2007 Self-Monitoring Report
Baumberg Complex - Hayward, California
Eden Landing Ecological Reserve

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Introduction

This annual self-monitoring report summarizes the results of the water quality monitoring and sediment sampling conducted at the Baumberg Complex, also known as the Eden Landing Ecological Reserve (ELER), in Hayward, California, April through November 2006. Data was collected by Department of Fish and Game (Department) staff in accordance with the waste discharge requirements. Water quality monitoring was performed using continuous data recorders at the locations described in the Self-Monitoring Program outlined in the Final Order. Water column sampling was not conducted in 2007 since previous sampling showed all levels were below Water Quality Objectives (WQOs), as approved by Regional Water Quality Control Board (RWQCB) staff in its letter to the Department, dated June 12, 2006.

The Final Order for the South San Francisco Bay Low Salinity Salt Ponds covered 15,100 acres of ponds in Alameda, Santa Clara and San Mateo counties. This report covers ELER (Baumberg Complex) pond systems operated by the Department in 2007 and described in the Initial Stewardship Plan (ISP), including Systems B10 (B11 in ISP), B2, B2C and B8A (via Pond B9). System B6A was not operated in the 2007 monitoring period to allow management activities necessary to provide suitable nesting habitat for the western snowy plover. Pond B10 operations were resumed in 2007 following completion of construction activities, including the new water control structure. Pond System B8A began operations via primary intake and discharge at Pond B9. The U.S. Fish and Wildlife Service (USFWS) submitted a report for the Alviso Ponds under separate cover.

The ponds are generally being operated as muted tidal systems, as described in the updated 2007 operations plans, augmenting flow-through systems described in the ISP. Bay water entered ponds via San Francisco Bay (SF Bay) and associated sloughs at high tides, flowed to one or more ponds, and discharged to sloughs and SF Bay at low tides. The ponds presumably discharge at tide stages lower than pond water elevations, generally 3.5’ (NGVD), a duration ranging approximately 13 to16 hours per day, based on predicted tides and spring or neap tide cycle. Pond intake is presumed to occur at predicted tide stages which are at elevations assumed to be approximately 1 ½ feet or more above pond water levels due to required head (pressure) to allow in-flows. In 2007, intake and discharge in Ponds B10, B2, B2C and B8A occurred at the same water control structure (WCS), as in previous years. Pond systems B8A and B2 also have additional intake WCS’s, as described in the ISP and operations plans.

The Final Order recognized two periods of discharges from the ponds: the Initial Release Period (IRP) when salinity levels in ponds were above 44 parts per thousand (ppt) and would decrease from the initial levels in the ponds, to a Continuous Circulation Period (CCP) thereafter, with salinities at or below the 44 ppt, which is the continuous discharge limit described in the Final Order. Different monitoring plans were identified in the Final

Order for each specific period. In 2007, operation of all systems was with parameters for CCP water quality monitoring, as more fully described later.

In 2005, the RWQCB required that triggering of reporting and best management practice (BMP) implementation should occur when the dissolved oxygen (DO) levels at the point of discharge fall below a 10^{th} percentile of 3.3 mg/L (calculated on a calendar weekly basis). Low DO conditions are expected during extended periods of high air and water temperature. The 3.3 mg/L DO “trigger” was determined based on levels found in Artesian Slough in July 1997, during an extended period of high air temperatures, and appeared to be the most relevant representation of natural DO variations in sloughs or lagoon systems currently available. This data and associated analysis were used in the issuance of Order No. R2-2005-0003, adopted by the Board on February 16, 2005, which permits Cargill Incorporated to discharge saline waters from Pond A18 to Artesian Slough. When a trigger event occurs, a timely report shall be made to RWQCB, and BMPs described in its Operations Plan shall be implemented. It has been documented that DO concentrations are observed in sloughs not affected by any discharge to contain DO levels below the Basin Plan standard of 5.0 mg/L, as well as periods below the 3.3 mg/L reporting trigger. Evaluation of benthic DO levels in a number of locations was completed during the monitoring season in 2006 in Newark Slough using receiving water monitoring protocol. In 2005, USFWS monitored ambient slough conditions at intake locations and noted that slough waters entering ponds during intake were below the 3.3 mg/L trigger. Therefore, observed receiving water DO levels may be within the natural range of variation in functional slough and lagoon environments of the South San Francisco Bay and not necessarily indicating a water quality signature of pond waters and discharges.

The RWQCB requested that additional information be provided in all Annual Self-Monitoring Reports (ASMR), as described in a letter dated March 25, 2005. This ASMR also incorporates those and subsequent suggested changes and requests for additional information, except as noted (i.e. discharge volumes, as discussed below). The Department has prepared this report as the Draft 2007 Self-Monitoring Report for the Eden Landing Ecological Reserve (Baumberg Complex). Additional analysis and interpretation of monitoring data may be completed to complement information presented in this report, and may be submitted for review by the RWQCB before being finalized.

2007 Annual Summary

This section discusses the activities performed during the 2007 monitoring season at the ELER ponds (Baumberg Complex) to comply with RWQCB Final Order and subsequent requirements and/or modifications. The site location is shown on Figure 1; sampling locations are shown on Figures 2a and 2b. See Figure 3 for Newark Slough sampling.

The water quality monitoring performed according to the Final Order for operation of the pond systems revealed periods of low DO. In previous years (2004-06), low DO levels were observed in a number of the South Bay Salt Ponds (SBSP), including ELER ponds, notably in the late-summer/early-fall when seasonal temperatures, winds and evaporation were expected to be highest. However, low DO levels are observed throughout the monitoring period, not just during the latter part of the season as was anticipated. Low DO levels are more pronounced in some pond systems than others, and a definitive explanation for such differences is not yet apparent. There appears to be some correlation with abiotic factors, such as spring and neap tide periods, weather conditions and seasonal variations, and there may also be biotic factors that affect DO levels, such as algal growth and growth and/or usage by pond invertebrates or larger animals, including fish. The Department completed additional analysis of the data sets to attempt to determine correlations and provided a summary in 2007, which unfortunately did not provide any conclusive results.

In 2005, RWQCB required that the time-period each day that ponds discharge, and an estimate of the quantity discharged, be included in the ASMR. It was understood that this information would be provided for particular periods of interest, rather than be provided in the form of a summary table for each actual discharge day. Estimates of discharge volume could provide useful information, which would be used for activities such as modifications to operations, and for evaluation and analysis, particularly for determining what effects, if any, discharges had on receiving waters, and determination of effectiveness of BMPs. RWQCB modified ASMR requirements similarly for the ponds operated by USFWS, which is working collaboratively with the Department on the ISP and long-term restoration project for the SBSP. In response to this requirement, USFWS requested assistance from U.S. Geological Survey (USGS) in developing a methodology to estimate discharge volumes. USGS developed a “calculator” to estimate discharge from five Alviso Complex ponds for USFWS. Inputs to the calculator include the pond water surface elevation, the number of discharge culverts (48"), and the range of dates for discharge. Output would be the estimated volume of discharge over the data range. Tidal height is predicted in the calculator. Generalized use of this calculator for other ponds, including those managed by the Department, could be expected once site specific calibration was performed. USGS performs a rigorous review process before they can publicly release the calculator report (for use outside the federal agencies). USGS completed a formal review process in January 2007. It was presumed that once the calculator is available for use by the Department, USGS could calibrate it for use at ELER; however, significant funds would be required to complete this task, which neither the Department nor USGS have available or are likely to be in the short-term future. We intend to pursue the use of this tool if funding can be secured.

System B2C:

Pond B2C was operated under Continuous Circulation protocol in 2007, similar to 2006. This system generally performed with continued low DO levels, as observed in 2005-6. System B2C continued to provide good habitat conditions for waterbirds despite the periods of low DO conditions. This muted tidal system frequently observed 10th percentile values for DO below the 3.3 mg/L reporting trigger set by the RWQCB, although median values generally ranged near the Basin Plan value of 5 mg/L. This may have been the result of the previous winter’s (2006) low rainfall totals, which presented challenges for pond management, as noted above and discussed more fully later. A new operational practice (Best management Practice, or BMP) was initiated in 2007, which moderated salinity successfully, and initial analysis of DO conditions also showed that

DO levels may have been improved. System B2C waters were periodically drained into the adjacent seasonal ponds (B5C, B4C and B1C) to improve turnover of pond system water as a result of greater intake volumes.

System B8A:

Pond System B8A was operated primarily via B9, following restoration of tidal action to Mt. Eden Creek described above. Pond B8A continued to operate as a system pond (year-round open-water ponds), with supplemental intake from North Creek. Pond B9 has four 48” culverts which are connected by an excavated channel to the historic mouth of Mt. Eden Creek at the northern end of the Whale’s Tail Marsh. Two of the four B9 culverts operate as main intakes, with two operated for supplemental intakes, primarily in the summer months to maximize intake during high evaporation season. The supplemental intakes can be closed during winter months when supplementary water comes from rainfall input. On the pond side of the WCS, B9 has two combination tide gates, one of which was used for discharge. This discharge location was considered a “bay location” due to it’s adjacency to the historic mouth of MEC, therefore Receiving Waters sampling was not required. This change in operations is described in the 2008 Operations Plan, and is a variation from the previous operation of the single 48” culvert in Pond B8A, described in the ISP as the primary discharge pond, with limited intake from the remnant Mt. Eden Creek channel in the Whale’s Tail Marsh (WTM). North Creek provides the main tidal connection to the 300-ac portion of the original 835-ac ELER (Baumberg Tract) restoration project. The 300-ac portion had been restored to tidal action in September, 2006. North Creek provides the tidal circulation connection to Old Alameda Creek and the bay for Pond 8A.

This system generally performed with continued low DO levels similar to observed conditions from 2005-6. System B8A continued to provide good habitat conditions for waterbirds despite the periods of low DO conditions. In 2007, this muted tidal system had greater difficulty in attaining the DO standard compared to 2006, frequently resulting in 10^{th} percentile values below the 3.3 mg/L reporting trigger, described below, and RWQCB staff were contacted and provided information as appropriate. Median values generally ranged near the Basin Plan value of 5 mg/L.

Construction activities for the 835-acre ELER (Baumberg Tract) restoration project included restoration of tidal action in Mount Eden Creek. Intake at B9 began after excavation of the Mt. Eden Creek channel was initiated in November, 2006, with excavation completed in January, 2007. Primary system intake now occurs at Pond B9, although supplemental intake to the system continues to occur at Pond B8A via North Creek. Residence time of pond waters was expected to decrease with the improved intake at B9; however, DO levels in 2007 did not improve over 2006 (and previous seasons) as was expected. This may have been the result of the previous winter’s (2006) low rainfall totals, which presented challenges for pond management with respect to some water quality parameters, as discussed more fully later.

System B2:
In 2007, Pond System B2 was operated with discharge occurring only from B2. Low DO conditions were again observed during a large part of the monitoring season, and higher salinity proved to be an additional challenge in 2007, presumably due to the previous winter's (2006-07) low rainfall totals, as discussed more fully later. Due to staff and budget limitations, some BMP's were not practicable means of addressing water quality issues. Such BMP's include operation of the #1 Baumberg Intake pump, periodic suspension of B2 discharge operations, and discharge via Pond 1 to Old Alameda Creek (OAC).

The system was operated as muted tidal, with supplemental intake and system discharge to the bay via Pond 2, while Pond B1 continued to operate as the primary intake pond with inflows during higher tides from OAC. As a bay discharge, receiving water monitoring was not required, as discussed above. System B2 management included typical discharge operations via B2 for the winter season, including successful recirculation of the "batch" ponds (B5 and B6).

System B10:
Pond B10 resumed operation as a managed pond (controlled discharge) beginning in February for the 2007 season. Construction operations were completed in January, including restoration of tidal action to Mt. Eden Creek (MEC) with full excavation of the bayfront levee breach, which was initiated in November, 2006. Operation of the pond began after the breach was completed, which was required to provide adequate tidal intake flows through the new water control structure (WCS). Pond 11 was operated as a seasonal pond in 2007, as described in the ISP and 2008 Operations Plan **(attachment)** with rainwater input, supplemented by transfers from Pond B10 to reach winter operations levels. Continuous monitoring devices (Datasondes) were reinstalled in B10, as per Continuous Circulation protocol in 2007; receiving water sampling was not required for this bay-discharge system, as previously approved by RWQCB in 2005.

System B6A:
Pond System B6A was operated as seasonal pond system and was not operated with slough intake and discharge during the 2007 monitoring season. Movement of water between ponds was periodically conducted. This system provided good habitat conditions for waterbirds, particularly for western snowy plover (WSP), a federally threatened species. To ensure breeding success for WSP, this system was allowed to draw down and operate as seasonal ponds.

For all pond systems:
To address water quality and to maintain summer operation water levels in the ponds, Systems B2, B2C, B11 and B8A WCS's were adjusted throughout the season. Management activity for the systems was relatively high, as adjustments were made frequently based on pond discharge and receiving water data, current or anticipated weather and predicted tidal conditions, to minimize discharge of pond waters not meeting water quality objectives (WQO's), including salinity and DO. A summary of discharge events is shown on Table 1.

Table 1 Summary of Discharge Events

Complete notes of pond (system) conditions and management activities are available for review upon request. Continuous meter data (Datasondes) was provided to RWQCB staff during the season and are not included in the report due to large file size; Final Datasonde files are available upon request.
NOTE: Table 1 salinity values displayed are generally from field measurements using hand-held refractometer, except occasionally when not collected and Datasonde values are substituted; Datasonde values differ slightly from refractometer values. Datasonde values should be considered more accurate and are used for all graphs listed as Figures in this SMR.

Pond	Location	Date	Salinity	Staff	Activity and notes
2c	B2c-14	4/17/2007	38	3.35	Opened 1x48" discharge (DISCH.) to 10%, resume transition to summer operations.
2C	B2c-14	4/19/2007	34	3.80	Increased 1x48" DISCH. to 15% to max. circulation during spring tides.
2C	B2c-14	4/24/2007	42	3.50	Reduced 1x48" DISCH. to 5% to maintain water levels, neap tide. Deployed Datasonde
2C	**B2C-14,** *B2c-15 (2c-5c)*	**5/8/2007**	**43**	**3.40**	**Closed 1x48" DISCH.** *Opened 1x36" 50% (B2C→5C) to increase B2C intake*.
2C	*B2c-15 (2c-5c)*	5/10/2007	*51*	3.20	CLOSED 2C-5C 1x36" gate
2C	**B2c-14**	**5/15/2007**	**37**	**3.35**	**Opened 1x48"DISCH. to10%** to increase circulation, control salinity.
2C	B2c-14	5/24/2007	48	3.50	Red.1x48"DISCH.to 5% for neap to maintain water levels.
2C	*B2c-15 (2c-5c)*	5/25/2007	47		*Opened 1x36" gate 15% to drain B2C water to B5C, increase B2C intake*
2C	*B2c-15 (2c-5c)*	5/29/2007	38		*Closed 1x36" gate (2c-/->5c)*
2C	B2c-14	6/7/2007	46	3.60	Increased 1x48" DISCH. to 10% during spring tides.
2C	*B2c-15 (2c-5c)*	6/14/2007			*opened 2c-->5c gate to 35%*
2C	*B2c-15 (2c-5c)*	6/19/2007			*Closed 2c-->5c gate*
2C	B2c-14	6/19/2007	35	3.50	Red.1x48"DISCH. to 5% for neap tides
2C	**B2c-14**	**6/22/2007**	**48**	**3.30**	**Closed 1x48" DISCH.**
2C	**B2c-14**	**6/25/2007**	**33**	**3.35**	**Resumed 1x48" DISCH. to 5%** for spring tides.
2C	B2c-14	7/5/2007	42	3.65	Increased 1x48"DISCH. to 15% for spring tides
2C	*B2c-15 (2c-5c)*	7/5/2007			*Opened 1x36" gate to 30% (2c-->5c)*
2C	*B2c-15 (2c-5c)*	7/13/2007			*Closed 1x36" gate (2c-/->5c)*
2C	B2c-14	7/13/2007	34	3.40	Reduced 1x48" DISCH. to 10%.
2C	B2c-14	7/26/2007	44	3.55	Increased 1x48"DISCH. to 25% for spring tides.
2C	B2c-14	8/7/2007	42	3.20	Reduced1x48" DISCH. to 10%
2C	B2c-14	8/16/2007	44	3.40	Reduced 1x48" DISCH. to 5%

2C	*B2c-15 (2c-5c)*	8/21/2007			*Opened 1x36" gate 10%, 2c-->5c.*
2C	B2c-14	8/30/2007	36	3.80	Increased 1x48" DISCH. to 20%
2C	B2c-14	9/4/2007	47	3.30	Reduced 1x48" DISCH. to < 5%.
2C	*B2c-15 (2c-5c)*	9/20/2007	*46 at 5C*		*Closed 1x36" gate. (2c-/->5c)*
2C	*B2c-15 (2c-5c)*	10/1/2007			*opened 1x36" gate 25% to drain 2C, max intake. 2C-->5C*
2C	B2c-14	10/1/2007	32	4.00	*Salinity from Datasonde*
2C	*B2c-15 (2c-5c)*	10/9/2007			*Closed 1x36" gate. (2c-/->5c)*
2C	*B2c-15 (2c-5c)*	10/15/2007			Opened 1x36" gate 10%, 2c-->5c
2C	*B2c-15 (2c-5c)*	10/24/2007			*Closed 1x36" gate. (2c-/->5c)*
2C	B2c-14	10/24/2007	31	3.45	Intaking
2C	B2c-14	11/1/2007	36	3.85	Begin transition to winter operations
8A	*B8A-NC*	*Winter 2006*	*~20*	*~0.50*	*1x48" DISCH. cont. at 5% (winter ops)*
8A	***B8A-NC***	***4/9/2007***	***40***	***0.05***	***Closed DISCH. 1x48" Intake set to 25%.***
9	B8a-1	12/8/2006	42	4.10	Intake only
9	B8a-1	12/21/2006	35	4.15	Intake only
9	B8a-1	1/27/2007	45	4.20	Intake only
9	B8a-1	3/1/2007	23	3.45	Intake only
9	**B8a-1**	**4/9/2007**	**41**	**3.40**	**Opened 1x48" DISCH. to 5%.**
9	B8a-1	5/3/2007	42	3.55	1x48" DISCH. set to10%
9	B8a-1	5/11/2007	44	3.30	Reduced 1x48" DISCH. to 5% for neap
9	B8a-1	5/18/2007	41	3.85	Increased 1x48 DISCH. to 25%.
9	B8a-1	5/24/2007	42	3.40	Reduced 1x48"DISCH. to 5% for neap
9	B8a-1	6/7/2007	46	3.70	Increased 1x48" DISCH. to 10%
9	B8a-1	6/11/2007	45	3.60	Increased 1x48" DISCH. to 25%
9	B8a-1	6/14/2007	41	3.75	Increased 1x48" DISCH. to 35%
9	B8a-1	6/20/2007	41	3.40	Reduced 1x48" DISCH. to 5% for neap
9	**B8a-1**	**6/22/2007**	**49**	**3.40**	**Closed 1x48"DISCH.** (high salinity, neap tides).
9	**B8a-1**	**6/25/2007**	**48**	**3.45**	**Resumed 1x48" DISCH. to 5%** (spring tides)
9	B8a-1	7/5/2007	46	3.70	Increased 1x48" DISCH. to 25% to max muted tidal mixing during spring tides
9	B8a-1	7/19/2007	45	3.50	Reduced 1x48" DISCH. to 5% for neap
9	B8a-1	8/2/2007	41	3.85	Increased 1x48" DISCH. to 25% to max muted tidal mixing during spring tides
9	B8a-1	8/13/2007	41	3.70	Reduced 1x48" DISCH. to 5% for neap
9	B8a-1	8/31/2007	44	3.65	1x48" DISCH. at 5% cont.
9	B8a-1	9/13/2007	44	3.80	1x48" DISCH at 5% cont.
9	B8a-1	9/27/2007	35	3.80	1x48" DISCH. at 5% cont.
9	B8a-1	10/6/2007	44	3.95	1x48" DISCH. at 5% cont.
9	B8a-1	10/18/2007	40	4.05	Opened 1x48" gate 100% for 20 min. to clear flotsam, resumed 5% DISCH.
9	B8a-1	11/1/2007	42	4.05	1x48" DISCH. at 5% cont.

2	B2-10	3/06/2007	(~34)	3.35	Reduced 1x48" DISCH. to 5% (from winter ops).
2	B2-10	4/17/2007	41	2.85	Opened 2x48" intakes 100% to raise water level. Transition to summer ops
2	B2-10	4/24/2007	38	3.25	
2	B2-10	5/2/2007	41	3.2	
2	**B2-10**	**5/15/2007**	**45**	**3.15**	**Closed DISCH. due to hi-salinity**
2	**B2-10**	**5/22/2007**	**43**	**3.40**	**Opened 1x48"DISCH. to 5% Muted tidal circulation resumed**
2	B2-10	6/11/2007	47	3.30	Increased 1x48"DISCH. to 25% to max muted tidal mixing during spring tides
2	B2-10	6/19/2007	47	3.45	Red.1x48"DISCH.to 10% for neap
2	B2-10	6/22/2007	50	3.40	Closed 1x48"DISCH. for neap,maint.H2Olevels.
2	B2-10	6/25/2007	49	3.40	Resumed 1x48"DISCH.to 5% for springs.
2	B2-10	6/29/2007	52	3.35	Increased 1x48"DISCH. to 25% to max muted tidal mixing during spring tides to attempt salinity control.
2	B2-10	7/3/2007	53	3.30	Reduced 1x48" DISCH. to 5% (neap)
2	B2-10	7/10/2007	53	3.45	Increased 1x48" DISCH. to 25% to max muted tidal mixing during spring tides (salinity control attempt
2	B2-10	7/17/2007	47	3.50	Reduced 1x48" DISCH. to 10%.
2	B2-10	8/7/2007	52	3.70	Increased 1x48" DISCH. to 50% to max muted tidal mixing during spring tides to attempt salinity control.
2	B2-10	8/13/2007	50	3.45	Reduced 1x48" DISCH. to 5%
2	B2-10	8/21/2007	51	3.45	DISCH. 5% cont.
2	B2-10	8/28/2007	52	3.60	DISCH. 5% cont.
2	B2-10	8/31/2007	53	3.65	DISCH. 5% cont.
2	B2-10	9/5/2007	49	3.75	DISCH. 5% cont.
2	B2-10	9/10/2007	51	3.60	DISCH. 5% cont.
2	B2-10	9/17/2007	50	3.45	DISCH. 5% cont.
2	B2-10	9/24/2007	49	3.35	DISCH. 5% cont.
2	B2-10	10/3/2007	46	3.55	DISCH. 5% cont.
2	B2-10	10/15/2007	45	3.70	DISCH. 5% cont.
2	B2-10	10/22/2007	45	3.60	DISCH. 5% cont.
2	B2-10	10/24/2007	43	3.60	DISCH. 5% cont.
2	B2-10	10/29/2007	33	3.65	Intaking. DISCH. 5% cont.
2	B2-10	11/1/2007	45	3.75	DISCH. 5% cont.
10	B11-1	3/15/2007	30		Structure complete, coffer dam removal
10	B11-1	4/19/2007	28	2.85	Set 1x48" DISCH. to 10% to max. water levels during neap.
10	B11-1	5/3/2007	32	3.5	
10	B11-1	5/11/2007	37	3.40	Increased 1x48" DISCH. to 20%
10	B10-B11 Wood gates	5/15/2007			Opened 1x wood gate (B10-->B11)
10	B10-B11 Wood gates	5/16/2007			Closed 1x wood gate (B10-/->B11)
10	B11-1	5/18/2007	32	3.45	Increased 1x48 DISCH. to 50%
10	B11-1	5/24/2007	37	2.70	Reduced 1x48" DISCH. to 10%

10	B11-1	6/14/2007	31	3.80	Increased 1x48" DISCH. to 50%
10	B11-1	6/20/2007	41	3.05	Reduced 1x48" DISCH. to 10% (neap)
10	B11-1	7/5/2007	36	3.70	Increased 1x48" DISCH. to 50%
10	B11-1	7/19/2007	41	2.90	Reduced 1x48" DISCH. to 10%
10	B11-1	8/7/2007	37	4.25	Increased 1x48" DISCH. to 50%
10	B11-1	8/13/2007	35	3.40	Reduced 1x48" DISCH. to 5%
10	B11-1	8/23/2007	41	3.60	Increased 1x48" DISCH. to 25%
10	B11-1	9/13/2007	42	3.45	Reduced 1x48" DISCH. to 5%
10	B11-1	9/27/2007	35	4.10	Increased 1x48" DISCH. to 25%
10	B11-1	10/4/2007	43	3.60	Reduced 1x48" DISCH. to 10%
10	B11-1	11/1/2007	35	3.95	Cont. 1x48" DISCH. at 10%

Water Quality Monitoring Requirements

Water quality monitoring was performed at the sampling stations shown in Figures 2a and 2b. The water quality parameters are provided in the Final Order and are summarized below for reference:

Table 2 Continuous Circulation Period Discharge Limits

All pond waters discharging to the Bay or Sloughs shall meet the following limits:

Constituent	Instantaneous Maximum	Instantaneous Minimum	Units
Salinity (Continuous Circulation Period)	44	n/a	ppt
Dissolved Oxygen[1]	n/a	5.0	mg/L
pH[2]	8.5	6.5	

[1 =] Limitation applies when receiving waters contain ≥ 5.0 mg/L of dissolved oxygen (DO). When receiving waters don't meet the Basin Plan objective, pond discharges must be ≥ DO receiving water level.

Dissolved Oxygen (DO) Trigger. At each pond discharge location, if the DO concentration is < 3.3 mg/L,calculated on a calendar weekly basis, values below the trigger shall be reported promptly to RWQCB, corrective measures shall be implemented in an attempt to increase DO concentrations, receiving waters shall be monitored and Operation Plans shall be revised, as appropriate, to minimize reoccurrence.

[2 =] The Discharger may determine pH compliance at the discharge or in the receiving water.

Water Quality Monitoring Methodology

Continuous Pond Discharge Sampling:

The Department installed continuous monitoring devices (Hydrolab-Hach Company, Loveland, CO) called Datasondes in ponds B9, B10, B2C and B2 in late April, 2007, prior to the 2007 season discharge monitoring. All pond systems were monitored under Continuous Circulation Period protocol in 2007 at the discharge point (B2, B2C, B9 and B10). A Datasonde was installed in pond B2C on April 24, 2006 and additional devices were installed in ponds B2, B9 and B10 on April 26, 2007. The Datasondes measured water quality at the outflow of the discharge into San Francisco Bay or the connecting tidal slough.

Datasondes were installed on the pond side of the WCS that discharged waters to the San Francisco Bay receiving waters using ABS plastic pipes as device holders mounted to the structure to allow for free water circulation around the sensors. The devices were installed at a depth of at least 25cm to ensure that all sensors were submerged, and these depths were monitored and adjusted to maintain constant submersion as the pond water levels fluctuated. The Datasondes were serviced biweekly to recalibrate and de-foul the units (unless otherwise noted in service records). Spare data recorders were deployed to replace devices during servicing periods.

Datasondes collected values for the following parameters: salinity, pH, temperature, and dissolved oxygen which were collected at 15-minute intervals with a sensor and circulator warm-up period of 2 minutes. Data were downloaded weekly from Datasondes and the devices were serviced to check battery voltage and data consistency. A recently calibrated Hydrolab Minisonde was placed next to the Datasonde in the pond at the same depth, and readings of the two instruments were compared. Datasondes were calibrated pre-deployment and maintained on a biweekly cleaning and calibration schedule unless they required additional maintenance. Any problems detected with the Datasonde were corrected through calibration or replacement of parts or instruments.

During periods of neap tides coinciding with discharge periods, Datasondes may have been occasionally exposed for short periods (hours), but this occurred to a minimal extent due to improved device mounting hardware. Device malfunctions that occurred resulted in gaps in data or questionable data accuracy and were mostly attributed to battery failure, corrosion, exposure and bio-fouling. These episodes were corrected as soon as possible after being observed in the field or during review of data and occurred less frequently than in 2005. It is likely that malfunctions cannot be completely avoided due to staff and budget limitations and because the Datasondes are deployed in harsh saline environments. The devices periodically suffer significant bio-fouling and the data from the week between cleanings may be affected by the bio-fouling.

Discharge Time-Period and Volume Estimates:

In a letter dated March 25, 2005, RWQCB required that the Department document in each ASMR the time-period each day that ponds discharge, and an estimate of the quantity discharged, starting in the 2005 monitoring period. Based on subsequent conversations with RWQCB staff, it is understood that this information would be provided for particular periods of interest, rather than be provided in the form of a summary table for each actual discharge day. Estimates of discharge volume could provide useful information, which would be used for activities such as modifications to operations, and for evaluation and analysis, particularly for determining what effects, if any, discharges had on receiving waters, and determination of effectiveness of BMPs. RWQCB modified ASMR requirements similarly for the ponds operated by USFWS, which is working collaboratively with the Department on the ISP and long-term restoration project for the SBSP. In response to this requirement, USFWS contracted technical assistance from USGS, which used in-house budget and staff in developing a methodology to estimate discharge volumes. USGS developed a calculation model (PONDCALC) to estimate discharge from five Alviso Complex ponds. Inputs to the “calculator” include the pond water surface elevation, the number of discharge culverts (48"), and the range of dates for discharge. Output would be the estimated volume of discharge over the data range. Tidal height is predicted in the calculator. Generalized use of this calculator for other ponds, including those managed by the Department, likely would be appropriate.

It should be noted, however, that constraints to contracting with USGS exist, which include securing additional funding because USGS base budget funding is not sufficient to undertake activities not previously programmed, and USGS studies and reports must go through a lengthy internal review process before data products can be made available for public release (for use outside the federal agencies). USGS completed the PONDCALC report at the end of January 2006. It was anticipated that little data collection and evaluation would be required to modify the calculator for use by the Department at the Eden Landing ponds; however, it was subsequently disclosed that USGS could not undertake a similar effort for the Department unless the State would provide funding (approx. $35-50K) to supplement unencumbered USGS funds. We intend to pursue development of such a calculator to provide discharge volume estimates in the future as funds can be secured, to assist in evaluation and analysis of particular periods of interest.

Discharge time period information is available in the electronic data files and summarized in discussions herein. Table 1: Summary of Discharge Events provides context for management operations; using discharge percentages, multiplied by discharge capacity described in ISP and Operations Plans a generalized volume can be obtained. The time-period each day that pond discharge was made is not specifically provided in this report. It should be noted that the daily discharge time-period information is based on predicted tidal elevations, not actual tide stages and time periods because there is currently no tide stage and other instrumentation installed to record actual discharge time-periods. Discharge periods in the ISP were assumed to be approximately 8 hours a day. For the initial evaluation of discharge time periods, it was assumed that discharge would occur once tide stage was below pond water elevations, which occurs for approximately 13-16 hours daily. This assumption may over-estimate discharge time periods (and volumes) because it disregards affects of head (pressure) which may affect discharge flows through culverts. Based on observed data, intake requires tide stages that are approximately 1 ½ to 2 feet higher than pond water elevations; therefore, discharge may have similar head requirements. Nonetheless, discharge event information is useful to contextualize management actions and BMP's implemented during ponds operations and provides information to complement the general information in the Operations Plans. Discharge quantity estimates, as noted above, will also complement this information.

Receiving Water Sampling (Continuous Circulation Period):

Receiving quality measurements were collected only where a pond is discharged into a slough at a substantial distance from the main body of the San Francisco Bay. Only one such discharge is described for ELER in 2007. This includes Alameda Creek Flood Control Channel (ACFCC), also known as Coyote Hills Slough, which is immediately adjacent to the WCS in Pond B2C. Sampling was conducted on an approximately weekly basis from May 3 through October 24, 2007. Receiving waters were measured by the Department at 6 sites along Alameda Flood Control Channel adjacent to Pond B2C (Figure 2a). Receiving water was not monitored for bay discharges, as approved by RWQCB in the revised Final Order in 2005. Bay discharge locations include Ponds B2, B9 and B10.

Receiving water samples were collected weekly when water quality objectives in discharge locations were not met. Sampling locations were recorded using Global Position System (GPS) waypoints. We accessed slough sampling sites via boat from a hand-launch site at the B2C discharge channel and used the GPS to navigate to sampling locations. When the boat was approximately 50-25 meters from the site, the engine would be cut or reduced to minimize disturbance to the water column for sampling at the site location. The sample reading was typically collected from the center of the slough after the anchor was dropped and the craft settled. A recently calibrated Hydrolab Minisonde (Hydrolab-Hach Company, Loveland, Colorado) was used to measure salinity, pH, turbidity, temperature, and dissolved oxygen at each location. Samples were collected from the near-bottom of the water column in addition to the near-surface at each sampling location. Depth readings of sample locations were collected at the completion of each Minisonde measurement to account for drift during the reading equilibration period. The majority of the samples were collected on the rising or high tide in order to gain access to the sampling sites, which were not accessible at tides less than 3.5 ft MLLW. Standard observations were collected at each site. These were:

A) Observance of floating and suspended materials of waste origin.

B) Description of water condition including discoloration and turbidity.

C) Odor – presence or absence, characterization, source and wind direction.

D) Evidence of beneficial use, presence of wildlife, anglers and other recreational activities.

E) Hydrographic conditions – time and height of tides, and depth of water column and sampling depths.

F) Weather conditions – air temp, wind direction and velocity, and precipitation.

Sections A, B, C, D and E were recorded at each sampling location. Section F was recorded at the beginning of sampling, unless it had changed significantly.

Calibration and Maintenance:

All the instruments used for sampling as part of the Self-Monitoring Program were calibrated and maintained according to the standard procedures previously developed and employed by USGS. Datasondes were calibrated pre-deployment and maintained on a biweekly cleaning and calibration schedule unless they required additional maintenance. During the cleaning and calibration procedure, simultaneous readings were generally collected with a recently calibrated Hydrolab Minisonde to confirm data consistency throughout the procedure (initial, de-fouled [post cleaning], and post calibration), except when the Minisonde was not available because it was in service with other staff. The initial and de-fouled readings were also used to detect shifts in the data due to accumulation of biomaterials and sediment on the sensors. The problem of biofouling was minimized with the use of nylon stockings and copper mesh covering the Datasonde. This allowed for maximum water flow past the sensors. We reviewed data at least biweekly during servicing, to determine if fouling caused detectable shifts in the data due to the accumulation of biomaterial and sediment on the sensors. A calibration and maintenance log was maintained for each pond.

Two types of DO sensors were used, Clark Cell and Luminescent DO. There was no particular reason why one type was used over another; rather the devices were deployed as needed. When malfunctions occurred and meters required replacements, the available replacement units may have had a different sensor. Clark Cell DO sensors were used throughout the season on the Datasondes in ponds B2 and B10. LDO sensors were used from the beginning of the monitoring season in pond B2C. Both Clark Cell and LDO sensors were used in Pond B9, beginning with the former and ending with the latter, due to instrument malfunction that required replacement. The Clark Cell sensors can be problematic due to the self-cleaning brush attachments on the equipment which can damage the surface of the membrane more frequently and the membranes require periodic service. Luminescent DO (LDO) sensors are improved in that they did not have the same brush mechanism and were less problematic, though were not problem free. Regardless of type, the salt pond environment results in corrosion and fouling and will continue to pose challenges to successful deployment of continuous monitoring devices.

Pond Management Sampling:

As approved by RWQCB in 2005, the Department discontinued pond management sampling previously collected according to RWQCB requirements due to limited analysis and applicability. We continue to collect data for pond management and analysis in most ponds throughout the season, however. Data include pond water elevation (staff gages), salinity (hand-held refractometer), wildlife (observations) and any items of note.

Chlorophyll-a Sampling:

The Department did not collect in-pond chlorophyll samples in 2007, which was discontinued due to limited analysis and applicability, as approved by RWQCB in 2005.

Metals- Annual Water Column Sampling:

The Department did not collect water column samples in 2007. This sampling was discontinued, as approved by RWQCB in 2005, because analysis of previous year’s data showed metals concentrations were within WQO’s.

Sediment Monitoring

The Department did not conduct sediment sampling because analysis of previous year’s data showed metals concentrations were within WQO’s. In 2006, RWQCB supported redirection of monitoring efforts to address specific issues rather than generalized pond monitoring; accordingly, mercury studies shall be centered on areas of concern, such as the USFWS Alviso Pond Complex, in Pond A8 and Alviso Slough. USFWS will provide a report to the RWQCB when available and any relevant findings may be applicable to the Department’s ponds at ELER.

Invertebrate Monitoring

Invertebrate monitoring was not conducted in 2007. Previous collections (2005-06) proved to be of limited use for analysis and had little applicability to pond operations.

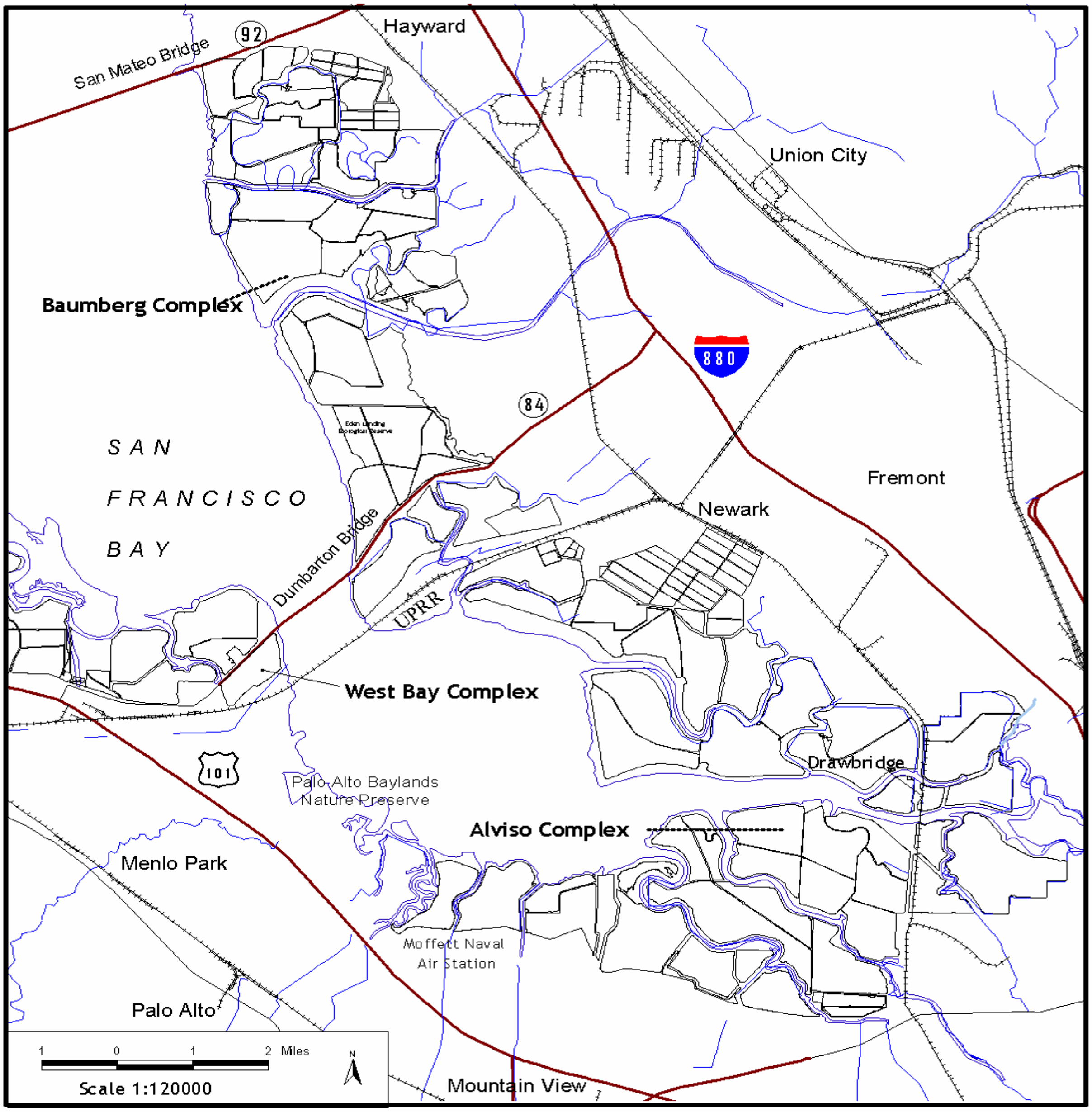

Figure 1. Vicinity Map of the Eden Landing Ecological Reserve (Baumberg Complex) Ponds

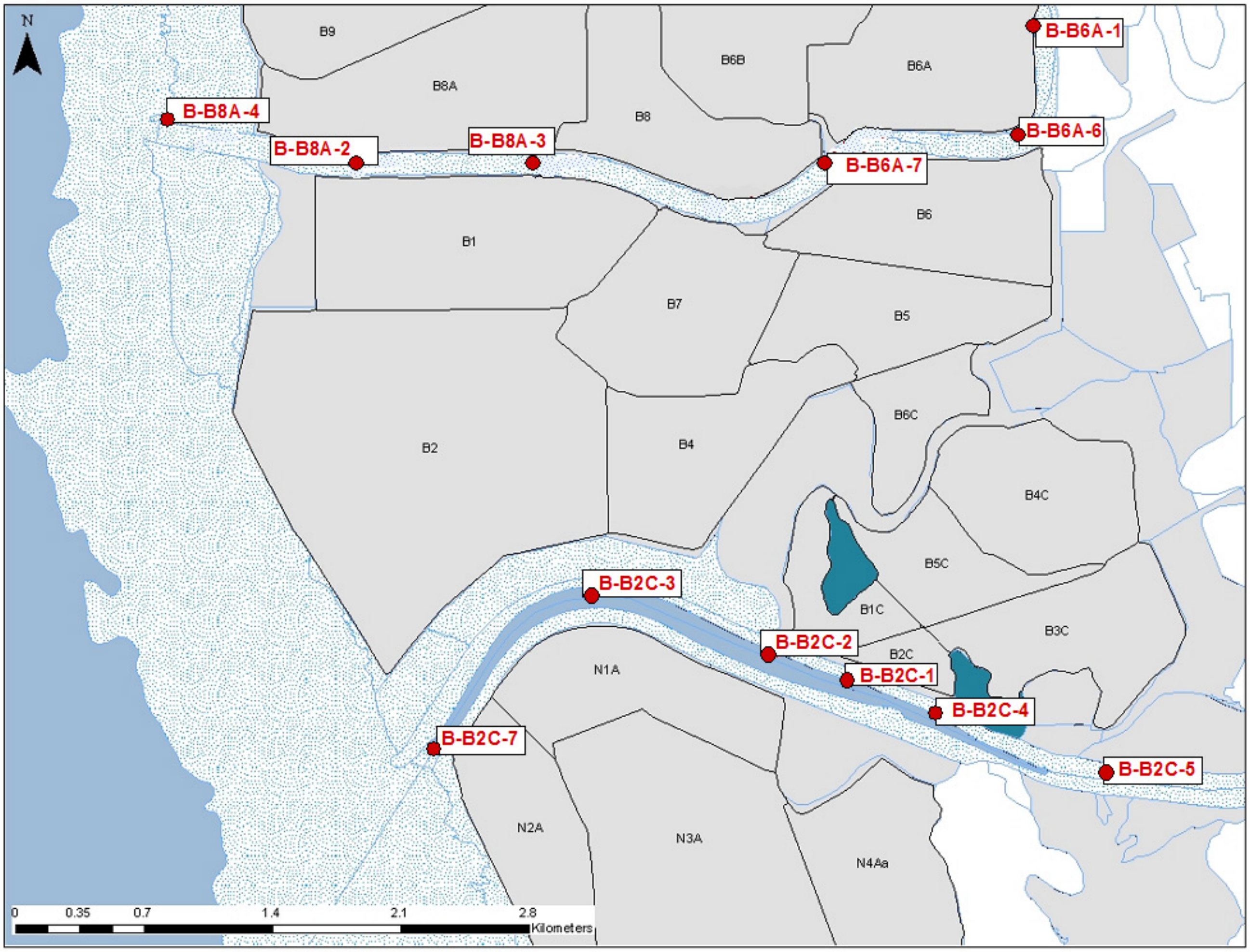

Figure 2a. Eden Landing Ecological Reserve (Baumberg Complex) Water Quality Sampling Locations- Receiving Waters (Note: B-B8A-* and B-B6A-* sites not utilized, see discussion)

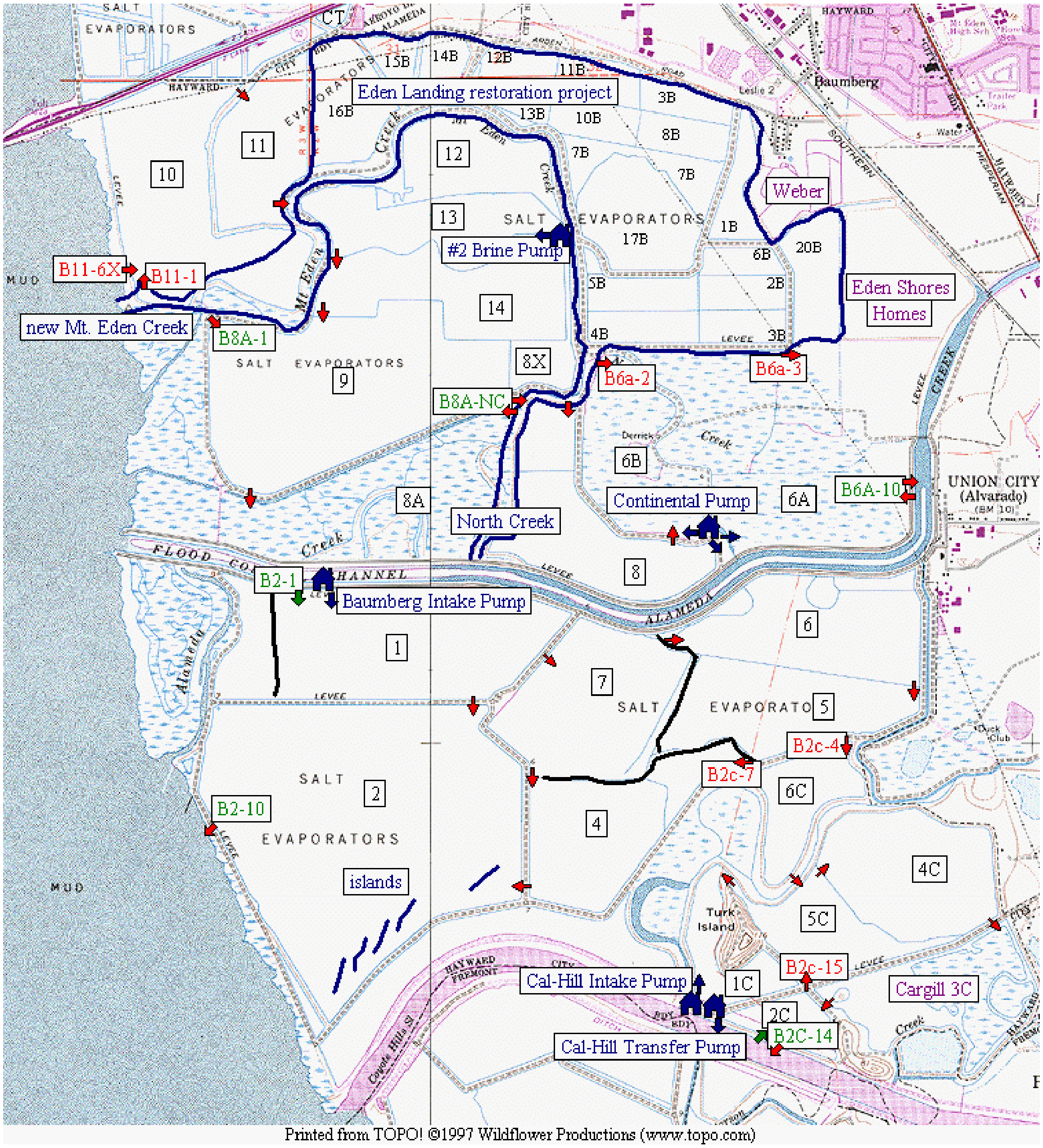

Figure 2b. Eden Landing Ecological Reserve (Baumberg Complex) Ponds ("B" nomenclature dropped on pond labels- Discharge and Intake Locations (Green text boxes). New B11-1 Intake/Discharge Operated in 2007.

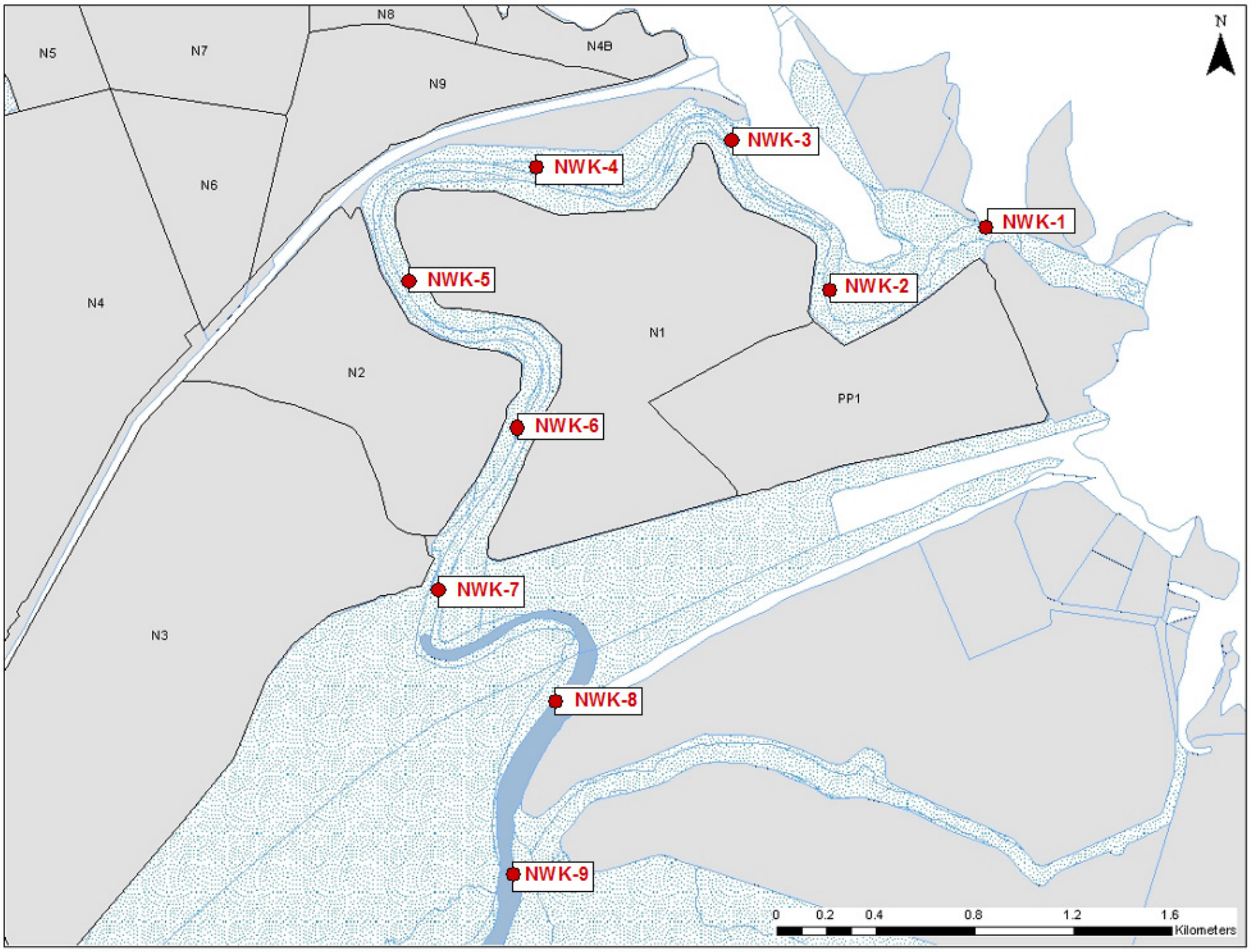

Figure 3. Newark Slough Water Quality Sampling Locations (Receiving Waters Reference)

Water Quality Monitoring Results

Discharge and Receiving Waters

Results from the monitoring of pond discharge locations and receiving waters are summarized below by parameter. It should be noted that, where the continuous data collection meter files show values below Basin Plan objectives and Final Order requirements, it does not necessarily indicate or reflect actual violations. Pond discharges do not occur continuously. Pond discharge data should be reviewed considering variation in tide stage and cycles, and operational activities which resulted in suspending or modifying discharges.

Figures 3-6 show the daily means for salinity, pH, temperature, and DO for the discharge monitoring and receiving water samplings at B2C. See Figures 7-10 for B9, Figures 11 - 14 for B2, and Figures 15-18 for B10. Receiving waters were only monitored for Pond B2C discharges into Alameda Creek Flood Control Channel (ACFCC), the only slough receiving pond discharge well upstream of the bay itself (discharge from B2C-14 location). Data collected in 2005-07 in Newark Slough are included in this discussion for context to show variability in ambient conditions for slough water quality, independent of discharge. Receiving water sampling for B2C discharges into ACFCC is provided in electronic format, as well as all other pond sampling data.

The 2007 pond water analytical results (continuous collection) and field observations are large files and are not included in this SMR. Rather, those data are provided in electronic format. Please contact the Department for requests to cite, distribute or utilize this information for purposes other than reviewing this report.

Salinity

Pond salinities were generally higher in 2007 than previous years. This is likely due to the low rainfall total for the winter season, which limited winter operations and resulted in management operations with reduced circulation. Winter pond discharge was more limited, and input of rainwater to dilute pond water less than expected. Salinities were generally not above the 44 ppt required for Continuous Circulation Period operations, except for brief periods, especially during neap tide intervals when intake is extremely limited (refer to Instantaneous/daily mean salinity values). These periods show how with limited intake to promote mixing and dilution, combined with overall higher pond salinities, slightly higher salinity will be observed. This is especially true for drought years, exhibiting atypical water circulation patterns in pond operations. Only a portion of elevated daily mean periods were during actual discharge events, and values were only a few points above 44 ppt. Refer to Figures 3, 7, 11, and 15 for daily means in B2C, B2, B9 and B10, respectively. The operating salinities for all system ponds are expected to remain under Continuous Circulation Period conditions in future normal rainfall years, and will continue to chiefly function as low-salinity systems, reflecting only relatively higher salinities than the intake waters from the Bay and sloughs. Differences in mean salinity between pond and bay waters are more apparent during neap tide periods and higher salinity should be expected during drought years. Review of 2007 data through the remainder of the year and initial review of 2008 data show that at least during normal rainfall years, seasonal or batch pond operations, where a limited number of ponds are allowed to reach moderate salinities, will not prevent continued management of primarily low salinity ponds. Batch ponds are sufficiently mixing with system ponds before discharge.

<u>B2C:</u>
System B2C is operated as a muted tidal system, with supplemental intake and discharge at the same location, and salinity therefore varied depending on intake periods affected by spring and neap tide cycles. Grab samples obtained during routine pond operations prior to installation of the Datasonde showed values ranging from 29 to 43 ppt, Pond B2C continuous monitoring values from Datasondes installed prior to the monitoring season in late-April revealed daily mean pond salinities from 36 to 46 ppt (compared to 5 ppt in late-April 2006). Throughout the 2007 monitoring season, B2C operated at daily mean values ranging from approximately 27-49 ppt (3-37 ppt in 2006). Daily mean salinity in B2C was generally below 44 ppt throughout the season with implementation of the new BMP in early-May. The new BMP involved pond operations whereby periodic draining of Pond B2C waters to seasonal ponds (B5C, B4C, B1C) was implemented, effectively increasing intake from the slough and improving mixing. After periods of water transfers to B5C, system salinities generally operated under 44 ppt, within Continuous Circulation standards. The system was operated assuming Continuous Circulation Period conditions, because average salinity over the entire monitoring season (late April through early November) was 39 ppt. Daily mean salinities were periodically above 44 ppt, but additional BMP's such as weekly discharge timing and minimizing discharge volumes adequately protected receiving waters.

Instantaneous salinity values ranged from a low of 4 ppt to a high of 52 ppt in 2007. The instantaneous salinity maximum was 52ppt on 7/27/07, though the daily mean was 42 ppt on that date. The highest recorded daily mean value was 49.49 ppt on 10/23/07. The 10/23/07 daily mean coincided with a period when pond water elevations were lower and a brief temperature "spike" occurred on 10/22/07 (21 degrees Celsius), however temperatures were approximately 18 degrees Celsius and falling on 10/23/07 and beyond. It is possible that higher salinity brines from other ponds in the B2C system had accumulated in B2C during the prolonged neap tide cycle just prior to a spring tide series. This period was during the latter part of the season when evaporation was high during warmer weather.

<u>B9:</u>
System B8A is operated as a muted tidal system primarily via Pond B9, with intake and discharge at the same location, B8A-1, adjacent to the historic mouth of MEC. Supplemental intake occurred in Pond B8A, via North Creek. This operational mode is the reverse of previous years, and was the first year such operation was feasible (after MEC was restored to full tidal action). The Pond B9 operational mode was an effort to improve water quality values. It was presumed that primary pond operations via Pond B9 could improve water quality in the system because the B8A-1 WCS is comprised of four-48" culverts, all of which can be used for intake, compared to the single-48" culvert in

Pond B8A, providing greater mixing. It is unclear whether this mode of operation will improve water quality, based on the review of 2007 data; meeting WQO's in all pond systems was complicated by the previous low-rainfall winter. Salinity correspondingly varied depending on spring and neap tide periods.

At the start of the 2007 monitoring season in late-April, daily mean discharge salinity from Pond B9 was approximately 37 ppt. (15 ppt in 2006). The higher value at the start of the monitoring season showed that this system was affected by low rainfall the previous winter, and this system did not reach winter water depths. The system was not operated with maximized circulation (increased discharge) due to the limited rainfall. The system was operated assuming Continuous Circulation Period conditions, as average salinity over the entire monitoring season (late April through early November) was 41 ppt. Daily mean salinities were periodically above 44 ppt, but not higher than 46 ppt. The brief periods of salinity exceeding 44 ppt typically occurred during or after prolonged neap tide periods. Some periods occurred, however, during the start of stronger, spring tides, but these periods also were preceded by weak, neap tides, consistent with the former the pattern.

The highest recorded daily mean value was 46 ppt (9/22/07). Instantaneous salinity values in 2007 ranged from 28 ppt to 51 ppt (12 ppt to 46 ppt in 2006), while daily mean salinity ranged from 35 to 46 ppt during the season. Refer to the electronic data files for instantaneous salinity values exceeding 44 ppt. Discharge salinity was actively managed and operations were implemented to minimize instantaneous discharge values above 44ppt. During only one brief period (6/22 to 6/25/2007) in a period of neap tides, discharge operations were temporarily suspended in an attempt to prevent discharge of higher salinity, higher pH, and lower DO waters and to maintain water levels. Review of Datasonde values in the period following the temporary suspension did not show an increase in water quality values, therefore suspension of discharge was not attempted again in 2007. Salinity, pH and DO appeared to continue within the typical patterns and ranges.

A new BMP was implemented in 2007 because of the apparent success in improving some water quality parameters in another pond system (B2C). The new BMP implemented involved periodic draining of Pond B9 waters to seasonal ponds (B14, which drained to B8X and B12/13), effectively increasing intake from the bay at the mouth of MEC and improving mixing. After periods of water transfers to B14, especially for periods of more than one day and during spring tide cycles, system salinities generally improved and operated under 44 ppt, within Continuous Circulation standards. When B9 water transfers occurred during neap tide cycles, salinities did not notably improve until intake increased during the following spring tide cycle. Higher salinity waters in Pond B9 appear to have been well mixed by intake in B9 at the discharge location during spring tides, presumably because intake and discharge occurred at the same location and there was greater turnover. The use of the new BMP was limited by use of the seasonal ponds by nesting western snowy plovers, a threatened species. When the periodic transfers resulted in water levels that threatened to flood western snowy plover (WSP) nests, the practice was not continued.

B2:
System B2 is operated as a circulating system, rather than a primarily muted tidal system as with all other ponds, but is augmented by muted tidal intake at the B2-10 discharge location on the bay. Alternative discharge operations were not initiated at the B2-1 location in Pond B1, which had lower salinities typical of "intake" ponds, as had been undertaken in previous years to address salinity and DO. It was not feasible to implement the alternative B1 operation due to staff and budget constraints. Operation of B1 as the primary muted tidal intake and discharge would have required substantial staff time as well as increased operational costs for supplies necessary to install the Datasonde, and substantial staff time to conduct receiving water monitoring in Old Alameda Creek. Receiving water monitoring for B2 (bay discharge) operations was not required, as discussed above. Daily mean salinities in B2 were above 44 ppt for much of the season (135 of 190 days), although the system was operated as if under Continuous Circulation Period conditions. The rationale for continuous circulation is as follows: The B2 discharge is located directly on the bay and operates as muted tidal intake/discharge; System B2 includes Ponds B1 and B2 (and by default B4 because it is connected to B2 via a large levee gap) and is the largest open water pond system in the ELER complex; no seasonally dry ponds are provided in the main body of System B2 which could receive water transfers; only seasonally drawn down "batch" ponds exist, which already contain as much open water as is hydrologically feasible; the linked System B2C seasonal ponds (all "C" ponds) are too far removed from hydrologic connection in this large pond system to have an affect on B2 water quality. Salinity at the discharge at B2 was approximately 42 ppt in late-April, 2007 and ranged from 37 ppt to 54 ppt during the season (27 ppt to 35 ppt. in 2006).

Instantaneous Pond B2 salinity ranged from 29-56 ppt. It is important to consider that discharge salinity values weren't necessarily sustained in the high end of the range, but the lowest salinity values corresponded only to intake periods. Furthermore, some of the higher values were during periods when use of one of the BMP's was implemented, for example, temporary suspension of discharge, for periods of a few days, most often during neap tide periods, as discussed above. Another BMP was implemented during spring tide cycles, for example, increasing discharge to improve mixing and turnover. This BMP may have had some success in moderating salinity, but due to the size of the B2 system, overall salinity only decreased by approximately 2-5ppt, and for only brief periods (during the higher tide events). Salinity for the majority of the 2007 season was only somewhat elevated over 44ppt, daily means averaged 47 ppt.

Daily mean salinities in 2007 were typically above 44 ppt beginning May 23, through September 26. Thereafter, daily mean salinity was below 44 ppt except for October 4-11 and October 21-23 and October 31. The system was operated as if Continuous Circulation Period conditions continued, since the salinity was not substantially elevated and discharge occurs over a broad mudflat where dilution occurs rapidly. Furthermore, no additional BMP's or management activities could have been implemented except total cessation of discharge for the season, which would have resulted in further degradation of water quality due to lack of circulation, and habitat values would have also been adversely affected. While intake at the discharge location improved salinity, such improvements were temporary and generally only during spring tide cycles. Average salinity over the entire monitoring season (late April through early November) was nearly 47 ppt. Rather than being a result of pond management activities, 2007's high salinity was a result of drought conditions from the previous winter's below average rainfall, and in future drought years pond operations could be targeted during strong tide and rainfall events to maximize circulation by operating ponds at elevations below normal winter water levels in an attempt to circumvent elevated salinity during the monitoring season.

B10:

System B10 is operated as a muted tidal system in Pond B10, with intake and discharge at the same location at the mouth of MEC. Pond B11 is operated as a seasonal pond and is drawn down and dried during the summer. Salinity in B10 varied to a lesser extent than other ponds, with some variation depending on spring and neap tide periods. At the start of the monitoring season in late-April, 2006 daily mean salinity in B10 was at approximately 31 ppt at the discharge location (B11-1). Daily mean salinities were not above 44 ppt and the system operated under Continuous Circulation Period conditions.

Instantaneous salinity values ranged from 8 ppt to 46 ppt, and the season average was 36 ppt. Daily mean salinity ranged from 31 to 44 ppt during the 2007 season, and the average daily mean salinity was 36 ppt. The highest recorded daily mean value in B10 was 44 ppt (9/21/2007). There were no recorded daily mean salinity values exceeding 44 ppt. Discharge was actively managed by operations to minimize discharge of higher salinity waters during the brief periods when such conditions were observed and to avoid large fluctuations in water levels which could result in flooding or land-bridging breeding bird nests on islands in B10.

System B11 provided good habitat conditions for numerous waterbirds in B10 despite brief periods of low DO conditions, and B11 provided seasonal habitat with conditions suitable for WSP and other shorebirds once the seasonal pond was drawn down.

pH

The pH values in each Pond System was very similar, with season averages of approximately 8.3 and ranged from a minimum of pH 7.0 to a maximum of 9.14. While pH values were generally less than 8.5 during discharge periods, brief periods of elevated pH were noted in various ponds. However, slough receiving water monitoring conducted showed that receiving waters did not appear to be affected, with pH values similar to typical slough and bay conditions. Receiving water was not monitored for systems considered to be bay discharges, including Ponds B2, B9 and B10. Compliance for pH levels was allowed in the Final Order to be measured in either the pond or receiving waters, as determined by the discharger. There was no readily identifiable pattern in pH values as related to discharge operations. In B9, pH varied most extensively, with values ranging as much as two points over the season. In other pond systems, pH ranged approximately one to one and a half points. Refer to Figures 4, 8, 12 and 16 for daily mean pH in B2C, B9, B2 and B10, respectively.

In Pond B2C, daily mean pH values ranged from approximately 8.3 to 7.7 during the 2007 season (8.3 to 7.7 in 2006). Instantaneous values ranged from 7.7 to 9.1 pH, and averaged 8.4 pH, through the season. While pH levels were above 8.5 for some periods within the ponds, the pH in B2C receiving waters did not appear to be elevated during monitoring and there did not appear to be any adverse effect from brief periods of elevated pH. Receiving water data for B2C is included in summary graphs (Refer to Figures 3-6). See Receiving Water summary data for details (electronic format).

In Pond B9, daily mean pH values ranged from approximately 8.9 to 8.0 during the season (8.9 to 7.8 for B8A in 2006). Instantaneous values ranged from 7.0 to 9.0 pH, and averaged 8.4 pH, through the season.

In Pond B2, daily mean pH values ranged from approximately 8.6 to 8.2 during the 2007 season (8.9 to 7.8 in 2006). Instantaneous values ranged from 7.8 to 8.8 pH, and averaged 8.3 pH, through the season.

In pond B10, daily mean pH ranged from approximately 8.8 to 7.9 during the 2007 monitoring season. Instantaneous values ranged from 7.7 to 9.1 pH, and averaged 8.4 pH, through the season.

The receiving water sample point at the mouth of Alameda Creek would reflect similar values to the bay during flood tides, and may be useful for reference.

Temperature

Pond water temperatures were generally similar to ambient bay and slough temperatures and were only slightly warmer during hot weather periods, especially for shallower ponds. The ponds easily met the discharge limits, not exceeding natural temperatures of the receiving waters by 20^{o}F. Refer to Figures 5, 9, 13 and 17 for daily means in B2C, B9, B2 and B10, respectively.

Dissolved Oxygen (DO)

For the 2007 season, pond dissolved oxygen values continued to be problematic for achieving compliance with the Final Order. Monitoring efforts showed that DO levels in Ponds B2C, B9, B2 and B10 generally continued to exhibit a strong diurnal pattern where lower DO is observed near dawn and higher DO is observed at mid-day. Substantial algal growth and decomposition in the ponds is assumed to be the cause of diurnal fluctuations of DO levels throughout the ELER Ponds during the summer.

Continuous monitoring DO values are discussed below by pond system, and evaluations are based on daily mean values recorded at the discharge locations and on calendar-weekly 10th percentiles. Values are referenced with the Basin Plan water quality objectives (compliance limit of 5.0 mg/L) and reporting "trigger" values established by RWQCB (below 3.3 mg/L), as discussed herein. Where calendar-weekly tenth percentile "trigger" values were below 3.3 mg/L, notification of these conditions was made to RWQCB staff.

It should be noted that the summary data does not necessarily indicate or reflect actual violations of the Final Order. Pond discharges did not occur continuously nor in all of these periods, and variations in pond operations, including Best Management Practices (BMPs), were implemented to attempt to increase DO values, or to limit potential adverse affects, such as temporarily ceasing discharge, or reducing gate settings to limit discharge. Refer to Figures 6, 10, 14 and 18 for daily means in B2C, B9, B2 and B10, respectively.

B2C: Monitoring data for B2C was collected April 24 to November 3, 2007, representing 180 total days, not including approximately 14 days when data was not recorded due to power loss. For valid data B2C, daily mean DO was below 5.0 mg/L on 62 of 180 recorded days (34%), and of those days, daily mean DO was below 3.3 mg/L on 14 days (8%). There were 19 weeks, of 28 weeks, where calendar-weekly tenth percentile “trigger” values were below 3.3 mg/L (68%). It should be noted that this summary does not necessarily indicate or reflect actual violations since pond discharges do not occur continuously. Best Management Practices (BMPs) were implemented to effectively minimize discharge during trigger periods. Monitoring indicated that Receiving Waters had at least one station that was below 5.0 mg/L on 8 of 24 days (33%). Refer to tables in electronic data files, and graphs included herein for interpretation. The first instance in the 2007 season when we recorded receiving waters values below 5.0 mg/L was on June 22. Lower DO values could be attributed to pond discharges or natural variation in slough and bay conditions associated with other factors, or a combination thereof, as discussed below.

The 6/22/07 sampling was conducted on an ebbing lower-high tide, and one bottom sample indicated lower water quality values were associated with pond B2C discharge (Bottom = 3.8 mg/L, 55.8 ppt). For the 6/22/07 samples, the lowest DO reading (2.9 mg/L bottom) was at the furthest upstream station, and as tide was quite low and ebbing, these values appear to be associated with slough conditions, rather than pond conditions. On the following week’s sampling, 6/28/07, all sampling stations showed normalized values, none of which were outside of WQO’s. Subsequent receiving water sampling dates which recorded DO values below 5.0 mg/L did not record values below the 3.3 mg/L trigger value, even when weekly 10^{th} percentile values were substantially lower. Rather than temporarily suspending discharge, we continued to utilize the BMP to minimize discharge volume for subsequent events. As the slough appeared to normalize values independent of temporary suspension of B2C discharge, the practice was not used again. Instead, we repeatedly used the new BMP in which periodic transfers of water from system ponds (B2C and B3C) to adjacent seasonal ponds (5C, 4C, 1C).

Pond System B8A (Pond B9): Monitoring data for B9 was collected from April 26 to November 5, 2007, representing 180 total recorded days; there were 14 days when meters did not record data due to power loss or device malfunctions. For B9, daily mean DO was below 5.0 mg/L on 142 days (79%), and of those days, daily mean DO was below 3.3 mg/L on 89 days (49%). Pond B9 was out of DO compliance for weekly tenth-percentile trigger values for the entire season; there were 27 weeks, of 28 weeks, where calendar-weekly tenth percentile “trigger” values were below 3.3 mg/L, which required notification of RWQCB. This summary does not necessarily indicate or reflect actual violations for the entirety of the season, but indicates that this pond generally did not meet discharge requirements for DO. While pond discharges did not occur continuously, discharge often occurred during low DO conditions. Best Management Practices (BMPs) were implemented; however, they likely only minimized discharge during trigger periods rather than avoided discharge. Because Pond B9 was considered a bay discharge, it is likely that low DO values did not persist in receiving waters once spreading over the mudflats at low, ebb tides. During flood tides, pond waters were mixed and carried with receiving waters upstream in MEC, which is currently only a 2 mile long channel, not yet connected to the 835-ac ELER Restoration Project. At low tide, MEC is dewatered since there is no upstream watershed or tidal area connected yet to provide conveyance.

<u>Pond System B2:</u> Monitoring data for B2 was collected from April 26 to November 1, 2007, representing 190 total recorded days, not including approximately 5 days when the Datasonde did not record all valid data due to malfunctions. Of those 5 days, only 3 days, April 28-30 were missing all data, and for May 1 and part of May 2 only temperature and DO were validly recorded, thus the B2 data was essentially continuous for the entire season, except for very brief periods (15-60 minutes). For B2, daily mean DO was below 5.0 mg/L on 40 days (21%), and of those days, daily mean DO was below 3.3 mg/L on only one day (2.0 mg/L, 5/18/07); there were 18 weeks, of 27 weeks, where calendar-weekly tenth percentile "trigger" values were below 3.3 mg/L (67%) and RWQCB was notified. The data represents all recorded data collected at the pond discharge location. It should be noted that this summary does not necessarily indicate or reflect actual violations. Pond discharges did not occur continuously, and discharge did not necessarily occur during all times within each week when the trigger value was observed. Best Management Practices (BMPs) were implemented and appeared to effectively minimize discharge during trigger periods. For System B2, receiving waters were not monitored because it is a direct bay discharge, as discussed previously.

<u>Pond System 10:</u> Monitoring data for Pond B10 was collected April 26 through November 1, 2007, representing 187 total recorded days. For this discussion and for the figures, 17 days were omitted because a set up error resulted in DO being collected in percent saturation, and those values can only easily be approximated in concentration (mg/L) due to the complexity in conversion. There were less than 3 full days when data was not recorded due to power loss. For B10, daily mean DO was below 5.0 mg/L on 31 days (17%), and daily mean DO was not observed below 3.3 mg/L in 2007. There were approximately 9 weeks, of 29 weeks (31%), where calendar-weekly tenth percentile "trigger" values were below 3.3 mg/L and RWQCB was notified. It should be noted that this summary does not necessarily indicate or reflect actual violations. Pond discharges did not occur continuously, and discharge did not necessarily occur during all times within each week when the trigger value was observed; the data represents all data collected at the pond discharge location. BMPs were implemented and appeared to effectively minimize discharge during trigger periods. For System B10, receiving waters were not monitored because B10 is a bay discharge, as discussed previously.

Newark Slough monitoring discussion: Newark Slough is located south of ELER, and south of the Dumbarton Bridge, but north of the USFWS-managed Alviso Pond Complex (Figure 3). In 2005, USGS began monitoring water quality in Newark Slough, which is not affected by pond or other substantial discharges. Newark Slough may be a suitable reference site for ambient conditions and provide a context for natural variation and comparisons to sloughs that receive pond discharges. See Table 3 below.

In 2005, 18 surface water samples were collected on August 2 from nine different sites in Newark slough, and seven recorded samples had instantaneous DO values less than 5.0 mg/L. In 2006, monitoring data for Newark Slough was collected approximately bi-monthly from June 8 through October 23, 2006 on 11 individual days composing a total of 99 surface and bottom values. Of the 99 total samples, 36 bottom samples and and 28 surface samples had an instantaneous value of less than 5.0 mg/L (Figure 19). In 2007, there were 108 samples collected with 48% of the bottom samples recorded with DO levels below 5.0 mg/L.

Table 3: Newark Slough, Dissolved Oxygen (from USGS data [1] , USFWS 2007 ASMR [2])

Sample Year	Total # of Samples	Total # of Surface Samples below 5.0 mg/L	Percent of Surface Samples Below 5.0 mg/L	Total # of Bottom Samples below 5.0 mg/L	Percent of Bottom Samples below 5.0 mg/L
2005	18	7	39%	N/A	N/A
2006	99	28	28%	36	36%
2007	108	39	36%	52	48%

[1] Shellenbarger, G.G., Schoellhamer, D.H., Morgan, T.L., Takekawa, J.Y., Athearn, N.D., and Henderson, K.D., 2008, Dissolved oxygen in Guadalupe Slough and Pond A3W, South San Francisco Bay, California, August and September 2007: U.S. Geological Survey Open-File Report 2008-XXXX

[2] 2007 Self-Monitoring Program For Alviso Ponds Within South San Francisco Bay Low Salinity Salt Ponds, Alameda, Santa Clara, & San Mateo Counties, California

USGS conducted additional water quality sampling for USFWS with a study goal targeting "understanding the natural variability of slough DO and the effect of pond discharge on the DO concentrations in the sloughs".[1] Newark Slough and Mowry Slough water quality was also tested to "document DO variability in nearby sloughs that were unaffected by pond discharge. The results showed that natural tidal variability in the slough appeared to dominate control on the slough DO concentrations. Pond discharge was identified in the slough with the deployed instruments, but the discharge at times increased DO concentrations in the slough. The effects of altering the volume of pond discharge were overwhelmed by natural spring-neap tidally variability in the slough."[1] The report from USGS for USFWS, "Dissolved oxygen in Guadalupe Slough and Pond A3W, South San Francisco Bay, California, August and September 2007" will be provided to RWQCB when available to FWS and will be reviewed by the Department.

The USGS study of dissolved oxygen in South Bay sloughs in August, 2007, indicated that pond discharges may have greatest affects on sloughs at low tide when discharge is greatest and dilution by slough water is smallest, as might be expected. Their study was not able to discern whether the correspondence of minimum slough DO and low water was caused by pond discharge, or by upstream discharge from Sunnyvale POTW, or what affect sediment oxygen demand may have. A simple experiment was suggested to test if the pond discharge were responsible; closing the pond discharge for several days should cause DO in the Slough to increase. If there were no increase, then either the pond discharge was not responsible or was not closed long enough for DO recovery. They suggested such operations should be the basis of follow up monitoring.

The study found that for the majority of low tides, pond water of higher DO entered the slough, based on Specific Conductance (SC) and pH "signals." Both parameters "spiked" up in the slough as high SC and pH water from the pond entered the slough at the discharge structure and middle sampling site. The study noted pH in the pond and slough were nearly identical, and pH did not increase landward or seaward from the discharge. DO in the pond increases in the late morning due to photosynthesis when lower low water (LLW) occurs, but pond DO was always less than slough DO. DO increased in the slough at LLW concurrent with the spike in pH. Pond water discharged was noted to have higher DO once entering receiving waters because after leaving the pond where the Datasonde was located, it would become somewhat more aerated after turbulence caused by the culvert and the trash rack and from turbulent flow down the wide shallow channel into the slough. Aeration along such a flow pattern was noted to increase DO about 1 mg/l. The subsequent flood tide transported the high pH and DO water to the landward site and was not observed at the seaward site.

DO varied semi-diurnally and lowest DO occurred during low tides and highest DO during high tides, suggesting that bay water has greater DO than slough water. Low DO slough water moves toward the bay during ebb tide and higher DO water moves from the bay into the sloughs during flood tide.

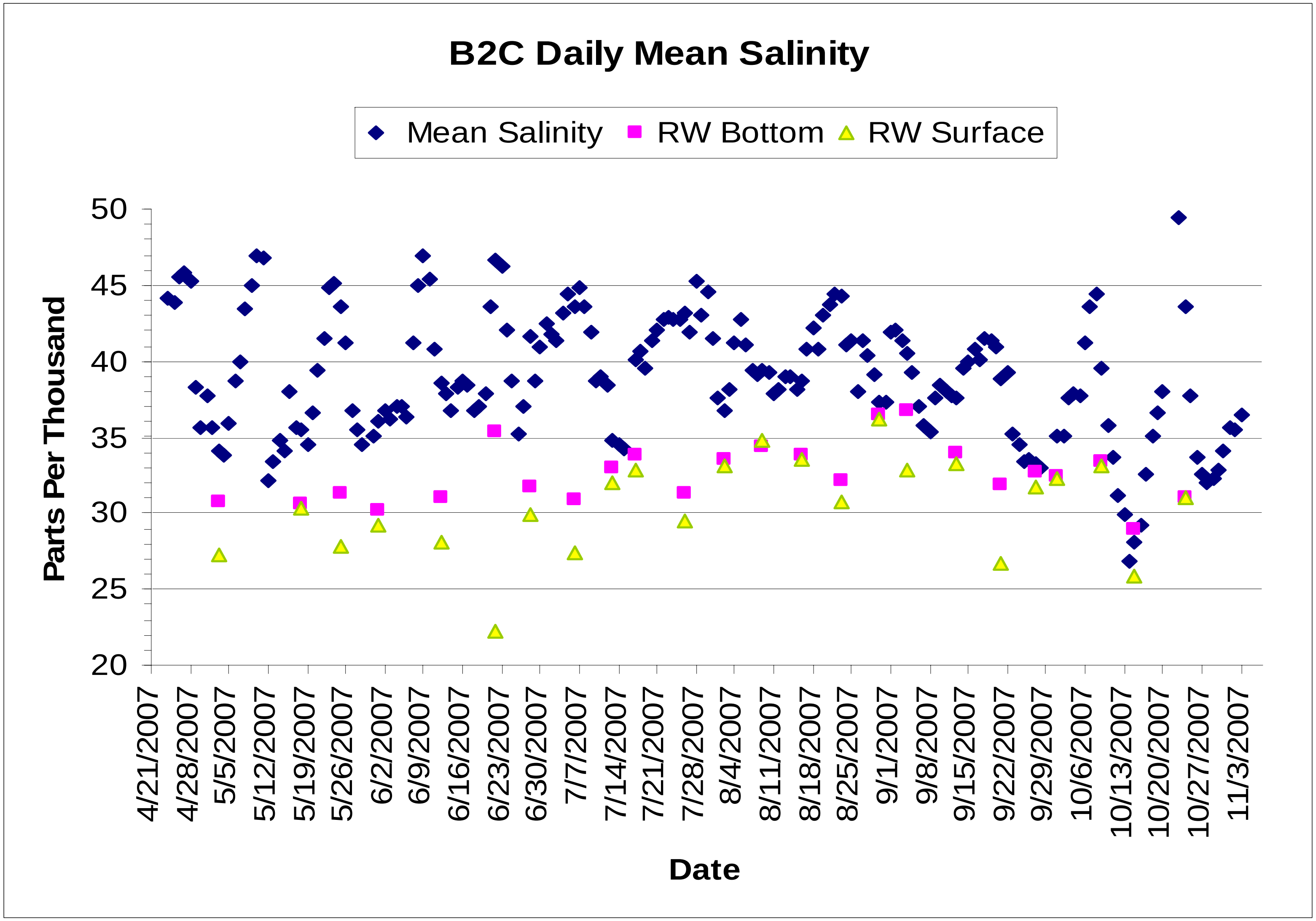

Figure 3. Pond B2C- Daily Mean Salinity for Discharge and Receiving Water

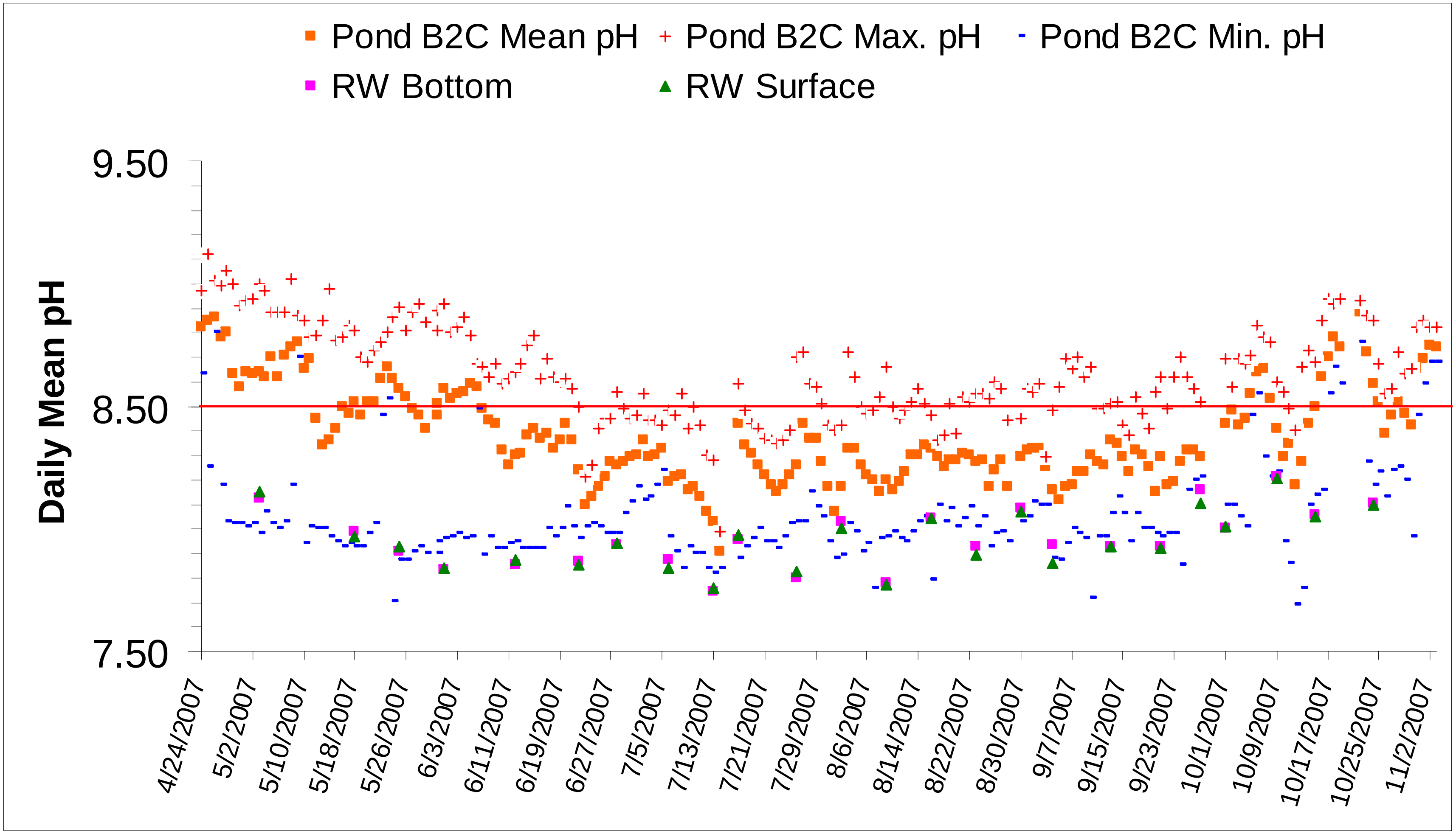

Figure 4. Pond B2C- Daily Mean pH for Discharge and Receiving Water

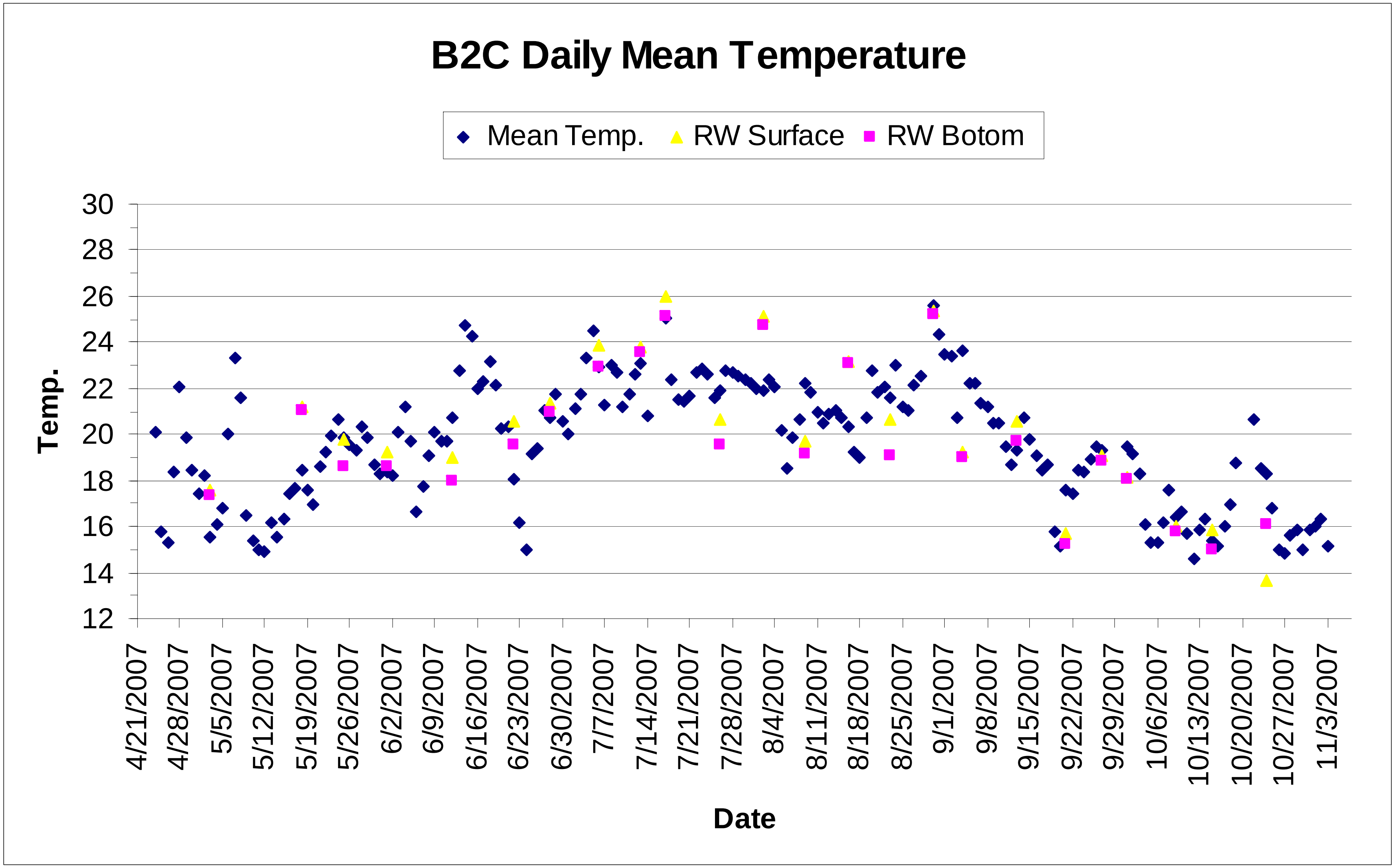

Figure 5. Pond B2C- Daily Mean Temperature for Discharge and Receiving Water

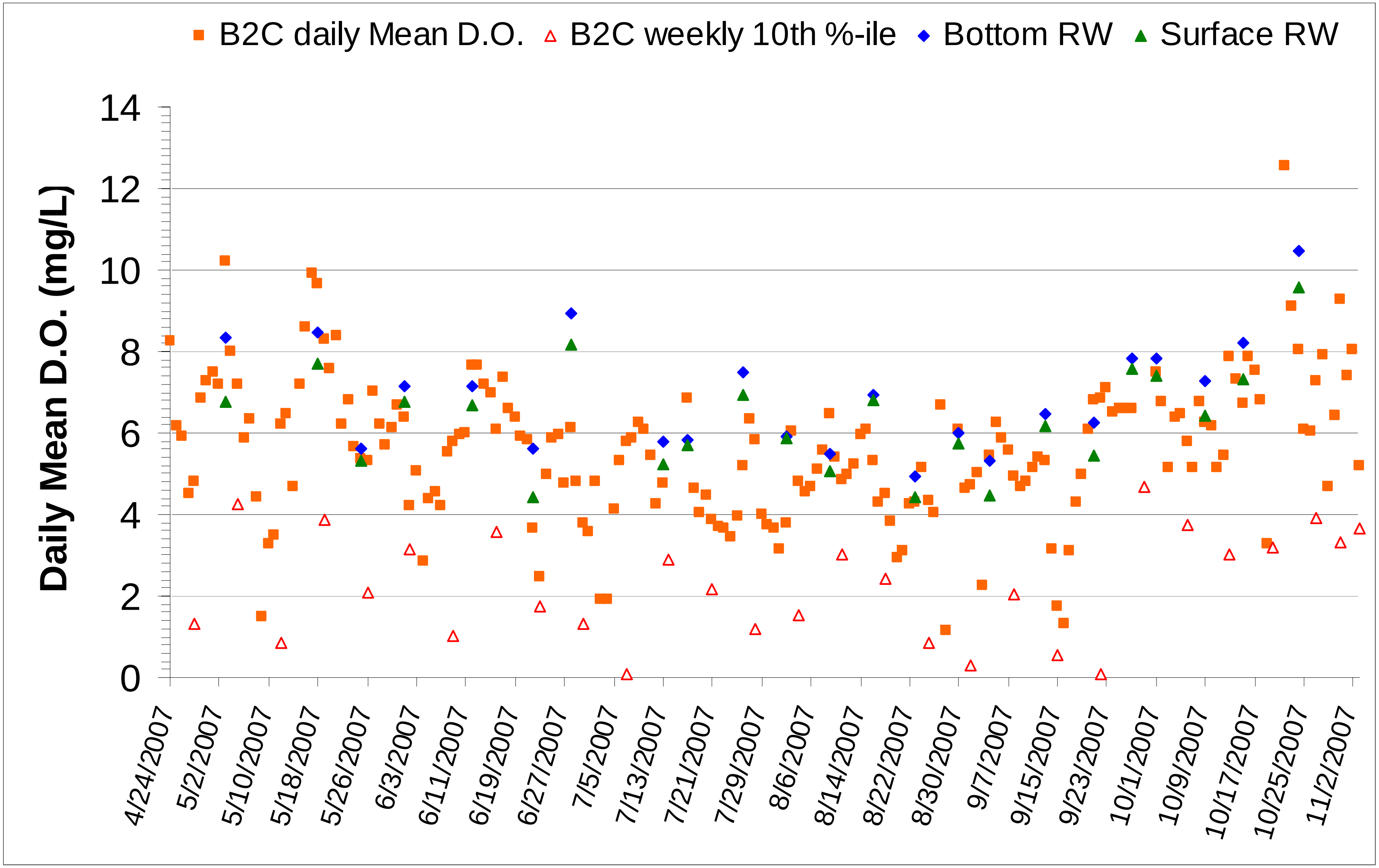

Figure 6. Pond B2C- Daily Mean DO for Discharge and Receiving Water

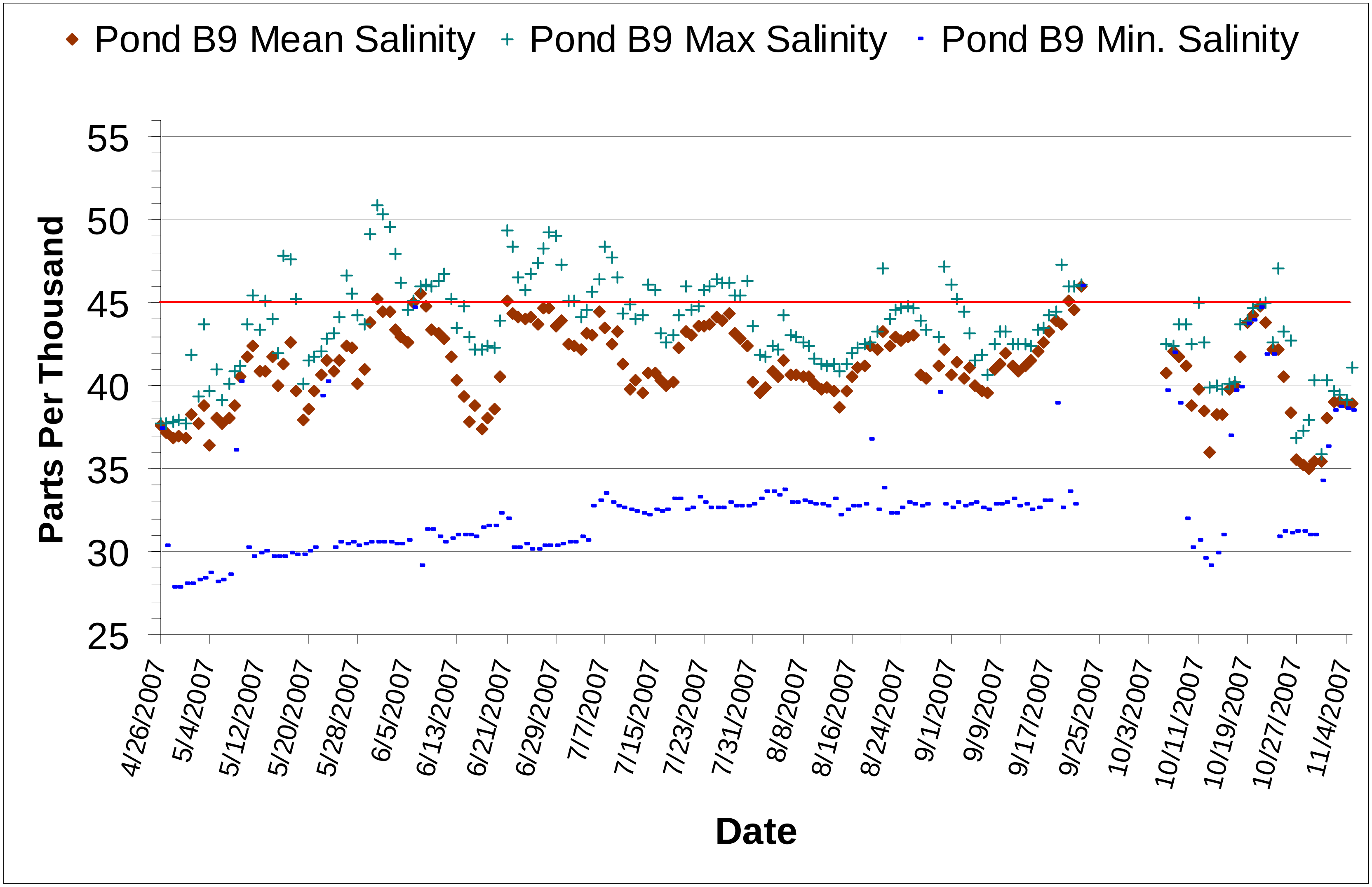

Figure 7. Pond B9- Daily Mean Salinity for Discharge and Receiving Water

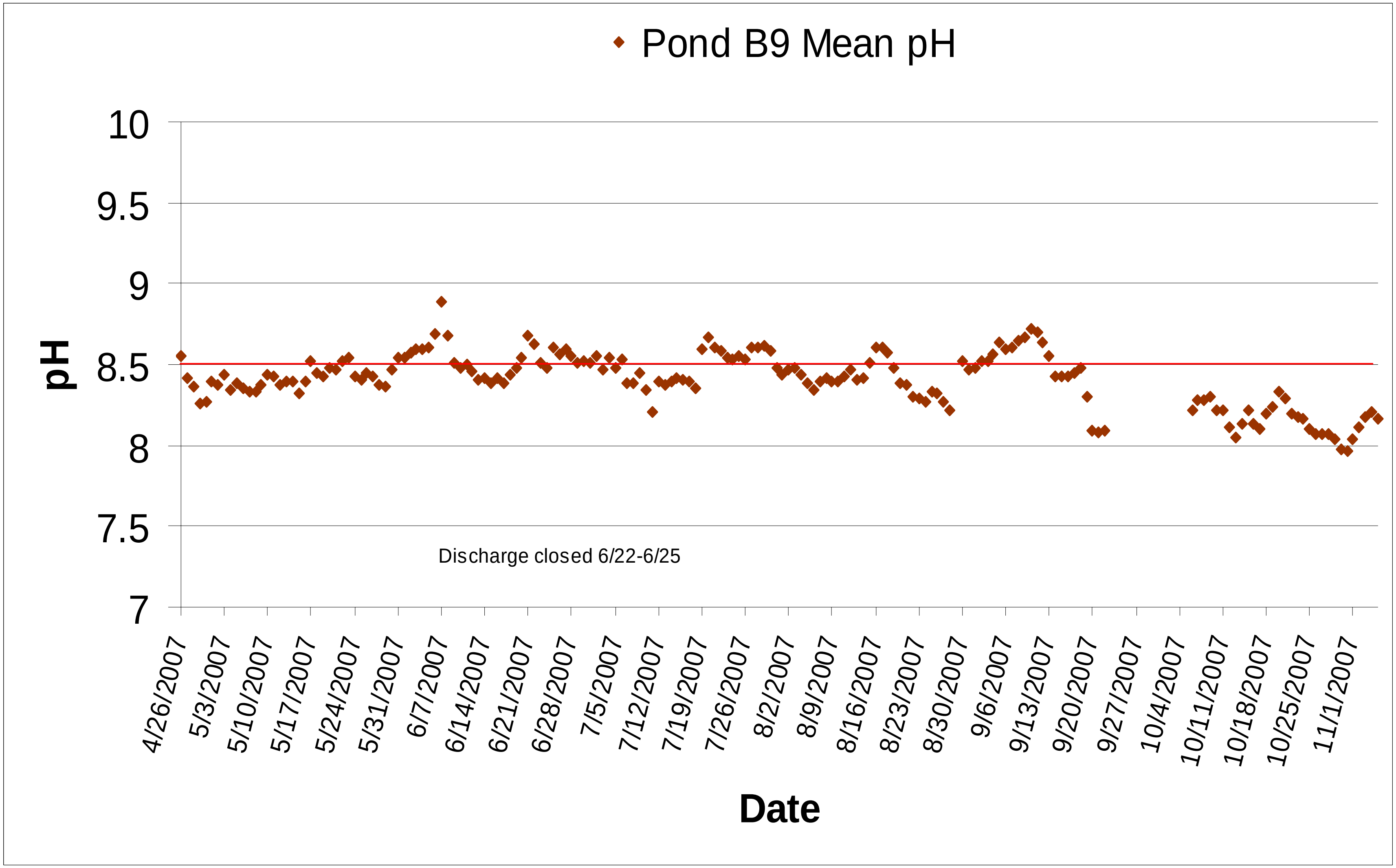

Figure 8. Pond B9A- Daily Mean pH for Discharge and Receiving Water

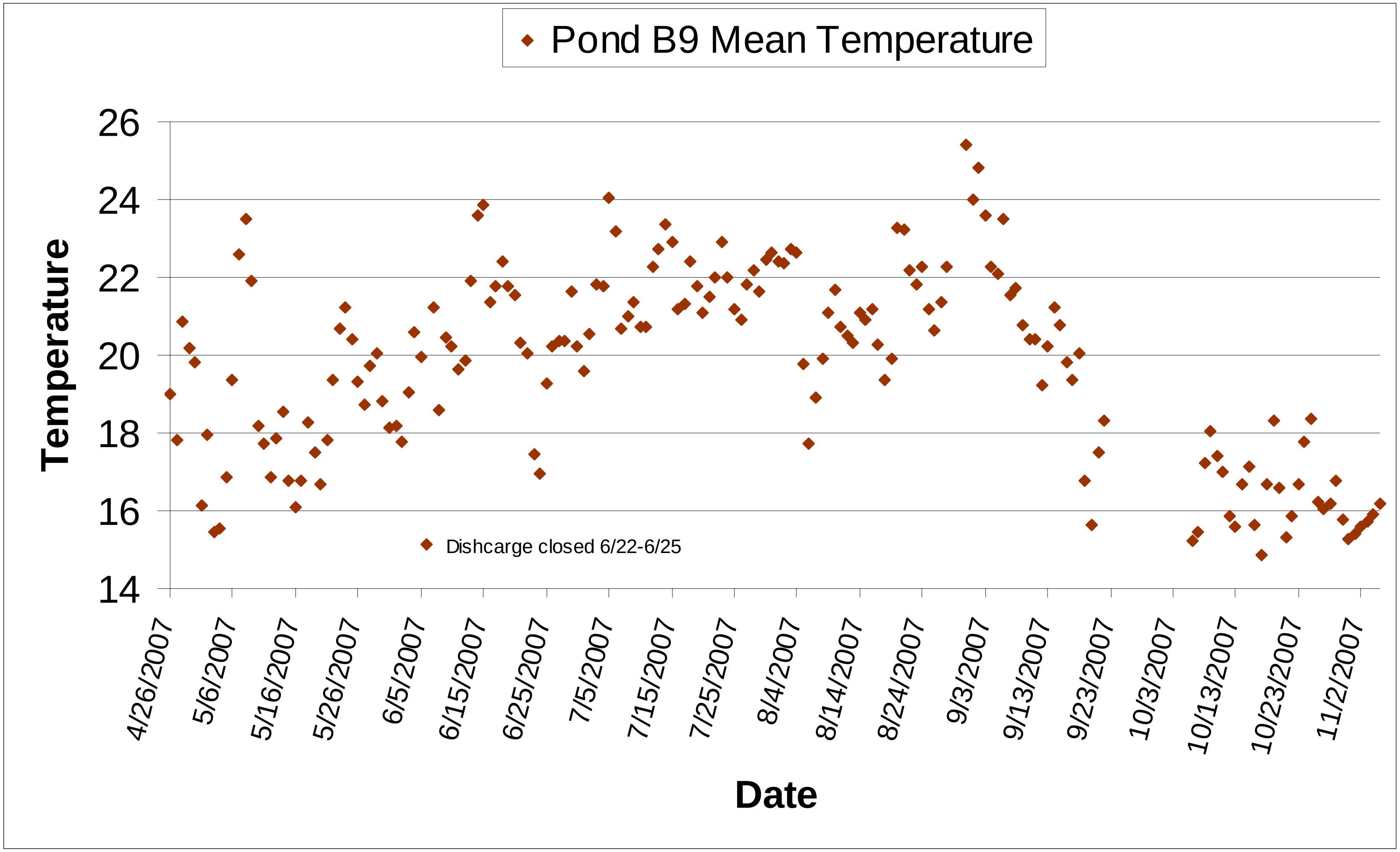

Figure 9. Pond B9- Daily Mean Temperature for Discharge and Receiving Water

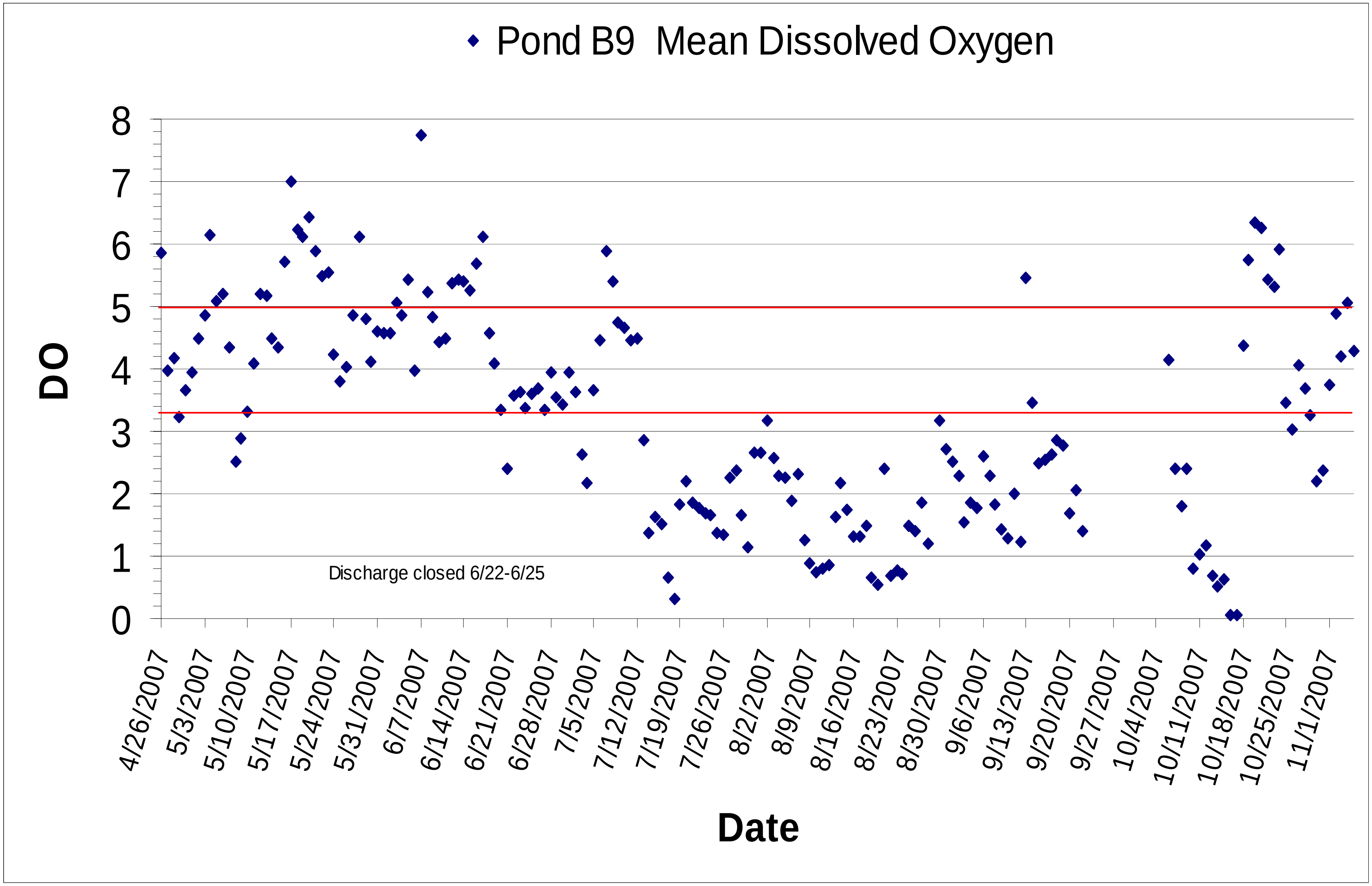

Figure 10. Pond B9- Daily Mean DO for Discharge and Receiving Water

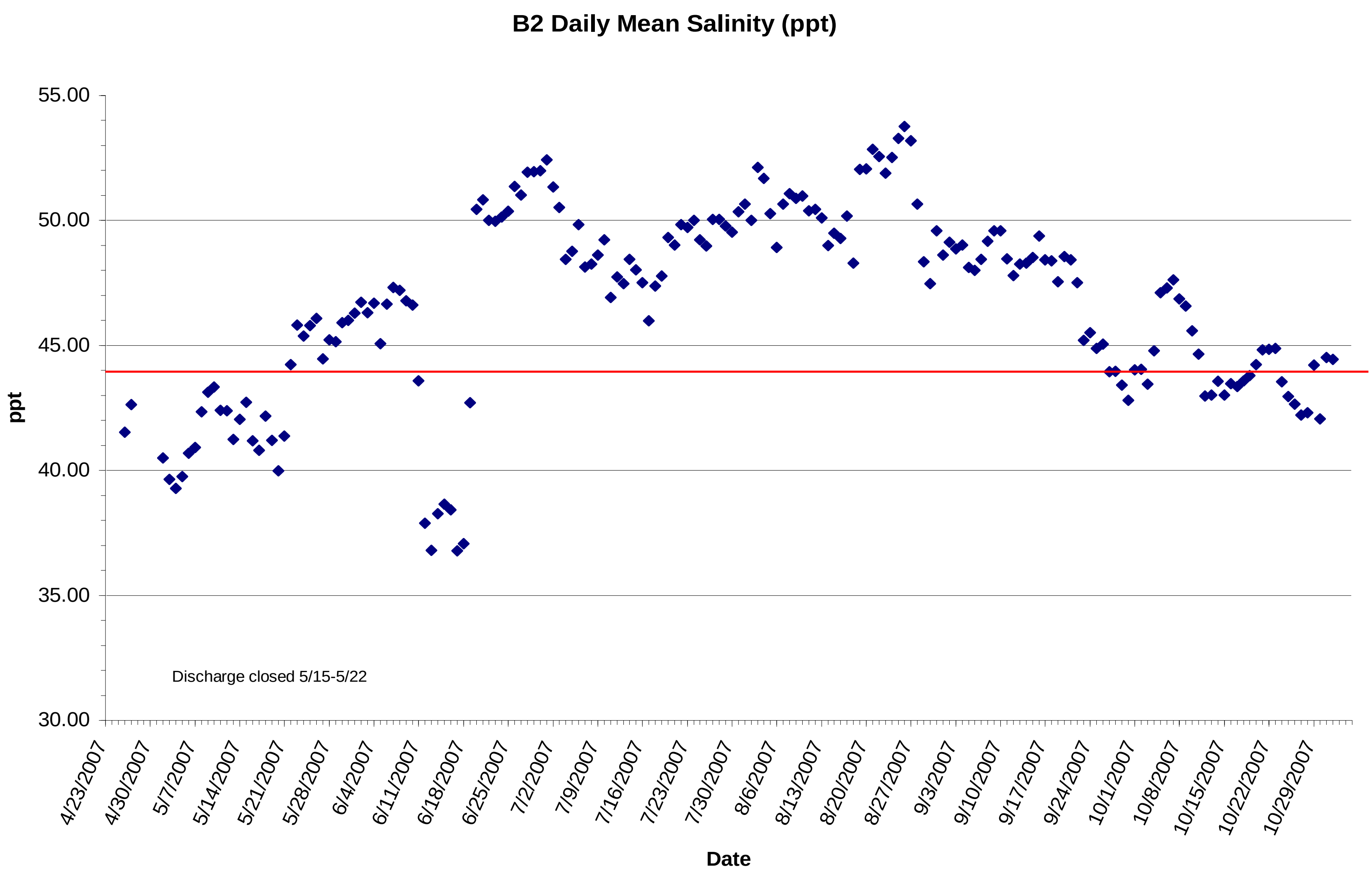

Figure 11. Pond B2- Daily Mean Salinity

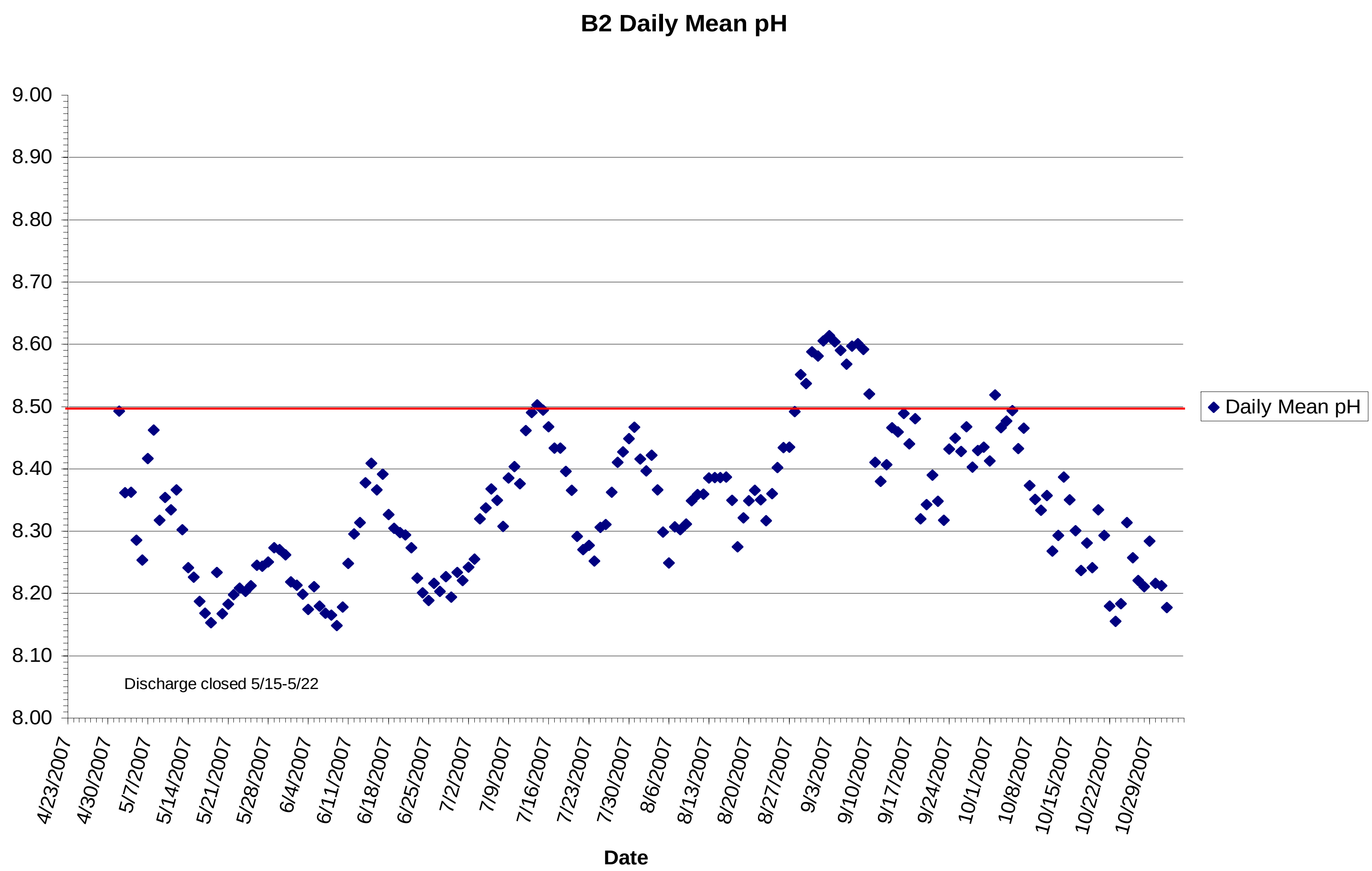

Figure 12. Pond B2- Daily Mean pH

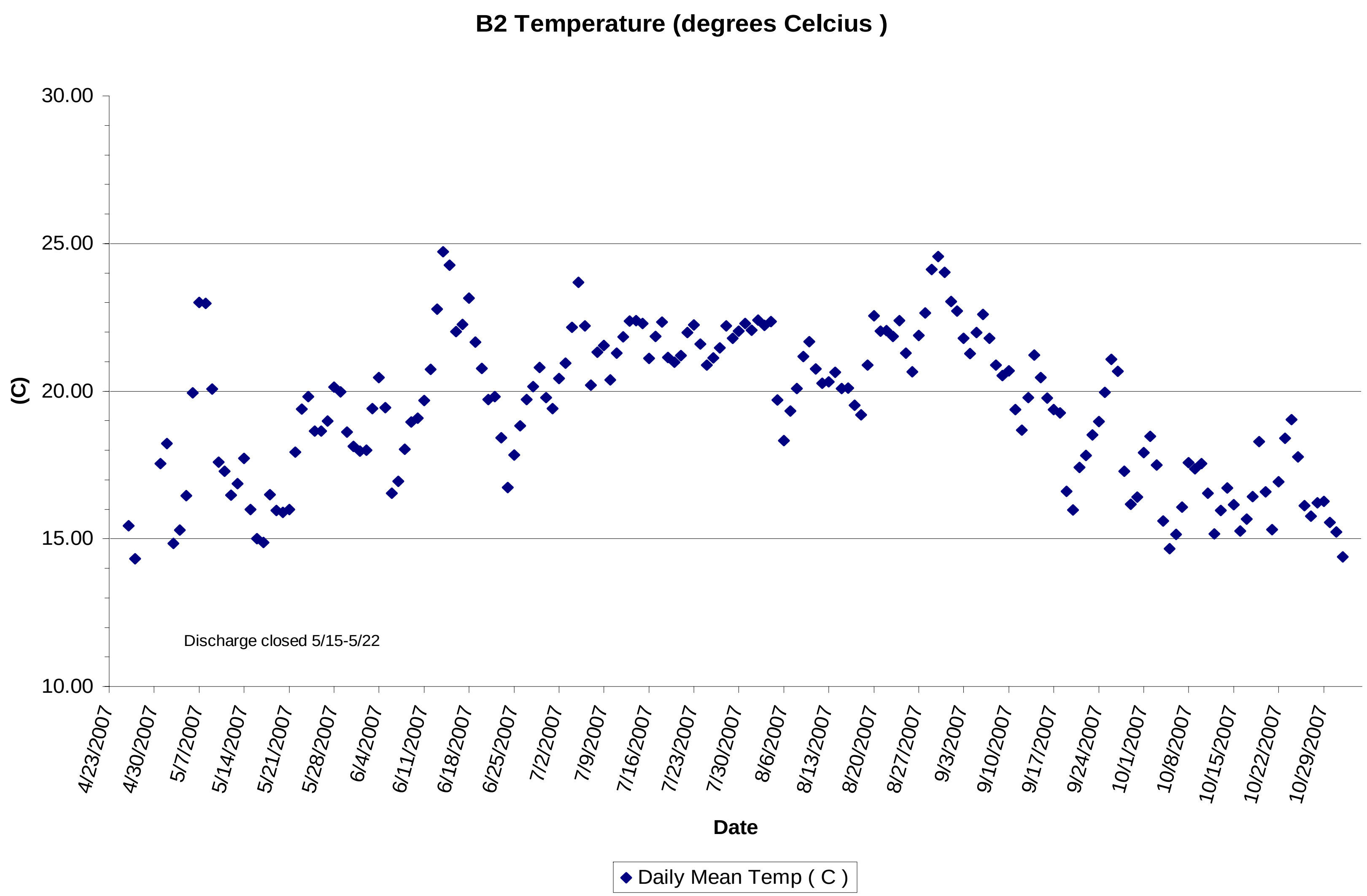

Figure 13. Pond B2- Daily Mean Temperature

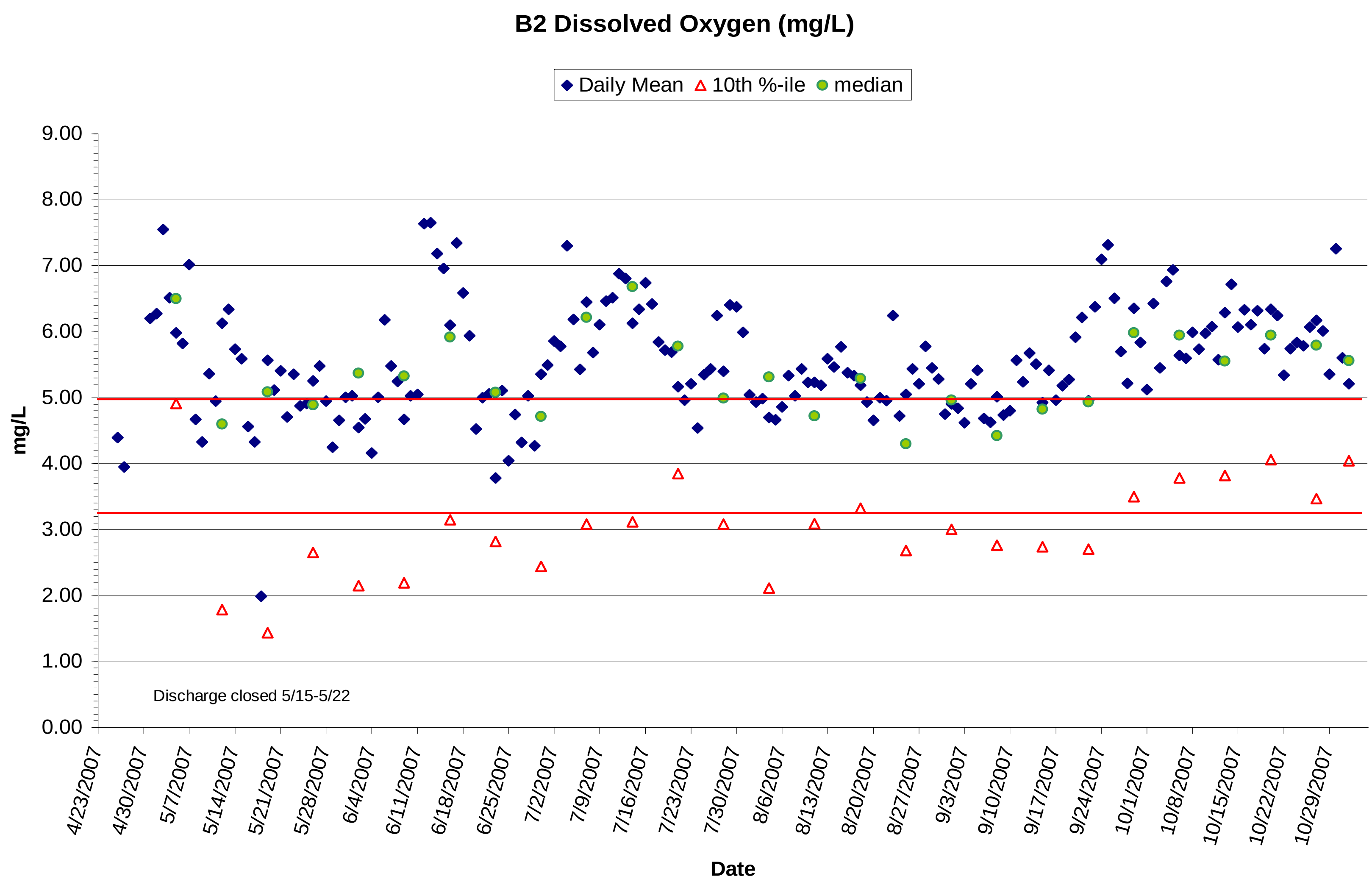

Figure 14. Pond B2- Daily Mean DO

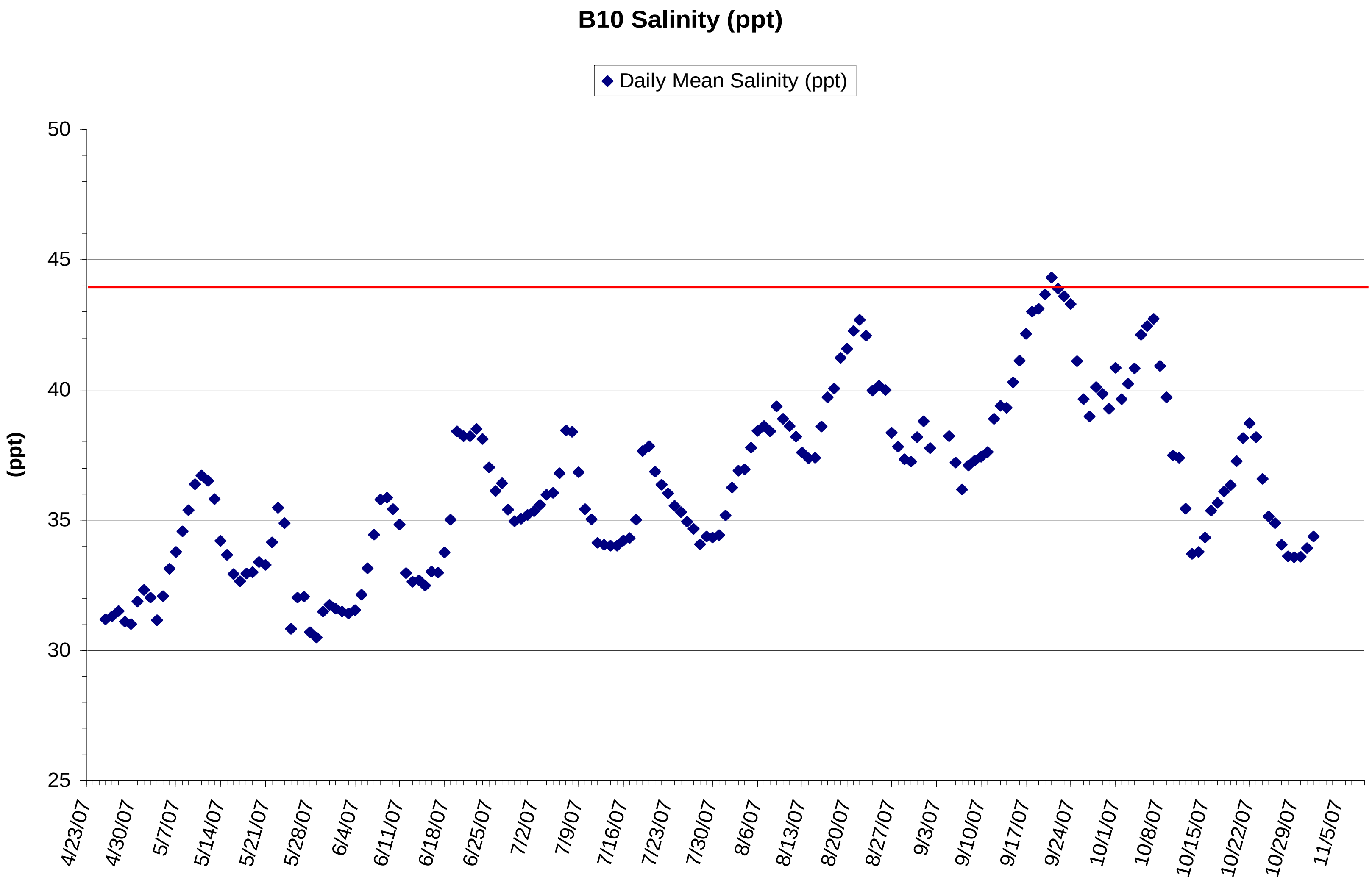

Figure 15. Pond B10- Daily Mean Salinity

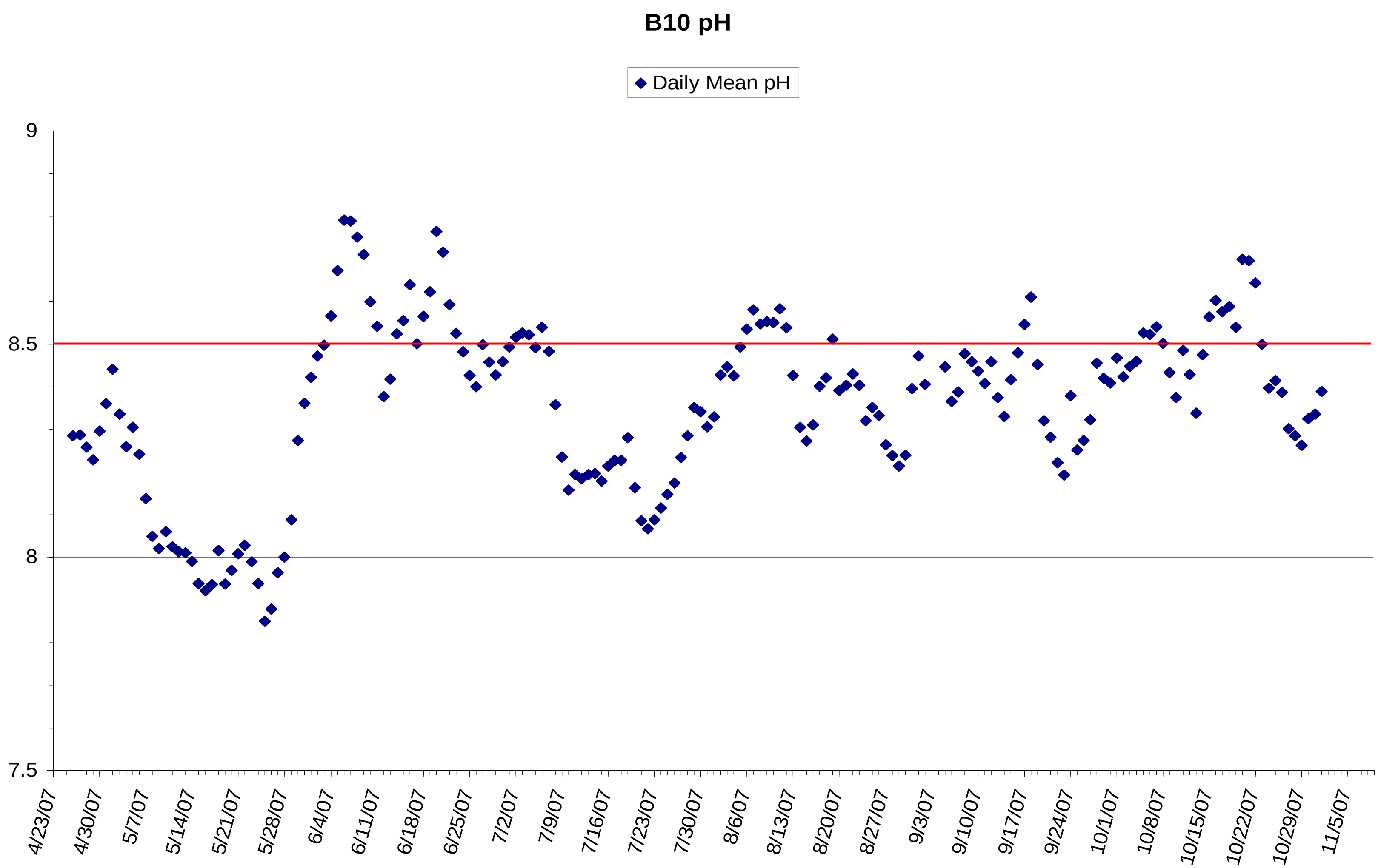

Figure 16. Pond B10- Daily Mean pH

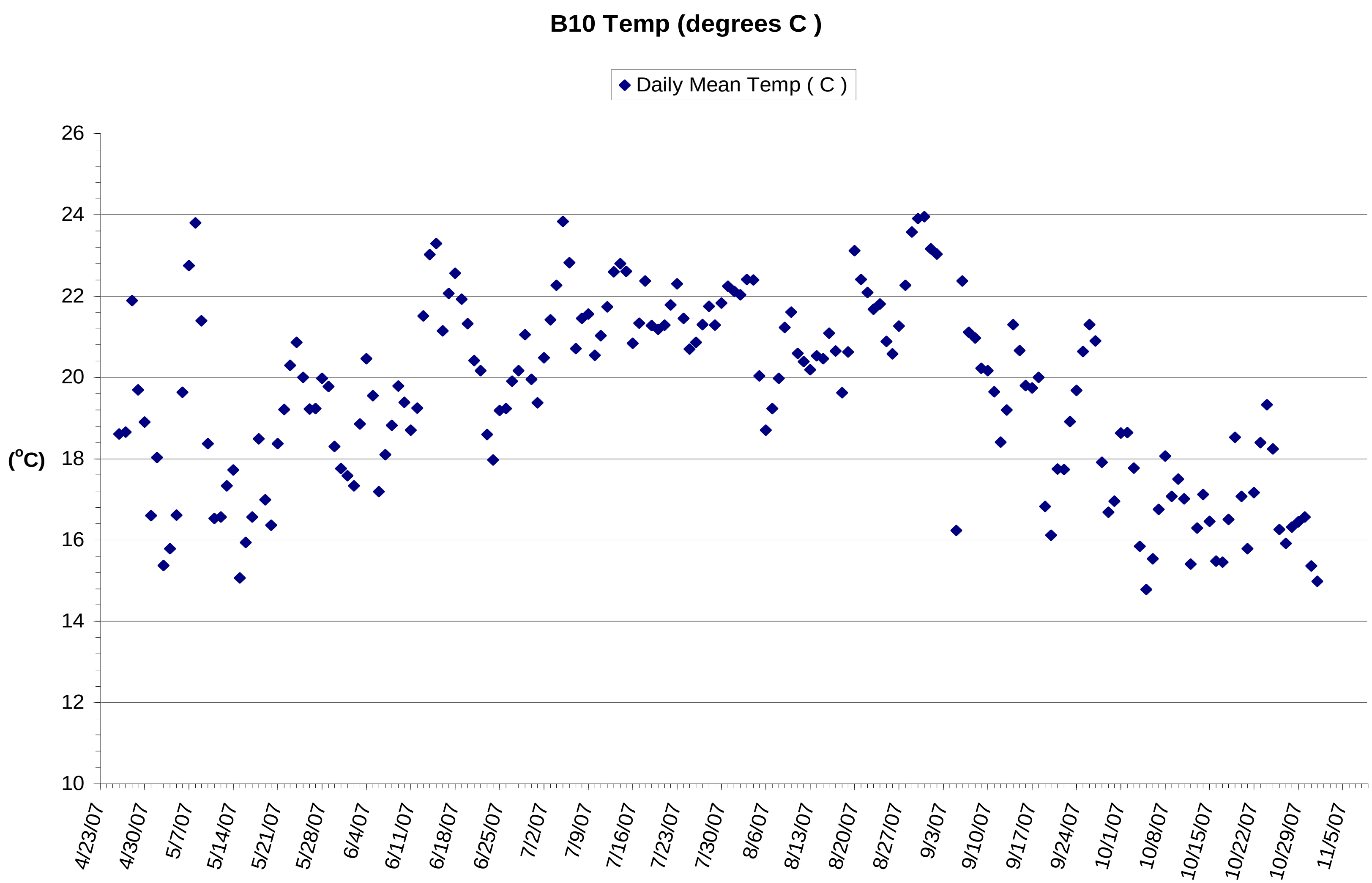

Figure 17. Pond B10- Daily Mean Temperature

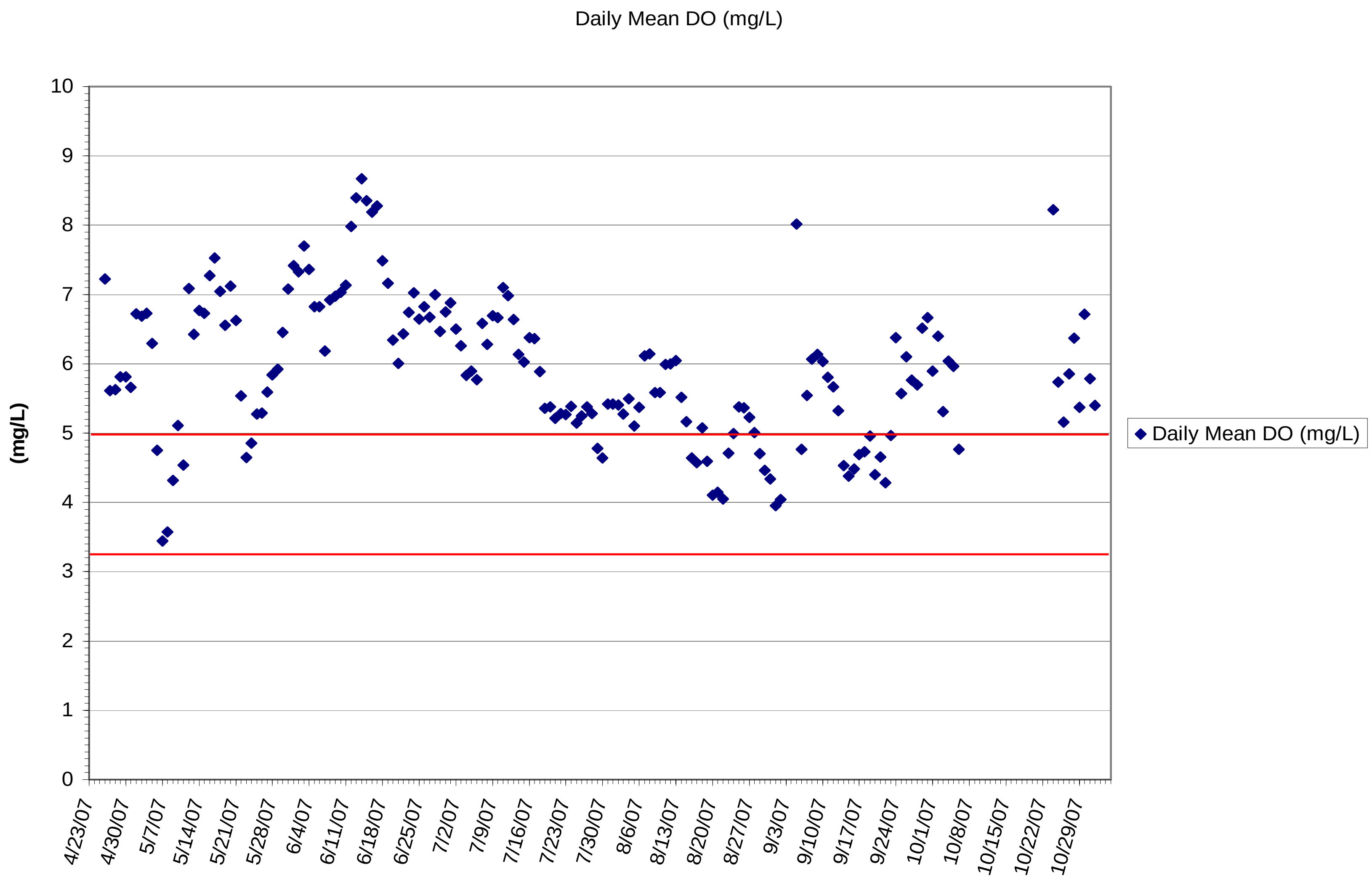

Figure 18. Pond B10- Daily Mean DO

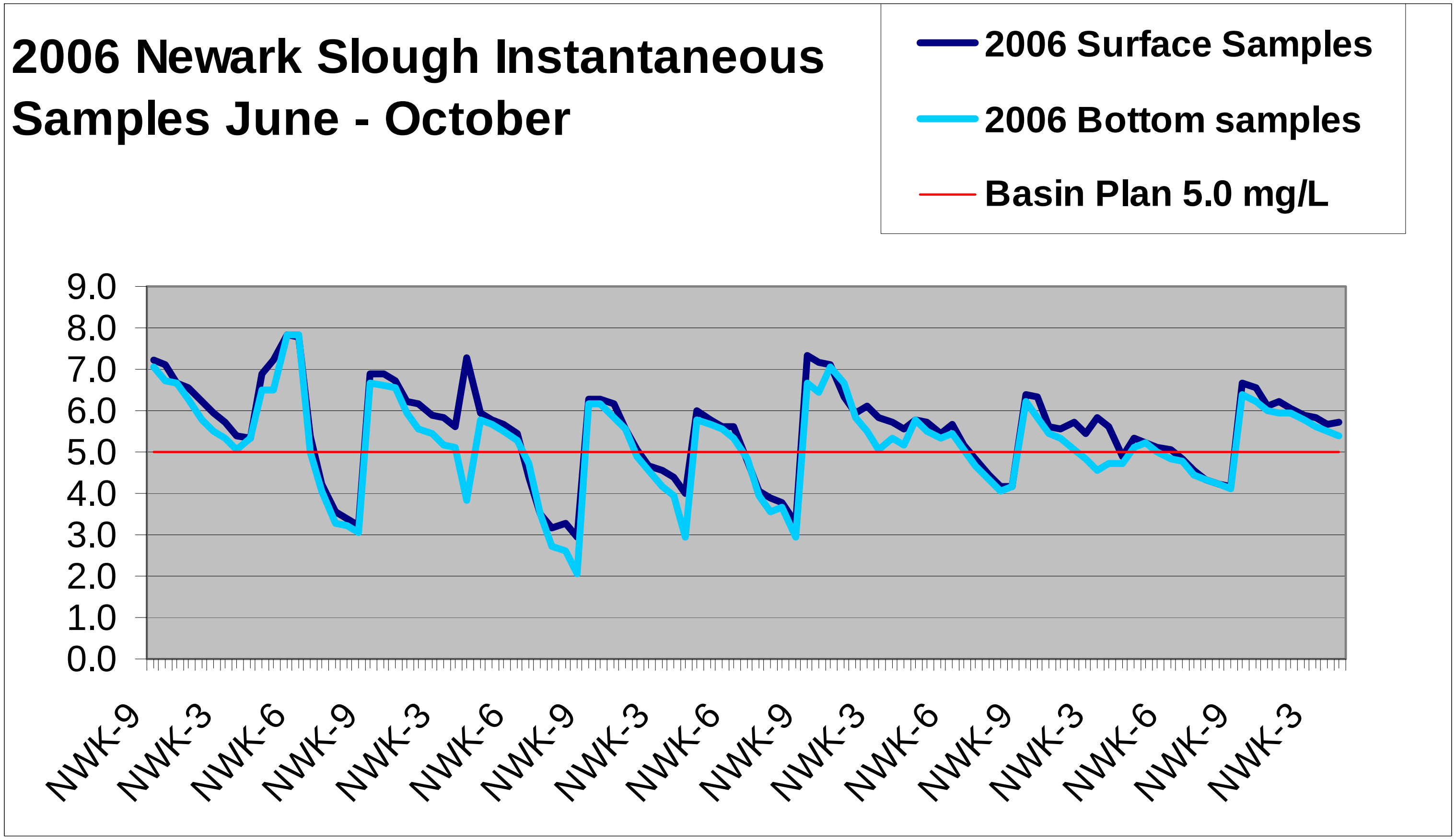

Figure 19. Newark Slough Dissolved Oxygen values, 06/06-10/06

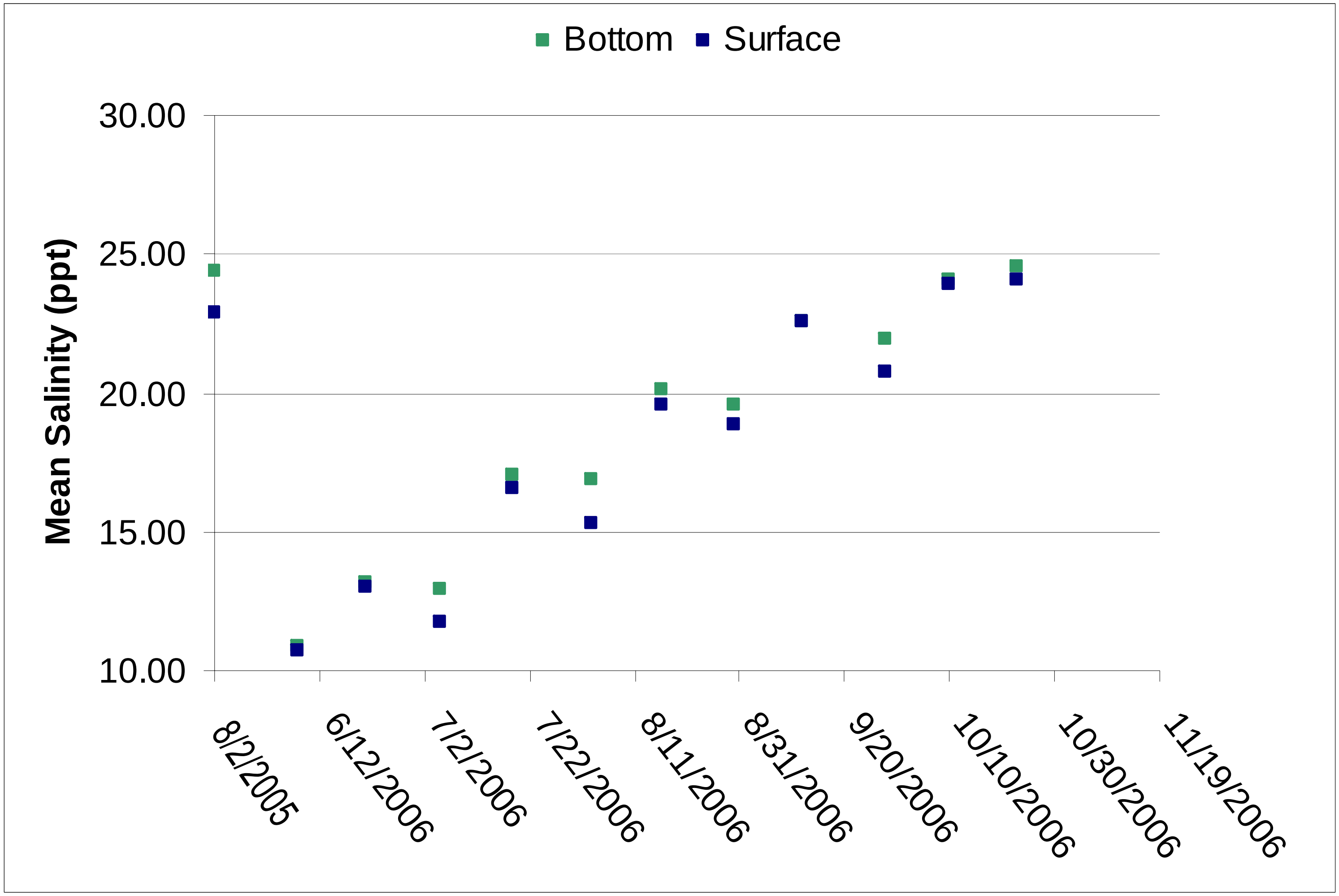

Figure 20. Newark Slough Salinity values, 08/05, 06/06-10/06

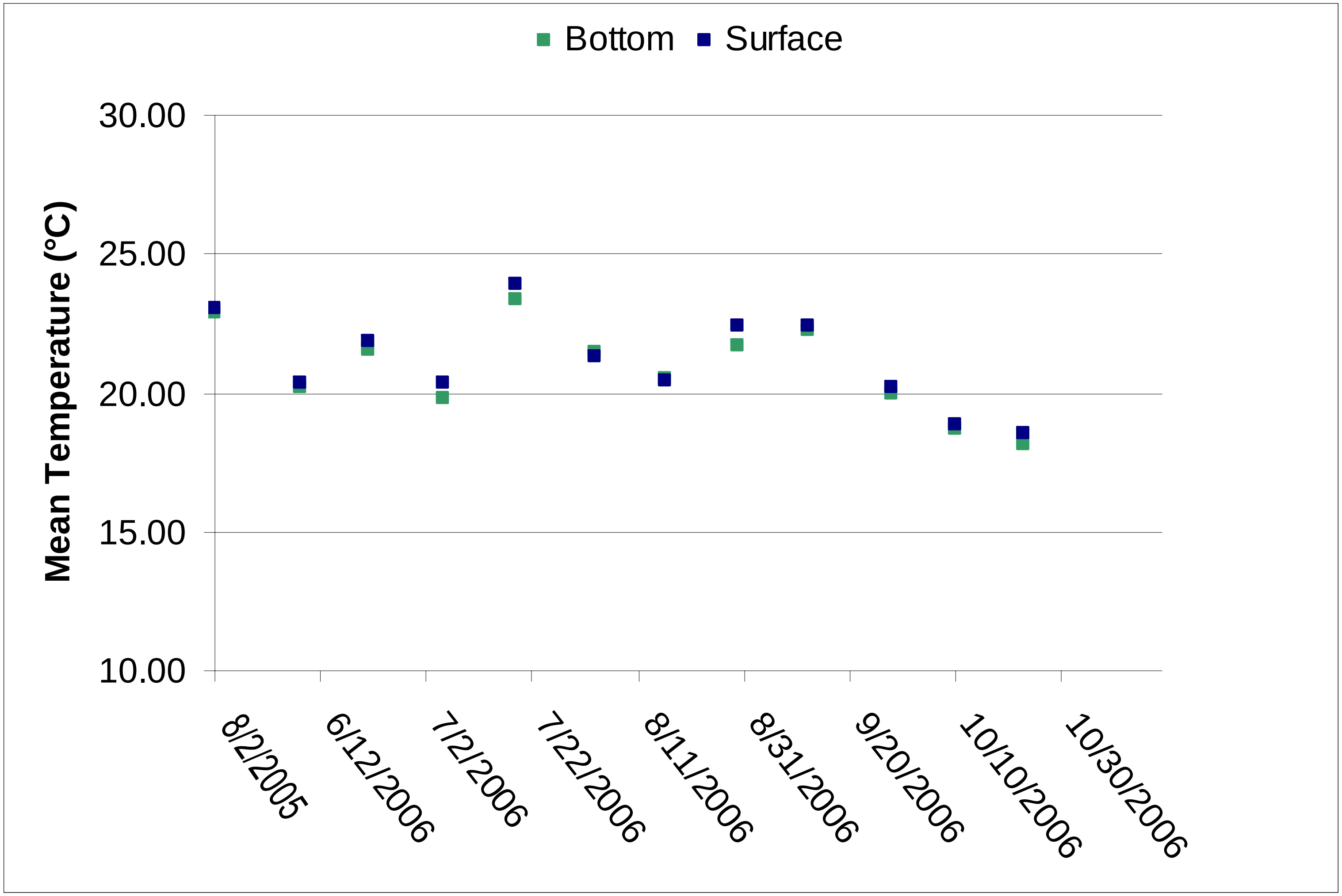

Figure 21. Newark Slough Temperature values, 08/05, 06/06-10/06

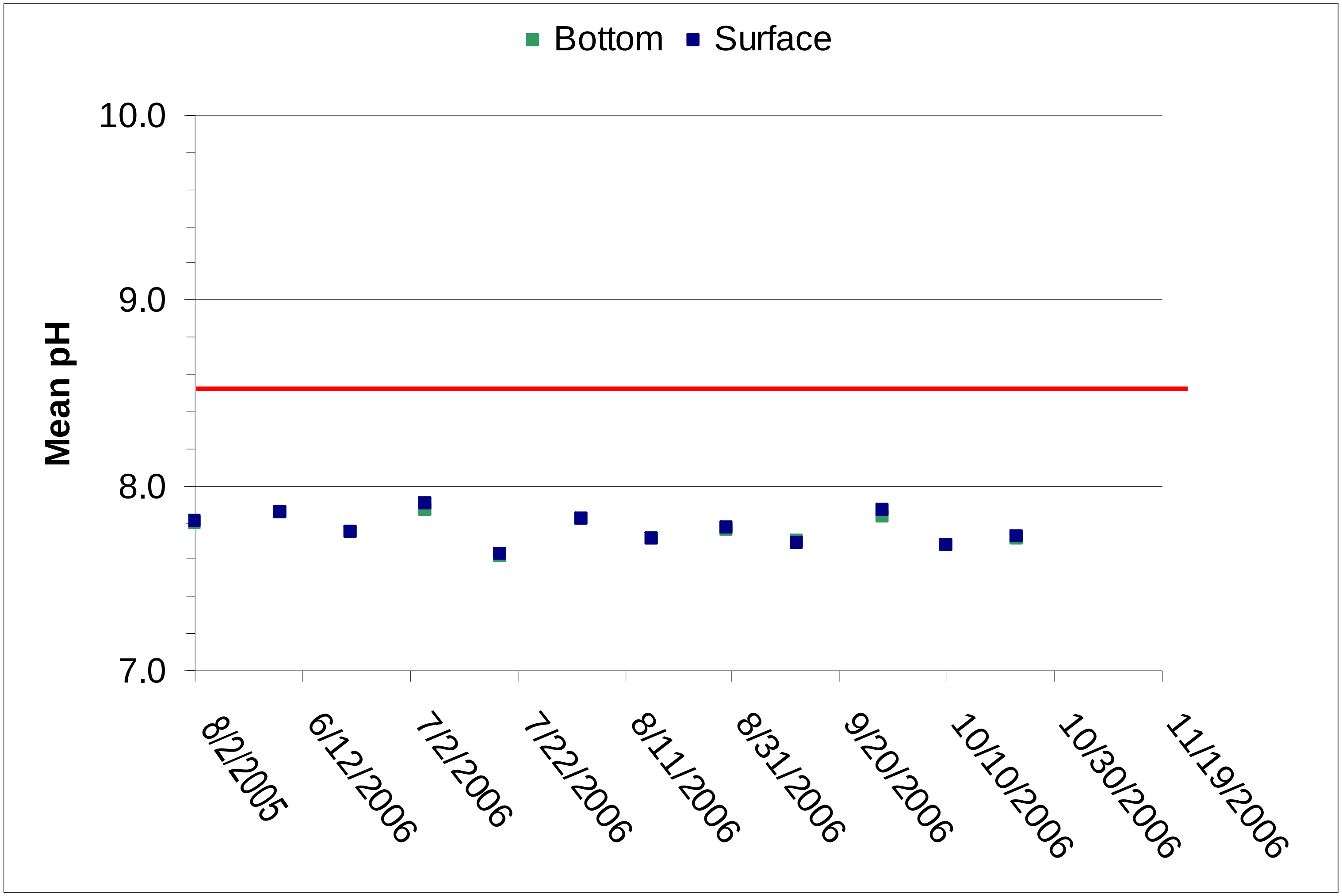

Figure 22. Newark Slough pH values, 08/05, 06/06-10/06

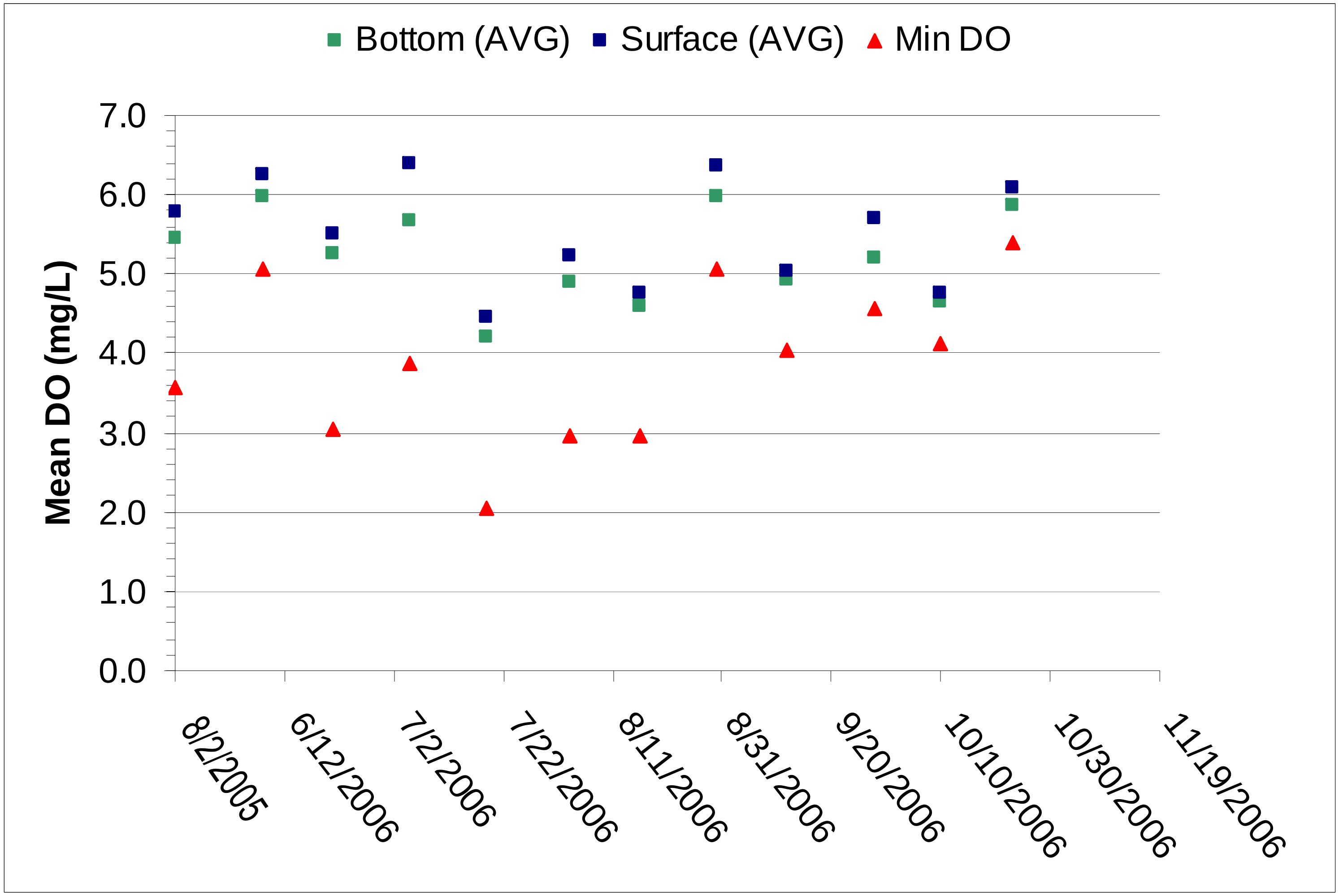

Figure 22. Newark Slough Dissolved Oxygen values, 08/05, 06/06-10/06

Effectiveness of Dissolved Oxygen BMPs

It is recognized that it will not be feasible for a well-operated lagoon system to continuously meet an instantaneous DO limitation of 5.0 mg/L as specified in the Basin Plan, which is based on the national criteria published by the U.S. Environmental Protection Agency (USEPA). It is understood that a stringent interpretation of this limit is not necessary to protect water quality, based on review of monitoring data in the Bay, site-specific standards work in recent years in the Everglades and Virginian Province (Cape Cod, MA to Cape Hatteras, NC), and data collected by USGS in Newark Slough in 2005, 2006 and 2007. The Department maintains that DO levels lower than 5.0 mg/l naturally occur in estuaries and lower values therefore do no necessarily implicate pond discharges. In 2005, the Final Order was modified such that RWQCB required a "trigger" for reporting and action if, at the point of discharge, the calendar weekly 10th percentile falls below 3.3 mg/L. RWQCB required that DO corrective measures (BMPs) be implemented, such as minimizing discharges if the 3.3 mg/L trigger values are observed, unless a more effective alternative can be implemented.

To address the excursions from the DO limit, several operational strategies or Best Management Practices (BMPs) were implemented, as described herein and in the individual system operations plans. We evaluated BMP's such as closure of the discharges during periods of time when the data indicates that DO would be below the 3.3 mg/L trigger. For example, ceasing discharge from approximately 10 pm to 10 am because there is a strong diurnal pattern to DO levels would avoid most periods of low DO and achieved standards described the Final Order. However, as stated in previous SMR's, a daily discharge timing BMP is not practicable due to staff and budget constraints. We did, however, use a weekly discharge timing BMP, which is expected to minimize discharge of low DO waters during trigger value periods. Weekly discharge timing entails setting discharges at greater volumes when DO conditions are low and that period correspond with periods when daytime tides are lowest, resulting in the majority of volume discharged during the day when photosynthesis increases DO.

During particularly weak (neap) tide periods, intake is limited and pond water has the least turnover. Substantially reducing the discharge volume for an extended duration minimizes potential affects on receiving waters but does not improve pond water quality because of lower turnover and higher residence time. Reviewing 2004-7 data, it appears that ceasing discharge for prolong periods of depressed DO levels may even degrade water quality further, because of less circulation and less mixing of in-pond waters. Reducing residence time of water in the ponds appears to improve overall DO levels; therefore, maintaining discharge, even at reduced volumes, provides for increased circulation and mixing. Muted tidal intake/discharge provides for the greatest circulation and mixing and is generally implemented in all ponds.

For most of 2007, we set discharge gates to allow reduced discharge volumes when the ponds are at or below the trigger value. Gates were set at approximately 5 percent open for extended periods rather than more frequent adjustments (increases and reductions) because of staff limitations. However, a new BMP was developed for 2007, whereby system pond waters were periodically drained into the adjacent seasonal ponds, where applicable, to improve turnover of pond system water as a result of greater intake volumes. This new BMP generally moderated salinity successfully, and initial analysis of DO conditions also showed that DO levels may have also been improved.

Refer to Table 1 for a full summary of discharge events and gate settings in 2007.

Compliance Evaluation Summary

In 2005, RWQCB suggested using some of the BMP's implemented by USFWS which appear to be successful in the Alviso Pond Complex. This includes installation of baffles which direct water from portions of ponds expected to have higher DO values and block off lower DO waters with substantial algal mats to help improve DO values at the discharge. We considered the use of baffles in ELER pond systems in 2006, and again in 2007. The installation of baffles was not expected to improve DO levels at ELER and have not been installed.

For pond B2C, installation of baffles is was not expected to affect DO at the discharge because algal blooms are not typically observed in B2C, and there is no deep borrow ditch at the discharge that would convey especially low DO water to the outlet because levee maintenance has not been historically conducted by Cargill using the floating dredge known as the Mallard, as is typically conducted by Cargill for salt pond operations. For B2C particularly, levee maintenance has not been necessary since this pond borders the Alameda Creek Flood Control Channel which has a high levee crest elevation and gradual slopes. In Pond B9, baffles do not appear warranted because any algal blooms are blown away from the discharge by prevailing winds, and in Pond B8A, algal blooms are not observed, presumably because this pond has a high bottom elevation due to historic gypsum precipitation which raised the pond bottom due to deposition, and water is only maintained in the borrow ditch channel along the Pond B9-B8A cross levee. For 2005-07, baffles were not been installed in Pond B2, though in some years they may be useful. B2 is a larger, deeper, open-water system pond. Significant algal mats have not been observed at the discharge, likely because any algal blooms are blown away from the discharge by prevailing winds and collect in rear portions of the pond. We will consider the use of baffles in Pond B2 in future years if necessary and installation is practicable. In Pond B10, baffles do not appear warranted because any algal blooms are blown away from the discharge by prevailing winds. For Pond System 6A, baffles are not necessary for seasonal operations and were it to be operated as a shallow water system in summer, no deep borrow ditches are located near the discharge because the pond is more uniformly shallow. Installation of baffles will be reconsidered as appropriate.

Strong diurnal patterns to DO levels are known to occur, however, ceasing discharge from 10 pm to 10 am in not a practicable means to avoid discharge of low DO waters. BMPs such as weekly discharge timing, reduced discharge gate settings and draining system waters to seasonal ponds to increase intake were implemented to address low DO values and appear to be sufficiently protective of receiving waters. For all systems operated in 2007, except B2C, pond water is discharged to the open bay and quickly dispersed and at lower tides the discharge is spread over extensive mudflats. In 2007, discharge gates were generally set to allow reduced discharge volumes to reduce the volume of discharge water entering the receiving waters, and correspondingly minimize the extent to which low DO discharges could potentially affect receiving water quality. More continuous operational periods, rather than intermittent operations, are expected to help raise DO values by reducing overall residence time.

The new BMP implemented in 2007, which drained large volumes of system pond waters into adjacent seasonal ponds for systems which have dry ponds to efficiently receive system water, appears to have successfully lowered salinity in systems which were near or above 44 ppt, by improving turnover of pond system water as a result of greater intake volumes. Initial analysis of DO conditions also indicates that DO levels may have also been improved.

Data, Collection, Evaluation, and Communication

In 2007, only few gaps in the data sets were caused by malfunctioning meters. Some instances of data gaps were caused by battery failure, which resulted from lower quality batteries being used when higher quality batteries were not obtained. The lower quality batteries did not provide did not provide the same battery life of higher quality batteries sufficient power to operate the Datasonde until the following week when staff returned to download and service the devices. While malfunctioning meters resulted in a few days of data gaps, there were no days when low water conditions resulted in full day data gaps, as occurred in previous years. This improvement came as a result of new ABS pipe used to contain the Datasondes, which improved submersion depth and device retrieval compared to the previous pole mounted PVC sleeve. It should be noted that pond operations were monitored as often as possible, given staff limitations, and efforts were made to retrieve data a service devices whenever possible to prevent down-time of the continuous data recorders. In the future we expect that there will be few, if any, data gaps that result from management operations, due to the lessons learned in 2007 and previously. A spare Datasonde is available to replace the four operating untis to address data continuity during device servicing. These efforts are expected to ensure data is adequately recorded.

In 2007, we collected data and made raw data to the RWQCB staff on a weekly basis. The Department conducted it's own monitoring in 2007 because financial support from private foundations were only available through 2006 to contract this work with USGS. While the partnership with USGS was very beneficial, additional coordination was required between agency staff which in some instances caused delays in reviewing and interpreting data. With the same Department staff conducting monitoring and reviewing and interpreting data, we were able to most effectively consider and implement operational and management decisions. Raw data was evaluated by Department staff for accuracy and erroneous readings, and then we typically provided the reviewed, calendar-weekly data set to the RWQCB within one week. This procedure provides adequate availability and use of collected information.

Final Order requirements regarding communication of compliance to the RWQCB continued to be satisfactory in 2007, and the Department followed Standard Provisions and Reporting Requirements, which required that we report potential noncompliance events to RWQCB staff by phone within 24 hours, and follow-up with a written report within 5 business days. The Department reviewed the raw data and the calendar-weekly data, and promptly contacted RWQCB when DO trigger conditions were observed. Communications were typically made via telephone and/or email. Additionally, we provided the data to RWQCB by posting files to its ftp site. This effort was very helpful in addressing concerns and conversations and other written communications between the Department and RWQCB staff were very helpful.

Requests for Revisions to SMP:

Continue March ASMR Submittal Date:
The Department's request for a March submittal date for ASMR's, as approved by RWQCB, was useful in preparing a detailed discussion of the previous year's data. We request that the March ASMR submittal date be maintained.

Rescind Intake Restriction for Pond System B2C
In the Final Order, Finding #63 stated no intake to Pond 1C shall occur from December through April to protect migrating salmonids in Alameda Creek (steelhead entrainment in ponds). While the Initial Stewardship Plan (ISP) described intake to Pond 1C by the Cal Hill Intake Pump, management of the pond system since 2004 (when Cargill met the transfer of operations standard) is by passive intake at Pond 2C, and the system as operated does not require pumped Pond 1C intake from Alameda Creek. Pond 1C is operated as a seasonal ponds and it gets water primarily in the winter from rainfall, and from passive, gravity flow from linked "C system" ponds rather than Alameda Creek. Pumping costs are prohibitive, thus passive filling via linked ponds is the preferred management and provides seasonal pond habitat for migrating waterbirds. There were no restrictions described for Pond 2C, which is the system pond operated year-round as open water (as well as Pond 3C, which is directly connected to Pond 2C, and the Department manages for Cargill).

Presumably the restriction for Pond 1C was included during initial evaluations and left in place in error, as NOAA Fisheries Biological Opinion did not restrict intake from Alameda Creek. No viable run exists in the stream due to upstream migration barriers and no suitable spawning in lower reaches, though restoration actions in the future will be intended to restore a potential run. The Department's review of the ISP did not determine intake restrictions were warranted, therefore the Water Board's restriction may be considered overly conservative and limits management flexibility. Furthermore, pond management activities and operational flexibility would be severely limited by intake restrictions to the Pond 2C system. In 2007, after a winter of low rainfall amounts, with intake restrictions observed, salinities in the Pond 2C system were near discharge limitations (44 parts per thousand), thus management of the system during the summer evaporation season was difficult due to higher salinity at the start of the summer evaporation season. In order to maintain overall water quality, especially during the summer, it will be important to allow intake to Pond 2C from Alameda Creek during the winter and spring.

Pond Discharge Monitoring:

It has been documented that DO concentrations in a number of South S.F. Bay sloughs (including Newark Slough, which is not affected by pond discharges), are often below the Basin Plan standard of 5.0 mg/L, and frequently experience periods below the 3.3mg/L trigger value as well. Based on these observations the Department proposes to modify the Final Order requirements for continuous monitoring. We propose to discontinue continuous monitoring during periods when pond discharges will be at 10% or less of capacity, since monitoring data for the past 3 years has not shown any adverse affects of pond discharges on receiving waters. At reduced discharge settings, the volume of waters entering the receiving waters at minimal discharge settings is presumably negligible relative to the volume of receiving waters. Previous monitoring of receiving waters rarely shows a water quality "signal" from the discharge, and no adverse affects have been observed (i.e. fish kills or other adverse affects on biological resources, observance of floating and suspended materials of waste origin, unusual water condition including discoloration and turbidity, unusual odor, affects on beneficial uses, such as wildlife, anglers and other recreational activities). For periods when pond discharges will be greater than 10% of capacity, the existing Final Order requirements would be followed such that continuous monitoring of discharges and periodic receiving water monitoring would be conducted.

Observed pond discharge and receiving water dissolved oxygen levels are likely within the natural range of variation in functional slough and lagoon environments of the South San Francisco Bay and not necessarily indicating any adverse affect on overall water and habitat quality or wildlife resources. Additional analysis and interpretation of monitoring data may be completed to complement information presented in this report, and would be submitted for review for any modifications requested for the Final Order.