

Minimum discharge and non-discharge pH values (Table 4) in 2020 were 0.9 units lower than in 2019, while maximum and mean values were 0.2-0.4 units lower. Unlike 2019, pH in 2020 generally decreased throughout the monitoring season, especially in September and October (Figure 4). Episodes of intense photosynthesis due to high algal biomass, elevated water temperature and increased solar irradiance tend to coincide with increased pH. This is usually followed by declines in pH when algae die off and decompose later in the season. Changes in these conditions generally coincide with shifts in phytoplankton species composition. As is typical, discharge and non-discharge pH did not differ from each other.

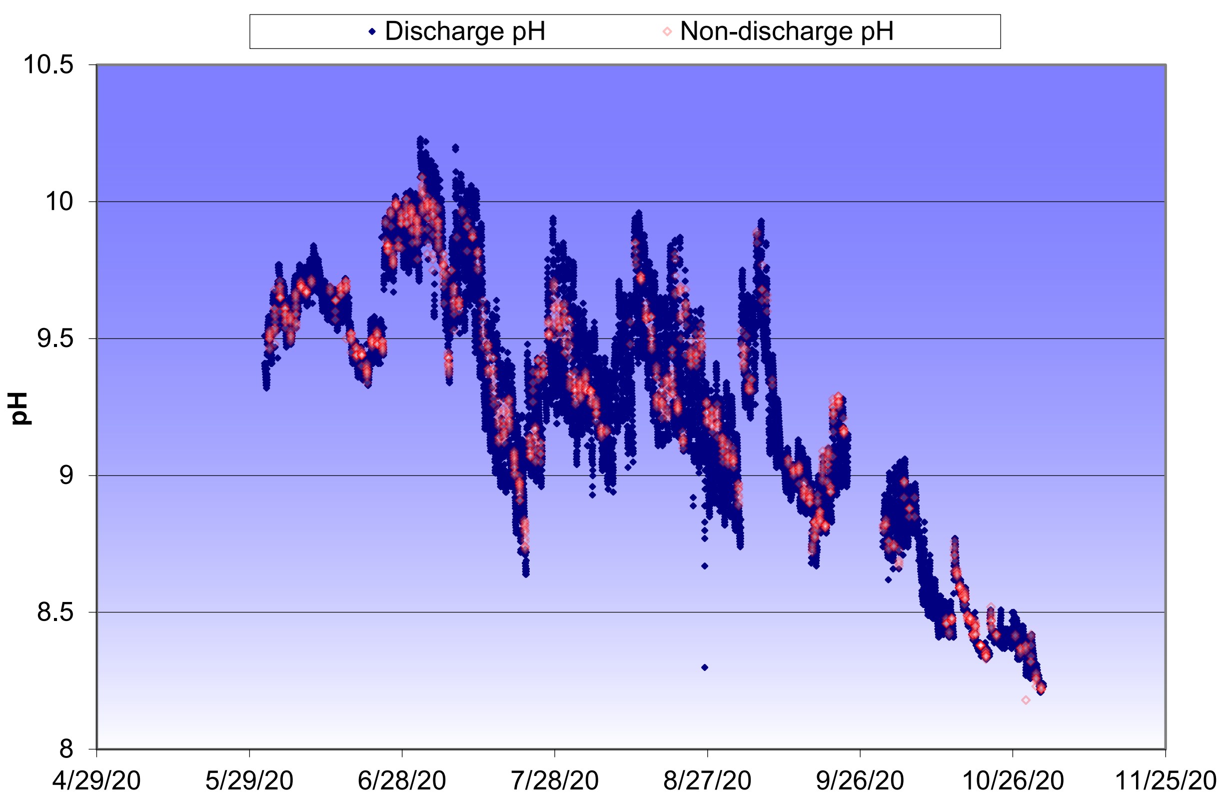

Figure 4. pH profile – Pond A18 2020 dry season

Dissolved Oxygen

Pond DO concentrations, under both discharge and non-discharge conditions, are summarized in Table 5.

Table 5. DO results – 2020 continuous monitoring (mg/L)

Site/Condition	Minimum	Maximum	Mean	Median	# of Measurements (n)
A18 Discharge	0.0	19.0	6.9	7.2	12,687
A18 Non-Discharge	0.0	16.0	7.3	7.6	1,336

Pond DO is primarily influenced by a photosynthesis-driven diurnal pattern (Figure 5) of high primary productivity by algae during the day and high net ecosystem respiration at night by algae and other organisms residing in the pond. Other factors influencing pond DO to a lesser extent include hydraulic residence time and flushing in the pond, intensity and duration of sunlight/cloud cover, temperature, and algal biomass and community composition.

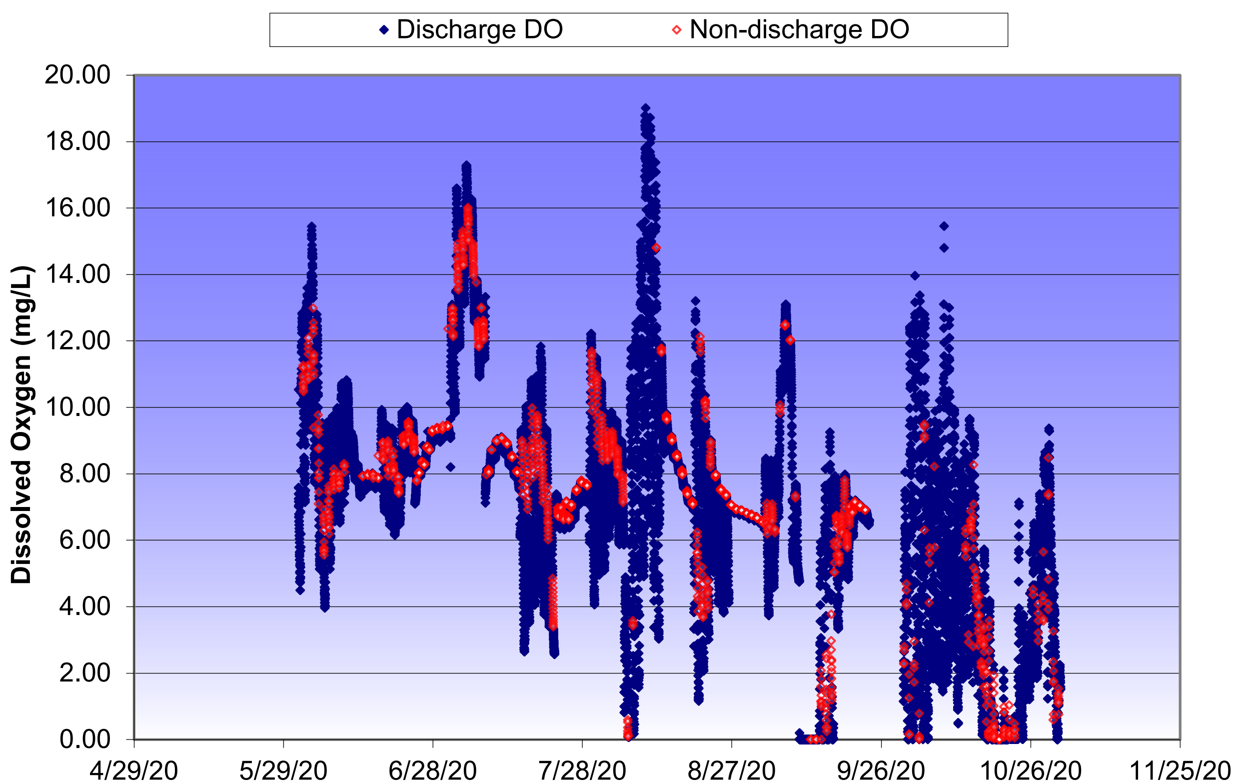

Figure 5. DO profile – Pond A18 2020 dry season

Pond DO concentrations were more variable in 2020 than in 2019, with maximum values (Table 5) approximately 1-2 mg/L higher. Mean 2020 discharge and non-discharge pond DO values were 1 mg/L lower than in 2019. Similar to years prior to 2019, DO occasionally dipped to zero starting in August and showed a slight decreasing trend from August through the end of the dry season.

Whenever the pond's weekly 10th percentile DO concentration fell below the 3.3 mg/L threshold, the City's trigger response consisted of weekly discrete water column sonde measurements at the surface and bottom at three receiving water monitoring stations. Under Pond A18's southern release configuration, these stations were located in Artesian Slough at Stations 1, 2, and 3 (Figure 1). Trigger monitoring occurred seven times in 2020 (Table 6). Trigger data was evaluated by Facility staff and revealed no negative effects from episodic low DO pond discharges, therefore, no additional adaptive management or monitoring actions were implemented. Trigger monitoring results are presented and discussed in Section III of this report.

Table 6. Weekly 10th percentile DO values for Pond A18 discharge and response in 2020

Week and Date Range	10th Percentile Value (mg/L)	Response
1: 6/1 – 6/3	5.8	None required
2: 6/3 – 6/10	5.6	None required
3: 6/10 – 6/17	7.6	None required
4: 6/17 – 6/24	6.9	None required
5: 6/24 – 7/1	7.9	None Required
6: 7/1 – 7/8	10.9	None Required
7: 7/8 – 7/15	8.0	None required
8: 7/15 – 7/22	3.8	None required
9: 7/22 – 7/29	6.4	None required
10: 7/29 – 8/5	5.7	None Required
11: 8/5 – 8/12	1.9	Trigger monitoring initiated 8/13 – no impacts
12: 8/12 – 8/19	7.1	None Required
13: 8/19 – 8/26	3.4	None Required
14: 8/26 – 9/2	6.6	None Required
15: 9/2 – 9/9	5.3	None Required
16: 9/9 – 9/16	0.0	Trigger monitoring initiated 9/16 – no impacts
17: 9/16 – 9/23	5.1	None Required
18: 9/23 – 9/30	No data – sonde deployment error	Trigger monitoring initiated 10/1 – no impacts
19: 9/30 – 10/7	0.8	Trigger monitoring continued 10/8 – no impacts
20: 10/7 – 10/14	2.1	Trigger monitoring continued 10/16 – no impacts
21: 10/14 – 10/21	0.0	Trigger monitoring continued 10/22 – no impacts
22: 10/21 – 10/28	0.0	Trigger monitoring continued 10/29 – no impacts
23: 10/28 – 10/31	1.0	None required- end of dry season monitoring

General Observations

Patterns of pond clarity and water color during the 2020 monitoring season were similar to 2019 in the first half of the season and diverged during the second half. Similar to 2019, pond water at the beginning of the 2020 dry season was green, with abundant benthic algae along the pond margins (Figure 6), and the water started to become clearer by July (Figure 7). Filamentous algae was prevalent at the margins of the pond during the summer months, also similar to 2019.

Figure 6. June 3 – green waters and abundant algae along pond margins

Floating clumps of benthic algae often obscured our ability to measure Secchi depth in June, though the water was relatively clear (Table 7). Extensive floating algal mats covered the majority of the pond throughout July. These mats began to recede toward the eastern end of the pond in early August, and they continued to recede further as wildfire smoke began to cover the Bay Area in late August (Figure 8).

Figure 7. July 8 – darker, clearer waters and extensive algae throughout pond

In early September, as dense wildfire smoke consistently darkened the sky, surface algae disappeared from the pond and waters became brownish-blue (Figure 9), though this trend was similar to 2019 observations. The smoke mostly cleared by the end of September. For a brief period in mid-October, waters became turbid and turned a greenish-gray color, with many small clumps of dead algae floating near the southern structure (Figure 10). By the end of the monitoring season, waters became clearer and algae clumps had diminished, similar to the previous year (Figure 11).

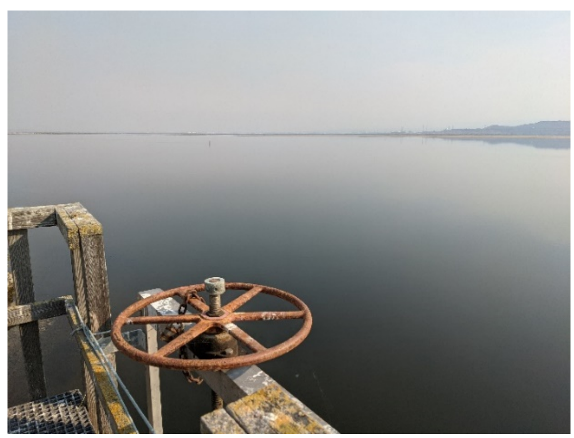

Figure 8. August 19 – sky hazy with wildfire smoke. Algae receded to eastern side of pond

Pond waters in 2020 were generally less clear, with slightly lower Secchi depths (Table 7), than in 2019, but waters were clearer than during the 2016-2018 northern discharge regime. Surface algae in the pond grew more extensively in the summer of 2020 than 2019. However, this algae also cleared more quickly in August 2020, perhaps partly due to decreased sunlight from wildfire smoke cover. The opaque gray-green waters with dead floating algae clumps in October 2020 (Figure 10) had not been observed in years past, and may have been caused by decomposing algal mats being flushed from the eastern end of the pond toward the southern structure. Fortunately, these conditions did not persist for long, and waters returned to normal by the end of the monitoring season.

Figure 9. September 9 – sky covered and darkened by wildfire smoke. Surface algae absent

Figure 10. October 21 – turbid, opaque waters and clumps of algae around southern structure

Figure 11. October 28 – end of monitoring season. Water clearing up, algae clumps gone

Table 7. Secchi measurements in 2020. Water quality measurements included for context to illustrate general changes in pond characteristics.

Date and Time	Secchi Depth (cm)	Temp (°C)	Salinity (PSU)	DO (mg/L)	pH
6/3 15:15	41	27.6	25.0	14.0	9.7
6/10 10:00	84	22.7	26.2	8.4	9.7
6/17 09:30	>75 (obscured by macroalgae)	22.0	27.2	7.6	9.6
6/24 09:00	>80 (obscured by macroalgae)	24.8	28.0	8.2	9.5
7/1 12:30	>65 (obscured by macroalgae)	24.8	28.6	8.2	10.1
7/8 12:30	44	24.4	27.5	7.1	10.1
7/15 11:30	>65 (obscured by macroalgae)	23.5	28.9	6.5	9.2
7/22 10:00	54	23.3	30.0	7.0	9.0
7/29 09:45	75	24.0	29.1	7.1	9.2
8/5 09:30	53	23.5	31.0	0.8	9.2
8/12 10:15	78	24.9	31.0	4.8	9.2
8/19 09:15	65	27.0	32.0	6.9	9.2
8/26 10:00	79	24.2	32.7	6.8	8.3
9/2 12:30	47	22.4	34.1	6.4	8.8
9/9 13:15	73	23.3	34.8	4.7	9.0
9/16 09:30	57	22.2	35.9	0.4	8.9
9/23 14:15	48	24.5	35.7	6.6	9.1
9/30 11:15	78	23.7	37.2	1.4	8.7
10/7 12:15	71	22.0	36.4	5.4	8.8
10/14 08:30	68	21.9	38.3	2.3	8.4
10/21 11:00	62	22.6	39.5	0.3	8.4
10/28 12:00	68	15.8	39.0	4.2	8.4

C. Discrete Monitoring

The WDR requires discrete water quality monitoring in both the pond and receiving water at monthly intervals.

Pond Discrete Monitoring

The WDR requires the collection of discrete water quality measurements in Pond A18 once per month. Monthly discrete DO and chlorophyll *a* readings for the pond need to be taken between 0800 and 1000 hours per the A18 WDR Monitoring Provisions. Staff measured the discrete pond water quality using temperature, salinity, pH, and DO from the continuous discharge monitoring sonde to fulfill these discrete monitoring requirements (Table 8). These measurements were recorded on the same date and time as the required monthly chlorophyll *a* sampling, which is detailed below in the section "Chlorophyll *a* Monitoring."

Table 8. 2020 discrete monthly water quality measurements at Pond A18 discharge

Date and Time	Temperature (C)	Salinity (PSU)	pH	DO (mg/L)
6/11 09:30	23.6	26.3	9.7	8.4
7/9 09:45	22.9	27.8	9.9	8.0
8/19 09:00	27.0	32.0	9.2	6.9
9/16 09:30	22.2	35.9	8.9	0.4
10/7 09:45	21.8	36.4	8.8	1.9

Receiving Water Discrete Monitoring

Discrete monthly water quality sampling is required at four receiving water locations (Figure 1) during the monitoring season (Figure 12). These surface and bottom measurements of DO, pH, temperature, salinity, and turbidity (Table 9) characterize the mixing of fresh slough water with Bay salt water during tidal exchange, and illustrate the effects (if any) that Pond A18 discharge may have on water quality. The WDR requires these measurements to be recorded while the pond is discharging.

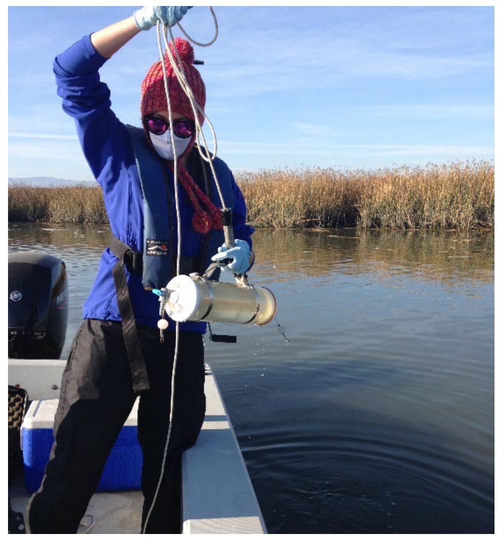

Figure 12. Biologist Jaylyn Babitch collects a discrete water sample from Artesian Slough

Table 9. Receiving water monthly surface and bottom water quality measurements in 2020

Date and Time	Site	Tide	Depth	Temp (°C)	Salinity (PSU)	pH	DO (mg/L)	Turbidity	A18 Flow (cfs)
6/11 09:50	1	Ebb	Surface	25.1	0.7	7.5	7.6	1.5	13.8
6/11 09:51	1	Ebb	Bottom	25.1	0.7	7.4	7.6	2.6	13.8
7/9 14:34	1	Flood	Surface	26.8	0.7	8.5	8.6	3.9	13.8
7/9 14:36	1	Flood	Bottom	26.9	0.7	8.4	8.7	4.7	13.8
8/13 13:16	1	Ebb	Surface	27.3	0.9	7.5	7.8	1.3	11.1
8/13 13:18	1	Ebb	Bottom	26.6	4.4	7.6	5.5	7.3	11.1
9/16 11:21	1	Flood	Surface	26.4	0.8	7.1	6.6	1.2	10.4
9/16 11:22	1	Flood	Bottom	24.5	8.9	7.7	5.2	21.4	10.4

Date and Time	Site	Tide	Depth	Temp (°C)	Salinity (PSU)	pH	DO (mg/L)	Turbidity	A18 Flow (cfs)
10/8 10:27	1	Ebb	Surface	25.8	0.8	7.1	6.8	1.2	11.8
10/8 10:28	1	Ebb	Bottom	25.8	0.9	7.1	6.7	1.6	11.8
6/11 09:55	2	Ebb	Surface	25.0	1.2	7.2	6.8	2.4	13.8
6/11 09:56	2	Ebb	Bottom	24.1	13.2	7.6	2.5	29.8	13.8
7/9 14:32	2	Flood	Surface	27.9	2.6	8.5	8.1	7.6	13.8
7/9 14:33	2	Flood	Bottom	26.3	13.7	9.1	6.1	21.9	13.8
8/13 13:11	2	Ebb	Surface	27.3	1.7	7.5	7.4	1.8	11.1
8/13 13:13	2	Ebb	Bottom	25.3	20.2	8.4	3.2	17.5	11.1
9/16 11:24	2	Flood	Surface	25.9	2.5	7.4	7.1	4.4	9.4
9/16 11:25	2	Flood	Bottom	23.0	18.4	8.0	4.2	45.6	9.4
10/8 10:31	2	Ebb	Surface	25.3	1.4	7.2	6.7	1.5	11.8
10/8 10:34	2	Ebb	Bottom	22.3	24.5	7.3	0.4	16.0	11.8
6/11 10:07	3	Ebb	Surface	24.7	3.2	7.8	6.1	9.3	14.3
6/11 10:11	3	Ebb	Bottom	24.4	5.0	7.6	4.5	36.7	14.3
7/9 14:17	3	Flood	Surface	24.6	12.5	8.7	4.8	25.7	14.5
7/9 14:19	3	Flood	Bottom	23.8	13.0	8.6	3.5	56.9	14.5
8/13 13:02	3	Ebb	Surface	27.0	3.5	7.4	6.0	3.9	10.6
8/13 13:04	3	Ebb	Bottom	24.8	17.5	7.7	1.8	20.1	10.6
9/16 11:30	3	Flood	Surface	22.4	14.8	7.5	5.0	35.1	9.4
9/16 11:32	3	Flood	Bottom	22.2	12.6	7.7	1.7	89.3	9.4
10/8 10:37	3	Ebb	Surface	24.2	2.8	7.4	6.3	8.8	11.8
10/8 10:41	3	Ebb	Bottom	22.2	15.9	7.9	2.2	24.4	12.1
6/11 10:22	4	Ebb	Surface	24.5	4.9	7.7	5.5	35.3	14.9
6/11 10:23	4	Ebb	Bottom	24.6	4.9	7.6	4.5	46.8	14.9
7/9 14:08	4	Flood	Surface	25.2	14.2	8.6	4.8	27.4	15.1
7/9 14:11	4	Flood	Bottom	24.3	14.7	8.7	4.3	51.6	15.1
8/13 12:51	4	Ebb	Surface	26.8	6.0	7.5	5.6	6.5	10.2
8/13 12:49	4	Ebb	Bottom	24.3	22.9	7.9	3.4	28.4	10.2
9/16 11:41	4	Flood	Surface	21.7	19.6	7.7	4.7	47.6	8.1
9/16 11:42	4	Flood	Bottom	21.6	19.9	7.7	3.9	59.5	8.1
10/8 10:48	4	Ebb	Surface	23.7	4.7	7.4	6.4	8.4	12.1
10/8 10:49	4	Ebb	Bottom	21.8	22.5	7.7	2.2	15.1	12.1

Temperature

Receiving water temperature was relatively consistent across the stations throughout the monitoring period, with a slight decrease moving downstream. Temperatures were lower at the bottom than at the surface, with the most temperature stratification apparent at Station 2 (Figure 13).

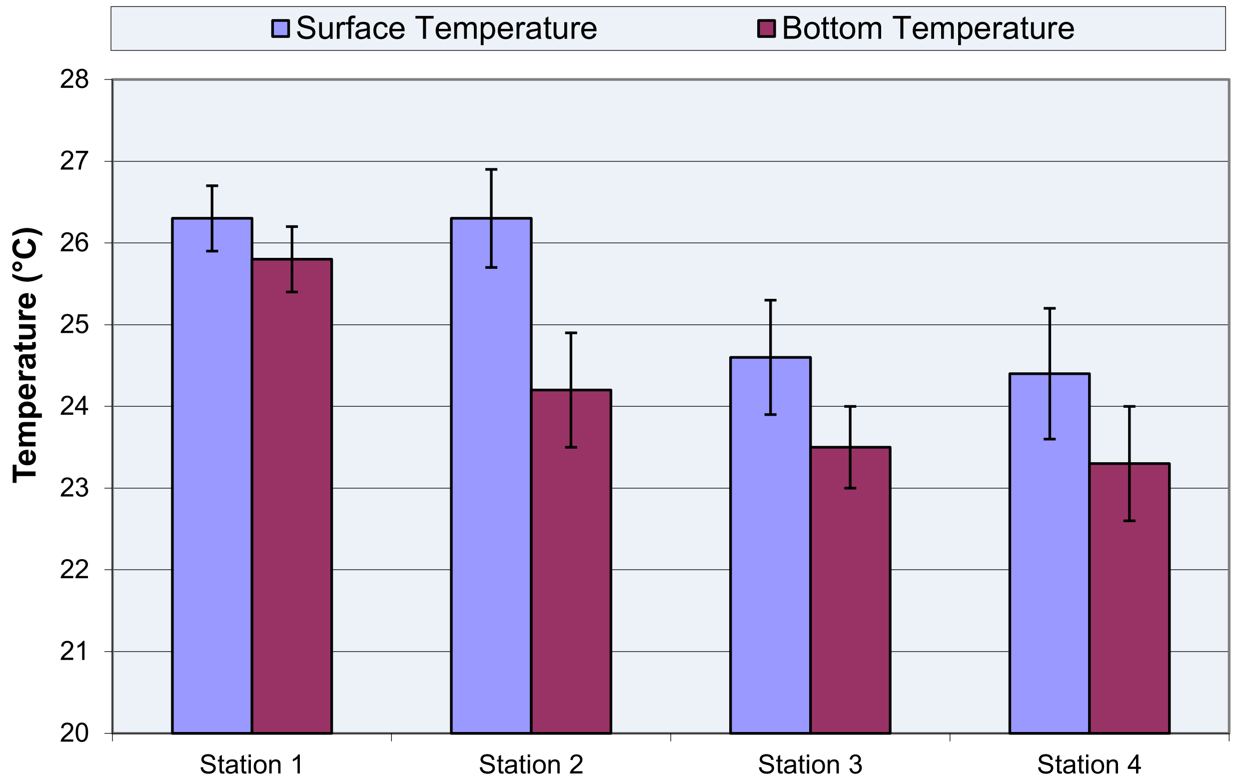

Figure 13. Mean (± SE) monthly temperature in receiving water in 2020

Salinity

Receiving water salinities were generally higher in 2020 than in 2019, but showed similar trends among stations and depths. As in 2019 and years prior to the implementation of the 2016-2018 northern discharge scenario, the receiving water salinity profile was dictated by upstream stratification (Stations 1 and 2) and downstream mixing (Stations 3 and 4) in Artesian Slough (Figure 14). However, Stations 3 and 4 showed increased stratification compared to 2019. The slough-wide pattern of greater stratification upstream is caused by fresher, less dense Facility effluent water floating on top of saltier, denser Bay water, an interaction that diminishes downstream as tidal mixing increases.

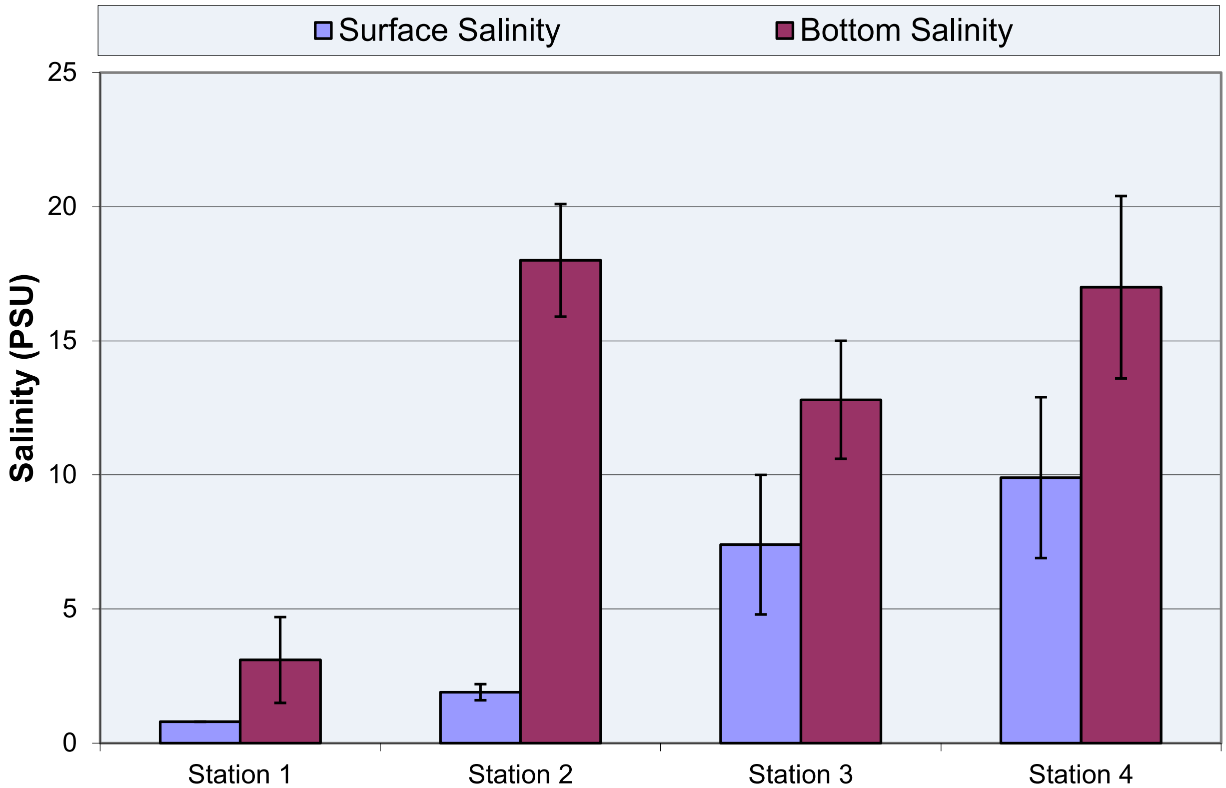

Figure 14. Mean (± SE) monthly salinity in receiving water for 2020

pH

Pond pH was generally higher (8.2 – 10.2; Table 4) than the surface and bottom measurements of the receiving water (7.1 – 9.1; Figure 15). Despite this, pH in receiving waters remained within the Basin Plan Objective (6.5-8.5), aside from three measurements on July 9, 2020: 8.7 at the surface at Station 3, 8.6 at the bottom at Station 3, and 9.1 at the bottom at Station 2 (Table 9).

At all four monitoring stations, pH was higher at the bottom than at the surface. Similar to 2019, pH in 2020 showed the most stratification at Station 2, while the other stations were relatively well-mixed. These results demonstrate that receiving water conditions are driven primarily by localized conditions and broader, more significant hydraulic inputs from the Bay, tributaries and the RWF discharge rather than being strongly influenced by Pond A18 discharge.

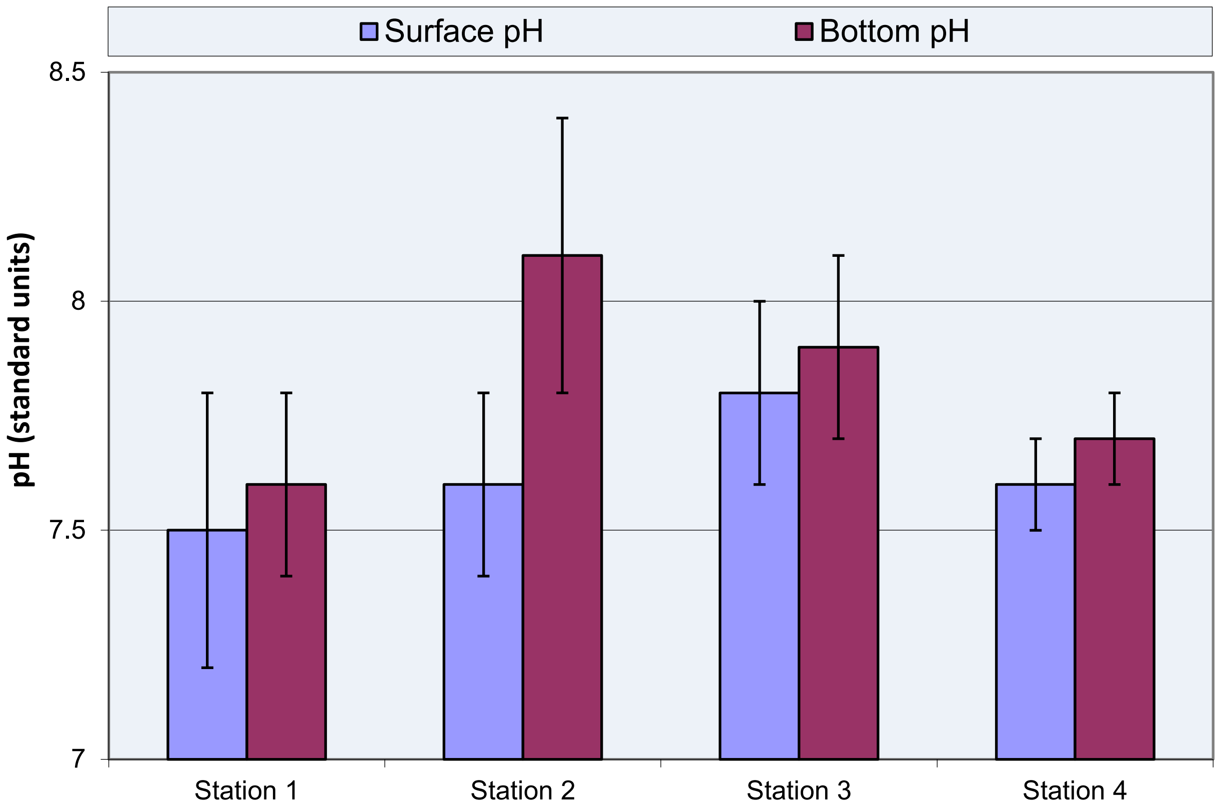

Figure 15. Mean (± SE) monthly pH in receiving water for 2020

Dissolved Oxygen

The WDR requires the Discharger to monitor, report, and take corrective action if monthly discrete DO levels in Pond A18 fall below 1.0 mg/L. This scenario occurred once during the 2020 season, on September 16 at 09:30 (Table 8). Trigger monitoring for temperature, salinity, pH and DO was conducted on August 13, September 16, and throughout the month of October when pond DO levels fell below the 10th percentile weekly trigger of 3.3 mg/l.

DO values were highest at Station 1 and generally decreased moving downstream, reflective of the oxygen-rich effect of the RWF effluent on both surface and bottom DO. Average surface DO was consistent between Stations 1 and 2, then decreased by approximately 2 mg/l at Stations 3 and 4. Bottom DO at Stations 2, 3, and 4 was approximately half of bottom DO at Station 1. Stratification was apparent at Stations 2, 3, and 4, with DO higher at the surface than bottom. Similar to 2019, stratification decreased at Station 4 as waters became more tidally-mixed, and bottom DO increased (Figure 16).

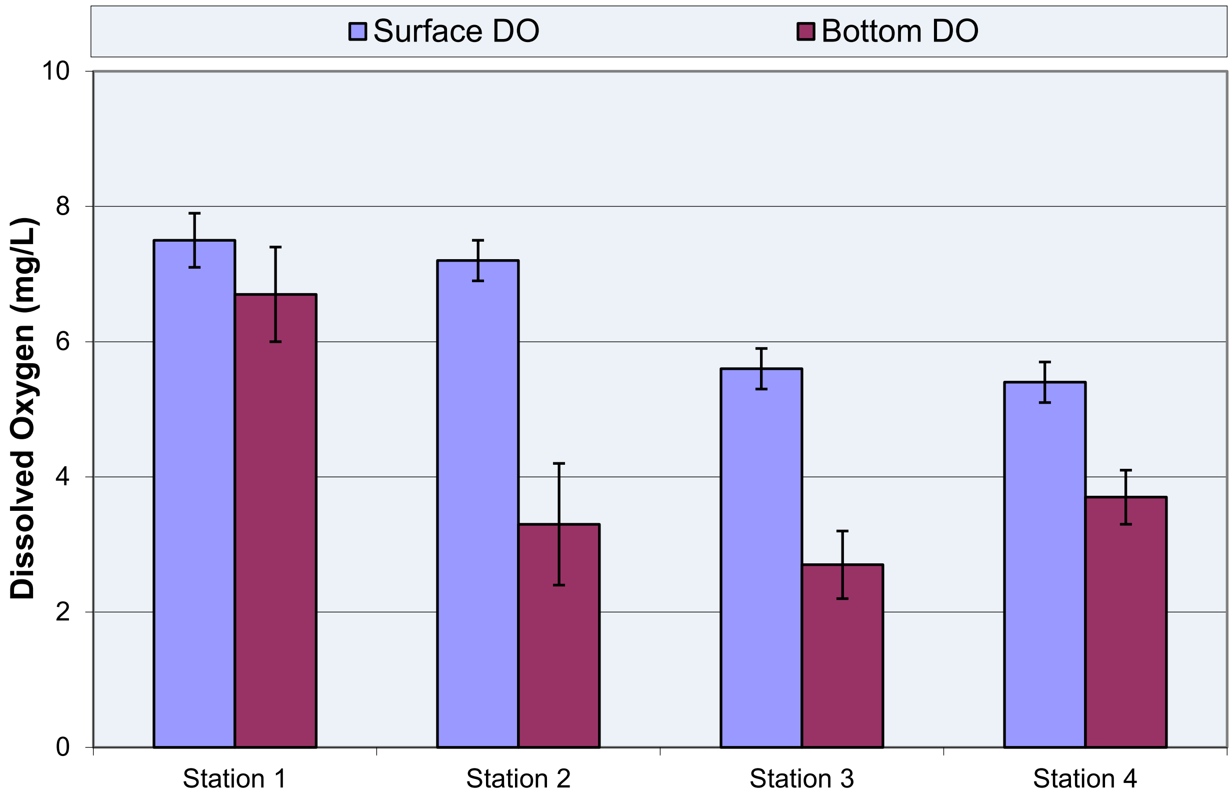

Figure 16. Mean (± SE) monthly Dissolved Oxygen in receiving water for 2020

Turbidity

Turbidity was measured monthly at the four monitoring stations (Figure 17). As expected, turbidity was higher at the bottom than surface at each station, with stratification evident at Stations 2 and 3. Surface and bottom turbidity generally increased moving downstream Artesian Slough, although values were similar between Stations 3 and 4. Average turbidity at these two downstream stations was lower than in 2019. Similar to 2019, overall turbidity in Artesian Slough was much lower than during the 2016-2018 northern discharge period, especially at the two stations nearest the Facility.

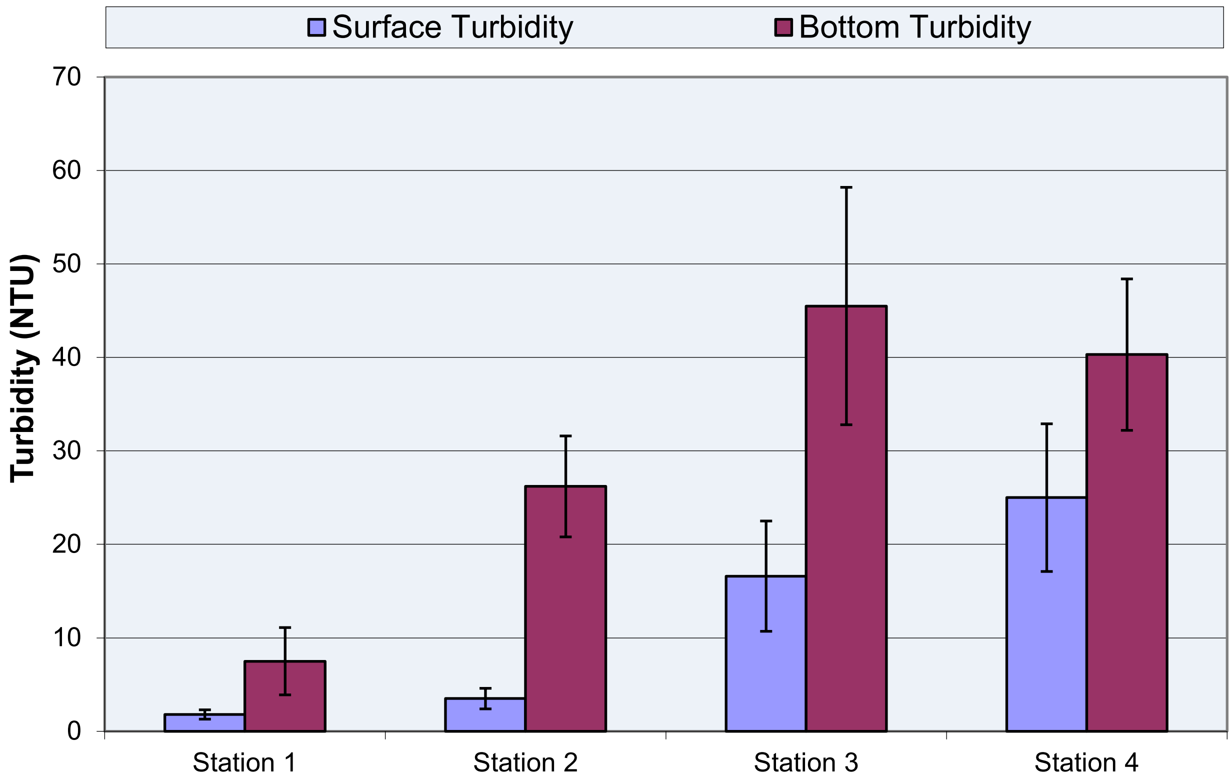

Figure 17. Mean (± SE) monthly turbidity in receiving water for 2020

Chlorophyll *a* Monitoring

The City measured chlorophyll *a* as an index of phytoplankton biomass in Pond A18 by collecting a monthly grab sample in a 2-liter brown plastic bottle. This sample, kept cool and out of direct light, was immediately brought to the Facility's Environmental Laboratory for fluorometric analysis (EPA Method 445.0) by City laboratory staff.

Phytoplankton biomass in the pond in 2020 (Table 10) was higher than in 2019 for July, August, and October, but it was generally decreased compared to the 2016-2018 northern discharge period. Similar to 2019, chlorophyll in 2020 was lowest in June and increased through July and August. Chlorophyll then decreased by over half from August to September, concurrent with a general decrease in DO levels and increase in salinity, and it remained consistent through October (Table 10). The observed variability in phytoplankton biomass reflects both seasonal and interannual cycles of community succession among phytoplankton flowing through the pond.

Table 10. Monthly chlorophyll a measurements at Pond A18 discharge in 2020. DO and salinity measurements are included for context to indicate general changes in pond characteristics.

Month	Date sampled	Chlorophyll *a* (μg/L)	DO (mg/L)	Salinity (PSU)
June	6/11/2020	12.9	8.4	26.3
July	7/9/2020	89.5	8.0	27.8
August	8/19/2020	260.0	6.9	32.0
September	9/16/2020	100.0	0.4	35.9
October	10/7/2020	133.0	1.9	36.4

III. EXCEEDANCES AND TRIGGERED ACTIONS

A. Trigger Monitoring Results

Table 6 lists the DO trigger events for pond discharges in 2020 and subsequent responses.

In 2020, the response to Pond A18's weekly 10^{th} percentile DO concentration falling below the trigger threshold of 3.3 mg/L consisted of recording additional weekly discrete water column measurements at Stations 1, 2, and 3 in Artesian Slough (Figure 1) to determine if lower DO pond discharges were adversely affecting receiving water DO (Figure 18).

Figure 18. Biologist Bryan Frueh records water quality data in Artesian Slough using a multi-probe YSI

Monitoring was performed in response to low-DO trigger events in weeks 11, 16, and 19 through 22 of the 2020 dry season, and in response to the sonde deployment error during week 18. Results are detailed in Table 11. Due to a logging error, no surface measurements were recorded at Station 1 on October 22, 2020. Since the bottom DO measurement at Station 1 (7.0 mg/L) was above the surface DO trigger threshold of 5.0 mg/L, we inferred that surface DO at Station 1 would have also been above this threshold. Nonetheless, trigger monitoring continued through the following week.

Trigger monitoring is designed to detect impacts of pond discharge on receiving water quality. Any confirmed negative impacts trigger additional adaptive management actions (e.g., additional water quality monitoring or valve adjustments). Negative impacts from pond discharges are defined as follows:

- Receiving water DO at Artesian Station 2 is < 5.0 mg/L at surface or < 3.3 mg/L at bottom, and;
- 2-hour average pond DO bracketing the time that receiving water measurements were taken is less than measured receiving water DO.

Low DO conditions in the receiving water must be linked to Pond A18 discharge to necessitate additional adaptive management measures.

There were three instances on August 8, October 1, and October 8, 2020, when trigger monitoring measured receiving water DO less than 3.3 mg/L at the bottom at Station 2 (Table 11). Continuous sonde data in the pond was evaluated to determine if pond discharge contributed to this value. The 2-hour average pond DO values bracketing the trigger measurement times were 9.3 mg/l on August 8, 0.5 mg/l on October 1, and 3.0 mg/l on October 8. The measurements on August 8 and October 8 were higher than the corresponding receiving water DO, but the measurement on October 1 was lower than the corresponding receiving water DO. However, this condition did not persist during the following weeks of trigger monitoring throughout October, so additional corrective actions were not implemented. Surface DO at Station 2 never measured below 5.0 mg/L during any trigger monitoring event in 2020 (Table 11).

Table 11. Discrete trigger monitoring results in 2020. ND indicates no data due to sonde malfunction

Week	Date and Time	Site	Tide	Depth	Temp (°C)	Salinity (PSU)	pH	DO (mg/L)
11	8/13 13:16	1	Ebb	Surface	27.3	0.9	7.5	7.8
	8/13 13:18	1	Ebb	Bottom	26.6	4.4	7.6	5.5
	8/13 13:11	2	Ebb	Surface	27.3	1.7	7.5	7.4
	8/13 13:13	2	Ebb	Bottom	25.3	20.2	8.4	3.2
	8/13 13:02	3	Ebb	Surface	27.0	3.5	7.4	6.0
	8/13 13:04	3	Ebb	Bottom	24.8	17.5	7.7	1.8
16	9/16 11:21	1	Flood	Surface	26.4	0.8	7.1	6.6
	9/16 11:22	1	Flood	Bottom	24.5	8.9	7.7	5.2
	9/16 11:24	2	Flood	Surface	25.9	2.5	7.4	7.1
	9/16 11:25	2	Flood	Bottom	23.0	18.4	8.0	4.2
	9/16 11:30	3	Flood	Surface	22.4	14.8	7.5	5.0
	9/16 11:32	3	Flood	Bottom	22.2	12.6	7.7	1.7
18	10/1 12:12	1	Flood	Surface	25.8	3.7	7.6	5.6
	10/1 12:13	1	Flood	Bottom	24.1	11.4	8.0	3.4
	10/1 12:14	2	Flood	Surface	26.4	2.1	7.5	6.7

Week	Date and Time	Site	Tide	Depth	Temp (°C)	Salinity (PSU)	pH	DO (mg/L)
	10/1 12:15	2	Flood	Bottom	23.7	13.6	7.7	3.2
	10/1 12:18	3	Flood	Surface	24.9	13.3	7.8	4.9
	10/1 12:19	3	Flood	Bottom	23.7	10.9	7.7	1.3
19	10/8 10:27	1	Ebb	Surface	25.8	0.8	7.1	6.8
	10/8 10:28	1	Ebb	Bottom	15.8	0.9	7.1	6.7
	10/8 10:31	2	Ebb	Surface	25.3	1.4	7.2	6.7
	10/8 10:34	2	Ebb	Bottom	22.3	24.5	7.3	0.4
	10/8 10:37	3	Ebb	Surface	24.2	2.8	7.4	6.3
	10/8 10:41	3	Ebb	Bottom	22.2	15.9	7.9	2.2
20	10/16 10:42	1	Flood	Surface	26.0	0.8	7.4	7.0
	10/16 10:43	1	Flood	Bottom	24.3	6.2	7.9	5.9
	10/16 10:38	2	Flood	Surface	24.4	4.1	7.7	6.7
	10/16 10:40	2	Flood	Bottom	22.5	14.5	7.8	3.6
	10/16 10:34	3	Flood	Surface	21.5	8.7	7.7	4.7
	10/16 10:35	3	Flood	Bottom	21.6	4.1	7.6	1.5
21	10/22 13:37	1	Flood	Surface	ND	ND	ND	ND
	10/22 13:39	1	Flood	Bottom	26.2	2.3	7.2	7.0
	10/22 13:40	2	Flood	Surface	26.1	1.8	7.3	7.6
	10/22 13:41	2	Flood	Bottom	23.3	24.6	8.1	4.4
	10/22 13:45	3	Flood	Surface	25.2	4.3	7.5	6.4
	10/22 13:46	3	Flood	Bottom	21.8	14.1	7.7	2.3
22	10/29 11:11	1	Flood	Surface	19.7	9.1	7.6	5.4
	10/29 11:13	1	Flood	Bottom	18.3	11.9	7.6	4.6
	10/29 11:14	2	Flood	Surface	23.5	1.7	7.4	6.9
	10/29 11:16	2	Flood	Bottom	18.1	13.6	7.5	4.2
	10/29 11:19	3	Flood	Surface	17.3	14.6	7.6	5.1
	10/29 11:20	3	Flood	Bottom	17.3	17.2	7.7	4.6

B. Summary of Corrective Action

There were six weeks in which the weekly 10th percentile DO level in the pond's discharge dipped below the trigger threshold, and one week during which a sonde deployment error resulted in no continuous data being recorded in the pond. The City responded by conducting additional weekly discrete water column measurements at three stations in Artesian Slough (Figure 1; Table 11). An evaluation of trigger data revealed no negative effects in the receiving water that could be attributed to Pond A18 discharge, so no additional corrective actions were necessary. During the periods when wildfire smoke obscured sunlight, and during the one week in September without pond discharge data, weekly monitoring observations identified no fish kills or any other indicators of declining ecological condition in the pond or receiving water. UC Davis researchers studying fish abundance and community composition, as well as San Francisco Bay Bird Observatory (SFBBO) staff monitoring for avian disease, also did not report impacts to wildlife or water quality in the vicinity of Pond A18 or Artesian Slough.

IV. DISCUSSION AND INTERPRETATION OF 2020 RESULTS

Temperature

Pond water temperature in 2020 was relatively consistent with 2019 temperatures, and temperatures during both dry seasons were higher than during the preceding period of northern discharge. Temperatures in 2020 remained consistent between discharge and non-discharge periods throughout the monitoring season. The pond is large and shallow with a limited flow, so pond water temperature is highly influenced by ambient air temperature. Pond temperatures generally peak in July/August and exhibit large fluctuations depending on heat waves or cloud cover. Mean monthly receiving water temperatures were slightly higher in 2020 than in 2019.

Salinity

Pond discharge salinity in 2020 was considerably higher than in 2019. Increased salinities during both of these years, as compared to the 2016-2018 northern discharge period, were likely due to the higher salinity of more Bay-influenced water flowing into the pond through the northern structure, as opposed to the fresher Facility effluent-rich water flowing in through the southern structure. Salinities especially in the second half of the 2020 dry season indicated strong marine influence, and the intensifying effects of evaporation may have been responsible for salinities climbing above 35 PSU in September and October.

Receiving water salinity in 2020 showed similar trends to 2019, although bottom salinities were generally higher at all four monitoring stations. Consistent with prior years, salinity gradients in the receiving water were driven by tidal cycles and freshwater effluent from the Facility. Less dense freshwater tends to float on top of saltier bay water that is pushed into Coyote Creek and Artesian Slough by the flooding tide.

pH

Increases in pond pH are driven by high rates of photosynthesis, accompanied by high irradiance and temperatures. Conversely, high salinity can act as a buffer, limiting pH increases. Pond pH in 2020 was generally lower than in 2019 and decreased toward the end of the monitoring season, rather than increasing as it did in 2019. This temporal trend reflects the effects of late summer algal decomposition observed in 2020.

Receiving water pH in 2020 was relatively consistent with previous years, showing the most stratification at Station 2. Although one surface pH measurement in July exceeded the Basin Plan Objective, it did not correspond with any peak in Pond A18 pH, and all other surface measurements were within range for the rest of the monitoring season.

Dissolved Oxygen

Pond DO was more variable in 2020 than in 2019. Typical boom-bust patterns of super-saturation followed by hypoxia were observed throughout the monitoring season, and a few prolonged (on the scale of hours) periods of anoxia occurred in September and October. These trends likely resulted from decomposition of the extensive algal mats that covered much of the pond in July before receding and dying off in August. Decreased DO also coincided with a decrease in phytoplankton biomass from August to September, though chlorophyll *a* remained relatively high (100-133 ug/l) through the end of the monitoring season.

Receiving water DO concentrations in 2020 were relatively consistent with those in 2019, although average bottom DO at station 2 was lower. Decreases in bottom DO at Station 2 only coincided with low pond DO in one instance on October 1, 2020, but continued trigger monitoring showed that this condition did not persist. Low average bottom DO at Stations 3 and 4 indicates that low DO observed at Station 2 likely originated from flooding Bay water.

Chlorophyll *a*

Chlorophyll *a* concentrations in 2020 were lower than those measured during the dry seasons of 2016 through 2018 (northern discharge pond flow), and they were more similar to concentrations measured in 2019 and before 2016 (southern discharge pond flow). This result indicates that the southern discharge regime, which brings more Bay-influenced, lower-nutrient water into the pond, leads to relatively lower phytoplankton productivity. The northern discharge regime, which brings more Facility effluent-rich, higher-nutrient water into the pond, leads to higher phytoplankton productivity. Variation in chlorophyll *a* can be due not only to changes in overall phytoplankton cell growth and abundance, but also to shifts in the relative abundances of various taxa with different traits, such as cell size, growth rate, or carbon:chlorophyll ratio.

Despite the pond's green water color at the start of dry season monitoring, June chlorophyll *a* in 2020 was lower than in 2019. However, chlorophyll *a* showed a sharper increase in July, peaked in August, and remained relatively high throughout the rest of the monitoring season despite wildfire smoke cover and drops in DO.

Nuisance Filamentous Macro-algae

The presence of filamentous macro-algae in Pond A18 varies from year to year. Filamentous algae consist of macroscopic filaments which are of little value to pond productivity since benthic filter feeders and filter-feeding zooplankton (copepods, cladocerans, rotifers, shrimp, aquatic insects) are not able to utilize them effectively. Further, filamentous algal mats impede light penetration through the water column, thereby decreasing phytoplankton production and overall pond productivity.

Filamentous algae were more prevalent during the summer months of 2020 than during the previous three years. Similar to 2019, filamentous and benthic algae grew in dense patches along Pond A18's margins in June, and large floating mats covered much of the pond throughout July. This high level of macroalgal growth particularly in the northern and eastern portions of the pond was last observed during the 2016 dry season. While macroalgae was mostly absent in August, clumps of detached benthic algae returned in September before clearing out by the end of the monitoring season.

Pond Infrastructure

No major problems with pond infrastructure were encountered in 2020. In 2018, the City contracted HydroScience Engineers, Inc., Environmental Science Associates (ESA), and Sweetwater Construction to complete the South Levee Repair Project. From August 23 to September 24, 2018, the deteriorating levee embankments in the vicinity of Pond A18's southern structure were repaired and reinforced to allow for flow in either direction. On October 9, 2018, the pond's continuous circulation was configured for inflow through the northern hydraulic structure and discharge from the southern structure, and this configuration has since been continued.

A HydroScience geotechnical engineer who evaluated the southern gate structure on October 21, 2020 noted low levels of baserock erosion around the bulkheads, but confirmed the sheet pile walls are performing satisfactorily. The City continues to monitor the mechanical and geotechnical vulnerabilities of the pond's southern structure, and to adjust operations to minimize sediment transport, scour and levee erosion.

Future Uses of Pond A18

The timing for determination of future uses of A18 will depend on the outcomes of the Shoreline Levee Project, currently underway, which will construct a flood control levee along the southern boundary of A18. The future flood control levee will replace the current flood protection provided by A18 levees, allowing for increased flexibility to restore or alter Pond A18. The Shoreline Levee Project is a partnership with the California State Coastal Conservancy, the U.S. Army Corps of Engineers (USACE), and regional stakeholders to provide tidal flood protection, restore and enhance tidal marsh and related habitats, and provide recreational and public access opportunities along ponds A12, A13, A16, and A18 (see Valley Water District map here).

During the summer of 2019, pre-construction work activities on the flood control levee commenced. The USACE completed truck hauling of levee import material to Pond A12 on December 18, 2019. On December 5, 2019 the USACE advertised the Phase I Project Reaches 1, 2, and 3 for construction bidding and closed bids in January 2020. In March 2020, USACE rejected the bids received and re-advertised construction of Phase I in December 2020 with the construction of Reach 1 (from Alviso Marina to the Union Pacific railroad) and Reaches 2 and 3 (from Union Pacific Railroad to Artesian Slough) beginning in spring/summer 2021. City staff continues to coordinate with the USACE, California Coastal Commission, and Valley Water on levee alignment and construction that will extend the levee across the RWF outfall and along the north and west sides of Facility biosolid lagoon areas. An active CIP project is underway to design and construct a new final effluent pump station that will enable the RWF to continue to discharge final effluent once the flood control levee is complete and the Artesian Slough crossing is closed. Conceptual plans for the future of Pond A18 have included pond restoration and conceptual designs for an ecotone levee.

Avian Habitat Value

The City partners with the Santa Clara Valley Audubon Society to evaluate local Christmas Bird Count (CBC) data to assess avian population trends. The Alviso Complex CBC dataset, encompassing the Facility and surrounding wetlands, most notably Pond A18, extends back to 1975 and provides 40+ years of data which has been instrumental in evaluating bird recovery in the context of Facility treatment advancements and large-scale wetlands restoration efforts (Figure 19).

Figure 19. Image of a Great Blue Heron (courtesy of chesapeakebay.net), one of the many bird species found in the Alviso area

2020 waterfowl abundance data underscores the habitat value of the Alviso Complex system. Although overall counts decreased from the previous year, they were still above population tallies observed before Pond A18, along with nearby Ponds A16, A17, A19, and A20, were breached and managed for long-term restoration in 2005-2006. Such positive trending illustrates Pond A18 continues to provide foraging and congregating habitat for many resident and migrating waterbirds.

V. LESSONS LEARNED AND RECOMMENDATIONS

1. Pond A18's primary productivity can decrease with cloud cover and rain events, which can decrease photosynthesis and temporarily lower DO. No adverse effects on receiving water DO have been measured during these short-term decreases in the sixteen years of monitoring. In 2020, periods of summertime wildfire smoke covering the sky and obscuring sunlight did not have any apparent effects on water quality or ecological condition in Pond A18 or the receiving water.

    Recommendation: Continuous pond discharge provides the most stable conditions in the pond. Shutting the discharge valve as a result of temporary low DO due to uncontrollable conditions may exacerbate low DO due to stagnation of pond water. As wildfires will undoubtedly continue to affect the Bay Area during future dry seasons, diligent monitoring of smoke cover and its possible effects on water quality will be required.

2. Continuation of the southern discharge regime in 2020 resulted in lower phytoplankton biomass in Pond A18 than during the 2016-2018 northern discharge period, likely due to lower-nutrient waters flowing into the pond. Dissolved oxygen concentrations were also less variable in 2019 and 2020 than in preceding years, though the minimum and maximum values still indicated that brief supersaturation and hypoxic events occurred. As with all previous years, the low DO conditions in 2020 did not adversely affect water quality in Artesian Slough, indicating that the pond discharges have minimal spatial influence on receiving water DO.

    Recommendation: Operating the pond in either the northern discharge or southern discharge configurations has had negligible effect on receiving water DO as demonstrated by multiple years of receiving water monitoring. However, the southern discharge scenario has resulted in lower phytoplankton biomass in the pond and more stable in-pond conditions compared to those documented during years of northern discharge. The City shall continue to manage the pond's operations to minimize sediment transport, scour, and levee erosion by adjusting flow and discharge configuration with levee integrity in mind, and adding baserock around the structure's bulkheads as deemed necessary by geotechnical assessment. If levee condition is stable, the default operational setting will continue to be the southern discharge configuration to provide for more stable in-pond conditions.

3. Monitoring during the COVID-19 pandemic requires careful planning and adherence to safety protocols. In 2020, City staff were able to conduct all required monitoring and operations for Pond A18 while following COVID-19 safety procedures.

    Recommendation: During the COVID-19 pandemic and any future public health crises, City staff will continue to prioritize health and safety in their work. For as long as necessary, staff will complete health screening (temperature checks and answering questions about COVID-19 symptoms) before entering any part of the Facility. Weekly continuous monitoring should also continue to be performed by one person at a time, and staff should continue to wear face coverings and maintain social distancing as much as possible while conducting trigger and monthly discrete monitoring.