Final

Water Quality Monitoring Plan

For

College Lake Integrated Resources Management Project

Prepared for

Pajaro Valley Water Management Agency

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CHAPTER 1
Introduction

1.1 Background

The Pajaro Valley Water Management Agency (PV Water) is planning to implement the College Lake Integrated Resources Management Project (College Lake Project or Project). The Project will store and divert water from College Lake for treatment, transmission, and distribution for agricultural irrigation. The primary purposes of the Project are to help balance the Pajaro Valley groundwater basin, prevent further seawater intrusion, and meet water supply needs in PV Water's service area by developing College Lake as a water storage and supply source. In support of this project, PV Water submitted water right Application A032881 to the State Water Resources Control Board for the storage and diversion of up to 3,000 acre-feet of water per year (AFY) at College Lake. The California Department of Fish and Wildlife (CDFW) initially protested the application but subsequently dismissed the protest conditionally, provided the water right permit contains a number of specific terms, including the following:

> "Prior to the initial diversion of water, the right holder shall submit to CDFW for written approval a College Lake water quality plan. The plan shall include appropriate lake water quality treatment measures, parameters, and water quality monitoring methodologies."

In October 2019, PV Water certified the *Final College Lake Integrated Resources Management Project Environmental Impact Report* (2019 EIR). The 2019 EIR identifies a potential for cyanobacteria blooms to occur in College Lake later in the summer if water of sufficient depth is present, given that the land uses in areas draining to College Lake are similar to those draining to nearby Pinto Lake where heavy cyanobacteria blooms have been documented in the past.[1] To mitigate this potential impact, the 2019 EIR stipulates implementation of the following measure:

> **Mitigation Measure HYD-2a: Water Quality Adaptive Management for College Lake**
>
> To learn about potential impacts of the Project on College Lake water quality and the quality of downstream water bodies, PV Water shall monitor College Lake water for indications of Cyanobacteria blooms. When the proposed weir crest is elevated to 62.5 feet NAVD88, PV Water shall monitor College Lake water temperature within the water column to establish whether a thermocline develops. PV Water shall use results of this monitoring to support the development of the Adaptive Management Plan (refer to Section 2.7 [of the 2019 Draft EIR]) that establishes management actions to minimize the conditions that can contribute to algal blooms, including cyanobacteria blooms, such that this impact is mitigated.

[1] Central Coast Regional Water Quality Control Board (CCRWQCB). 2015. *Progress Report to Support Development of Total Maximum Daily Loads Addressing Nutrients and Algal Toxins in Waterbodies of the Pinto Lake Catchment*, CCRWQCB, San Luis Obispo, CA.

This College Lake Water Quality Monitoring Plan has been prepared in response to the CDFW-requested protest dismissal term and the requirements of Mitigation Measure HYD-2a in the 2019 EIR.

1.2 Setting and Project Description

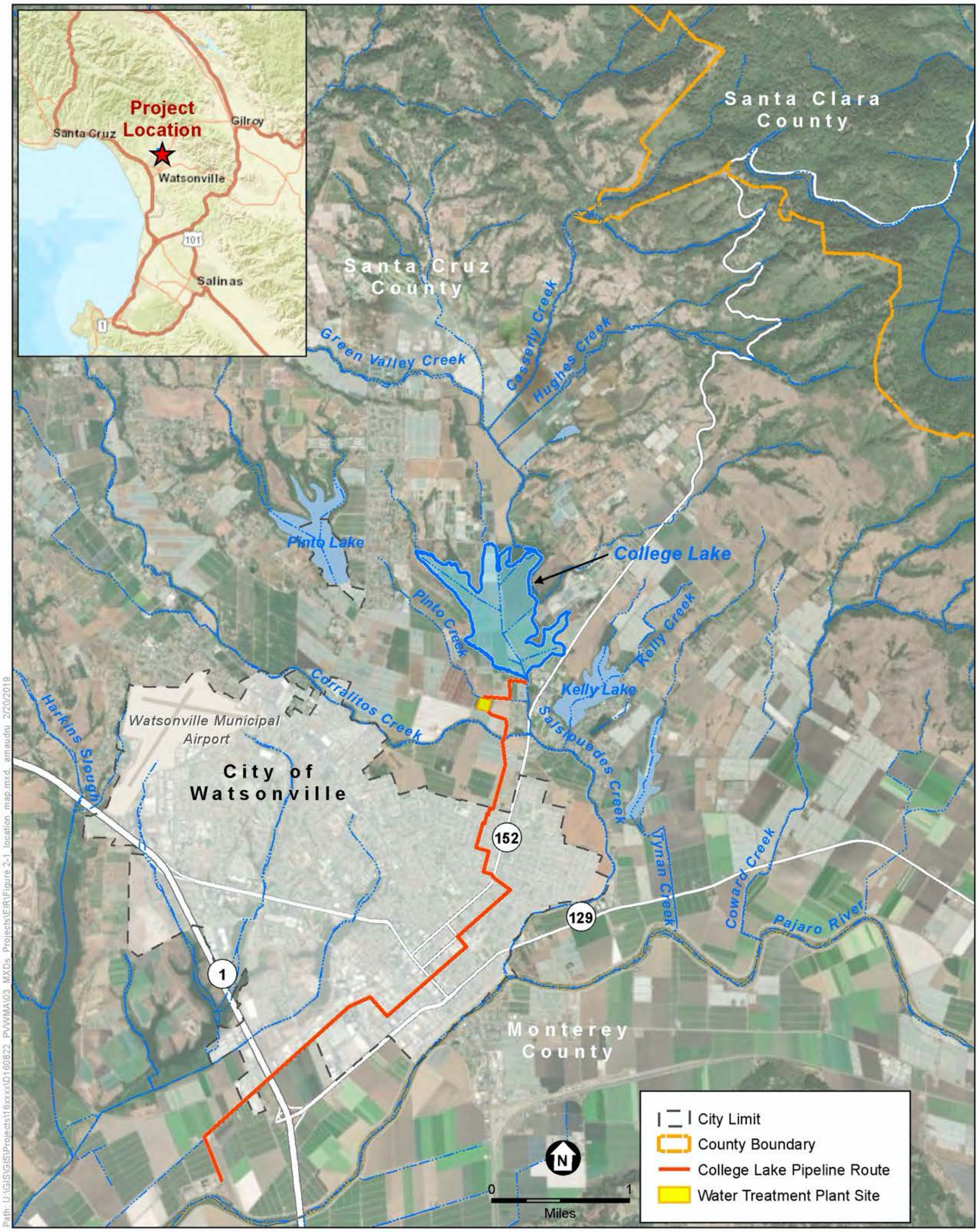
College Lake is a seasonal lake that forms in a topographic depression along the Zayante-Vergeles Fault zone. The lake receives inflows from several tributaries (including Green Valley, Casserly, and Hughes Creeks, shown on **Figure 1**) and drains into Salsipuedes Creek, which is a tributary to the Pajaro River. The College Lake watershed consists of approximately 11,000 acres of range, rural residential, and crop lands. Approximately 2,000 feet downstream of College Lake, surface water enters Salsipuedes Creek from Corralitos Creek. At times during the wet season, the flow direction in the reach of Salsipuedes Creek between College Lake and the Corralitos Creek confluence can reverse. When these conditions occur, surface water can flow from Corralitos and Salsipuedes creeks into College Lake. Flow magnitudes and directions in this reach of Salsipuedes Creek are controlled by several factors, including the water level of College Lake, the flow rate in Corralitos Creek, and the flow rate in Salsipuedes Creek downstream of the Corralitos Creek confluence. During wet years, surface water overflowing from Pinto Lake flows through a drainage channel (called Pinto Creek) into this reach of Salsipuedes Creek between College Lake and the Corralitos Creek confluence (**Figure 1**).

Under current conditions, Reclamation District 2049 (RD 2049) operates an existing weir and associated pump station located at the outlet of College Lake, which is at its south end. Flooding in and around College Lake occurs in association with wet weather events; during the wet season, water surface elevations regularly exceed the elevation of the existing weir (60.1 feet North American Vertical Datum of 1988 [NAVD88])). To allow summer farming in the lakebed, RD 2049 currently pumps water out of College Lake in the spring, usually beginning in mid-March, with each year's starting date depending on spring rain patterns. Pumping continues intermittently during the summer and fall as necessary to keep the lakebed dry while crops are growing. The purpose of the existing weir is to prevent water that is pumped from College Lake into Salsipuedes Creek from flowing back into the lake. Under existing RD 2049 operations, no water is pumped out of the lake for water supply purposes.

Under the Project, PV Water will construct a new adjustable weir to seasonally raise the controlled College Lake water surface level by up to 2.4 feet to an elevation of 62.5 feet NAVD88. Depending on water supply needs, PV Water will pump water from College Lake (either by direct diversions of water flowing into the lake or re-diversions of water previously stored in the lake) to a new water treatment plant. PV Water will convey the treated water through a new pipeline to its existing Coastal Distribution System (CDS) for deliveries to farmers who will use the water for irrigation in lieu of pumping equivalent amounts of groundwater.

1.3 Adaptive Management Plan

The 2019 EIR incorporates mitigation measures previously adopted by PV Water's Board of Directors under the 2014 Basin Management Plan (BMP) Update Programmatic EIR. Mitigation Measure BIO-2i.1 (Develop Adaptive Management Plan for College Lake Waterfowl Management and Multi-Species Mitigation) was included in the *Final Environmental Impact Report for the Basin Management Plan Update* (2014 BMP Update PEIR) in response to public comment. PV Water is committed to preparing an Adaptive Management Plan (AMP) as part of the College Lake Project, as outlined below:



SOURCE: Carollo Engineers, 2017; ESRI World Imagery, 7/23/2016; ESA

College Lake Integrated Resources Management Project

Figure 1
Project Location Map

ESA

BIO-2i.1: Develop Adaptive Management Plan for College Lake Waterfowl Management and Multi- Species Mitigation. To mitigate impacts to existing waterfowl or waterfowl habitat at College Lake, an Adaptive Management Plan for waterfowl management and multi-species mitigation will be developed with the consultation of the state and federal resource agencies and College Lake stakeholders. The Adaptive Management Plan for waterfowl management and multi-species mitigation at College Lake will develop multi-year baseline waterfowl population and habitat use data for future project design, environmental permitting and CEQA impact analysis of project-level alternatives. To the extent practical, it will integrate the results of ongoing College Lake hydrology and hydraulic analyses, as well as future consultations with state and federal agencies on fish flows and fish bypass criteria.

The Management Plan will be specific to the level of impact and mitigations under site-specific and project implementation conditions. However, the following standards will apply as defined during project-level design, regulatory review and CEQA analysis: The Management Plan should include terms and conditions from applicable permits and agreements as appropriate and define provisions for monitoring assignments, scheduling, and responsibility. The Management Plan should also include habitat replacement and revegetation, protection during ground-disturbing activities, performance standards, maintenance criteria, and monitoring requirements for temporary and permanent impacts consistent with mitigation in this EIR and regulatory requirements during project- specific review. The Management Plan will be in conformance with the biology mitigation measures from this EIR, and will also include terms and conditions consistent regulatory requirements as applicable from the USFWS, USACE, SWRCB, and CDFW permits during project design and permitting as applicable. The Management Plan will be prepared for project level project implementation as determined needed through future CEQA review and consultation with agencies as required under CESA and ESA.

Adaptive management is defined as "a framework and flexible decision-making process for ongoing knowledge acquisition, monitoring, and evaluation leading to continuous improvements in management planning and implementation of a project to achieve specified objectives."[2] An adaptive management approach provides a structured process that allows for taking action under uncertain conditions based on the best available science, closely monitoring and evaluating outcomes, and re-evaluating and adjusting decisions as more information is learned.[3] Adaptive management encourages an ecosystem-level approach to resource management and promotes collaboration among scientists, managers, and other stakeholders on decisions. To be effective, that decision-making processes must be flexible enough to adjust in the face of uncertainties, variances or other unforeseen outcomes from management actions and other external events. With an established AMP, the project will be set up to use tools such as monitoring, modeling, or other applied studies to generate the science-based information that managers need for decision-making. Once this information is available, managers can "Adapt" a project. If needed, possible adaptive management actions include additional studies or monitoring and corrective on-the-ground actions. It is imperative when approaching a project with significant uncertainties, that all stages of the "Plan" phase are open to adaptive management consideration.

In response to environmental review and permitting requirements, the College Lake Project is generating several plans that are related to adaptive management. These include this water quality monitoring plan, a steelhead (*Oncorhynchus mykiss*) monitoring plan, an invasive species management plan, an operations and maintenance

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[2] 2011 California Water Code, Division 35. Sacramento-San Joaquin Delta Reform Act of 2009, Chapter 4, Section 85052.

[3] California Department of Fish and Wildlife, Adaptive Management. Available online at https://www.dfg.ca.gov/erp/adaptive_management.asp. Accessed on August 6, 2019.

(O&M) plan, and a water right compliance plan. All of these plans have a role in the project process and will need to be comprehensively considered in the adaptive management process. The intention is for the AMP to serve as an umbrella document where the data and information generated by these various elements can be evaluated holistically in the context of the project objectives. The AMP therefore will become a critical process document and serve as the central organizing "spine" of most of the other plans, including this water quality monitoring plan. Most of these plans will already be complete prior to the development of the AMP. As such, the AMP will include a feedback process to each of those plans to account for any future management decisions that have the potential to ripple through various other documents. Since these other plans are driven largely by the regulatory process, the AMP will have to account for a process by which stakeholder education and feedback are incorporated back into those plans through the adaptive management process if warranted. For example, if data collected during implementation of this water quality monitoring plan indicate that a parameter exceeds a certain pre-determined threshold, it may trigger an adaptive management action such as source identification, targeted treatment, or perhaps a direct change in water management. Conversely, the management action may then necessitate additional/refined water quality monitoring. PV Water would be responsible for reporting action triggers and implementing management actions based on these triggers as part of the development of the AMP. In short, this water quality monitoring plan is intended to feed science-based data and information into the adaptive management decision-making process, which may include, among others, adaptively managed changes to this monitoring plan itself.

CHAPTER 2
Monitoring Plan Design

2.1 Existing PV Water Surface Water Monitoring

PV Water has been collecting water quality data in College Lake since 1994. PV Water's current monitoring program includes bimonthly (i.e., every two months) grab samples collected at the College Lake pumphouse located immediately upstream of the existing weir and monthly sampling when accessible (approximately spring through fall) collected at another College Lake site (added to the program in May 2019), located approximately 800 feet upstream of the pumphouse. Samples are submitted to an Environmental Laboratory Approval Program (ELAP) certified laboratory for analysis of the constituents listed in **Table 1**. Since 2012, PV Water has also been operating a pressure transducer data logger at the pumphouse site to collect continuous (15-minute interval) pressure, depth, water temperature, actual conductance, and specific conductance data. At the upstream sampling site, the monthly grab sample data is currently augmented by biweekly (i.e., every two weeks) field measurements of water temperature, dissolved oxygen (DO), specific conductance, turbidity, and hydrogen ion concentration (pH).

In addition to the two College Lake sampling sites, PV Water also conducts bimonthly (i.e., every two months) water quality monitoring for the majority of constituents listed in Table 1 in a number of College Lake inflow tributaries, including Green Valley, Casserly, and Hughes creeks, as well as other sites within the Pinto Lake and Corralitos Creek sub-basins that may contribute surface water inflows to College Lake during certain backflow conditions (i.e., when Corralitos Creek flows are high). **Figure 2** depicts the sampling locations of PV Water's current basin-wide water quality monitoring program.

As part of the planning process for the Project, PV Water conducted a study in 2017 to characterize the lake water quality for the conceptual design of the College Lake treatment plant. While the study was mostly based on historical water quality data collected by PV Water, grab samples were collected and analyzed for algae and algal toxins. In April, May, and July 2017, cyanobacteria were present in College Lake in low concentrations and none of the toxins analyzed (microsystins, anatoxin-a, cylindrospermopsin) were detected. However, during a visual bloom on September 13, 2017, the sample contained 1,130 cyanobacteria cells per milliliter (#/ml), but again none of the toxins analyzed were detected. For reference, cyanobacteria concentrations of more than 100,000 cells per ml have been measured in nearby Pinto Lake.

TABLE 1

COLLEGE LAKE WATER QUALITY CONSTITUENTS CURRENTLY MONITORED BY PV WATER

Constituent	Methodology		Units
Alkalinity, Total (as CaCO3)	SM2320B	mg/L	Alkalinity, Total (as CaCO3)
Anion-Cation Balance	Calculation		%
Bicarbonate (as HCO3-)	SM2320B		mg/L
Boron	EPA200.7		mg/L
Bromide	EPA300.0	mg/L	Bromide
Calcium	EPA200.7	mg/L	Calcium
Carbonate as CaCO3	SM2320B	mg/L	Carbonate as CaCO3
Chloride	EPA300.0	mg/L	Chloride
Fluoride	EPA300.0	mg/L	Fluoride
Hardness (as CaCO3)	SM2340B/Calc	mg/L	Hardness (as CaCO3)
Langlier Index, 15°C	SM2330B		NA
Langlier Index, 60°C	SM2330B	NA	Langlier Index, 60°C
Magnesium	EPA200.7	mg/L	Magnesium
Nitrate as N	EPA300.0	mg/L	Nitrate as N
Nitrate+Nitrite as N	EPA300.0	mg/L	Nitrate+Nitrite as N
Nitrite as N	EPA300.0	mg/L	Nitrite as N
Orthophosphate as P	EPA300.0	mg/L	Orthophosphate as P
pH (Laboratory)	SM4500-H+B	pH (H)	pH (Laboratory)
Potassium	EPA200.7	mg/L	Potassium
QC Anion Sum x 100	Calculation	%	QC Anion Sum x 100
QC Cation Sum x 100	Calculation		%
QC Ratio TDS/SEC	Calculation	NA	QC Ratio TDS/SEC
SAR (Sodium Adsorption Ratio)	Suarez, 1981		NA
SAR, Adjusted	Suarez, 1981		NA
Sodium	EPA200.7	mg/L	Sodium
Specific Conductance (EC)	SM2510B	µmhos/cm	Specific Conductance (EC)
Sulfate	EPA300.0	mg/L	Sulfate
Total Dissolved Solids	SM2540C		mg/L
Total Suspended Solids	SM2540D	mg/L	Total Suspended Solids
Turbidity	EPA180.1	NTU	Turbidity

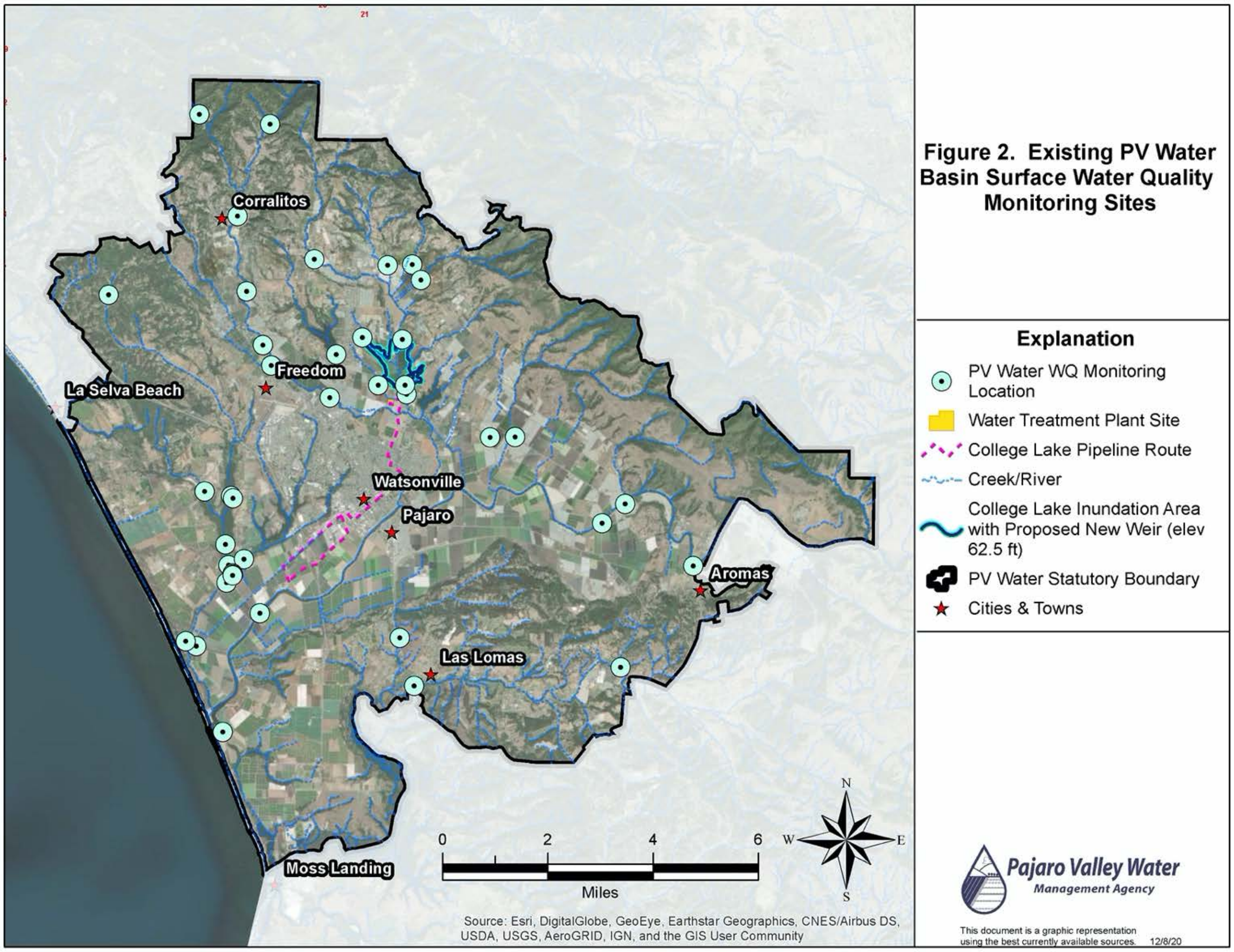

Figure 2. Existing PV Water Basin Surface Water Quality Monitoring Sites

2.2 Monitoring Plan Goals and Objectives

Seasonal hydrology, lake management, and surrounding land uses can affect water quality in lakes. College Lake has been actively managed for agricultural production for a century, and farming will continue to occur on surrounding lands. Implementation of the Project will alter the existing hydrologic regime of College Lake, primarily during the summer and fall when the lake will be operated for water supply storage and diversion rather than agricultural production, thereby extending the duration, extent, and depth of lake inundation compared to existing (mostly dry) summer and fall conditions. Although PV Water has been collecting water quality data from the in-lake drainage channel during the summer and fall period, the lakebed has not been inundated during the dry season for approximately 100 years[4], and baseline water quality data are therefore not available for such conditions. Therefore, it will be necessary to establish a new summer/fall water quality baseline for College Lake.

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[4] RD 2049 was formed in 1920 and was granted express legal authority under State law (California Water Code Section 50000 et. seq.) to pump water from College Lake to reclaim the land for agricultural production.

The goals of this plan are to develop a program for monitoring water quality in and around College Lake to (1) conform with EIR Mitigation Measure HYD-2a and the CDFW water right protest dismissal term, (2) contribute to an understanding of the evolution of aquatic habitat conditions under a new management and hydrologic regime, and (3) generate data and insights that will support the adaptive management decision-making process.

The primary objectives of the College Lake Water Quality Monitoring Plan are to:

(1) determine if and how the water quality characteristics of the lake are affected by PV Water's implementation of the College Lake Integrated Resources Management Project (i.e., seasonally deeper lake, extended inundation period);

(2) evaluate the temporal and spatial suitability of the lake's water quality for biological resources (e.g., fish and wildlife) during target seasons (e.g., winter, spring) under Project operations; and

(3) establish whether a thermocline and/or other conditions conducive to potential cyanobacteria blooms develop in the lake.

These objectives will be met through routine sampling (grab sampling) and continuous measurements (sonde deployment) and analysis of surface water quality parameters at selected sites to capture spatial (upstream, downstream, and within College Lake) and temporal (annual, seasonal, rainfall-driven) trends in water quality.

During the initial 3-5 years of Project operations, a broad monitoring protocol will be implemented to develop a thorough understand of spatial and temporal variabilities in water quality parameters throughout the lake, particularly during the summer and fall storage and diversion period. Depending on the results obtained during this initial period, the scope of the monitoring program may later be reduced or otherwise modified. For example, if data indicate relatively homogenous conditions throughout the lake, a reduction in the number of data collection sites and/or events may be considered through the AMP.

2.3 Monitoring Parameters

The focus of PV Water's existing monitoring program is to track water quality to ensure suitability for water supply and distribution. However, the program already includes a number of parameters (e.g., temperature, turbidity, pH, etc.) that are also relevant to seasonal habitat suitability for fish and wildlife species. In addition, sampling for nitrate and orthophosphate under the existing monitoring program allows PV Water to monitor whether concentrations of these constituents approach levels that may promote toxic algal blooms such as those documented to occur in nearby Pinto Lake.[5] PV Water's extensive existing program therefore provides a strong foundation for the College Lake Water Quality Monitoring Plan. This College Lake Water Quality Monitoring Plan adopts portions of the existing monitoring program that are directly relevant to College Lake such as in-lake and source tributary sampling sites and parameters, and expands upon those with additional parameters related to cyanobacteria bloom monitoring, as well as additional sampling sites, frequencies (see Section 2.4), and sampling methods (i.e., additional continuous sonde deployments). Components of the existing basin-wide monitoring

[5] Central Coast Regional Water Quality Control Board (CCRWQCB). 2015. *Progress Report to Support Development of Total Maximum Daily Loads Addressing Nutrients and Algal Toxins in Waterbodies of the Pinto Lake Catchment*, CCRWQCB, San Luis Obispo, CA.

program that are not specifically included in this College Lake Water Quality Monitoring Plan remain discretionary to PV Water.

Parameters selected for this College Lake Water Quality Monitoring Plan include periodic grab sampling of the constituents listed in Table 1 as well as algal identification/enumeration and cyanotoxins listed in Table 2. In addition to periodic grab sampling, additional sondes will be deployed in-lake for continuous sampling of depth, water temperature, dissolved oxygen, specific conductance, pH, chlorophyll-a, and phycocayanin. Monthly profile sampling of water temperature, dissolved oxygen, specific conductance, chlorophyll-a, and water clarity (Secchi depth) will alos be conducted. Sampling locations and frequencies are described in Section 2.4 below and summarized in Table 3.

TABLE 2

ADDITIONAL CONSTITUENTS FOR COLLEGE LAKE WATER QUALITY MONITORING PLAN

Constituent	Methodology	Units
Algal identification and enumeration	Microscopy	#/ml
Microcystins, total	EPA Method 546	mg/L
Anatoxin-a	EPA Method 545	mg/L
Cylindrospermopsin	EPA Method 545	mg/L

2.4 Monitoring Locations and Frequency

Sampling locations for the College Lake Water Quality Monitoring Plan were selected based on (a) in-lake and source inflow sites currently sampled by PV Water, (b) an additional in-lake site to assess spatial variability, (c) additional in-lake sonde deployment to assess vertical variability, and (d) an outflow sampling site downstream of the new weir to monitor potential effects of lake water quality on downstream waterways (i.e., Salsipuedes Creek and Pajaro River). In total, the monitoring program consists of six sampling sites: Two in-lake sites (CL1 and CL2), three inflow sites (CA2W, CA2E, PLO)[6], and one outflow site (SA1). Sampling site locations are depicted in **Figure 3**.

Grab samples for analysis of Table 1 constituents will be collected at monthly intevals at all six sampling sites when surface water is present, as well as during or immediatley following the first runoff event of the season (i.e., first flush sampling). In parallel, grab samples for the parameters listed in Table 2 will be collected at the in-lake (CL1 and CL2) and outflow (SA1) sites. Field equipment will be used to measure water temperature, DO, and specific conductance concurrent with grab sample collection.

Multi-parameter sondes for continuous (i.e., hourly) measurements of water temperature, DO, and specific conductance will be deployed at the two in-lake sites (CL1 and CL2). At each sampling site, a pair of sondes will be deployed to assess vertical variability and potential stratification: one approximately 0.5 ft below the water surface (i.e., attached to floating buoy) and one approximately 0.5 ft above the lake bottom. In addition, the surface sondes will also be fitted with chlorophyll-a and phycocyanin sensors to support characterization of

[6] Note that existing inflow sampling site CA2E is located on Casserly Creek downstream of the Green Valley Creek and Hughes Creek confluences and is therefore representative of cumulative water quality conditions entering the lake. Water quality monitoring at existing sampling locations within each of the main upper watershed tributaries will continue as part of PV Water's existing basinwide monitoring program.

potentially harmful algal bloom conditions. The continuous monitoring sondes will be operated year-round unless the lake water surface elevation at the individual sonde location falls below the elevation of individual sondes during lake drawdown or sondes have to be removed temporarily to protect them from damage (e.g., major storm events). Deployment of top and bottom sondes will allow for increased resolution of temporal (e.g., diel, ambient weather, etc) and spatial variability to augment potential stratification information derived from monthly profiles. Should sonde data prove superfluous after a few initial (3-5) years of operation (e.g., no evidence of thermocline), the bottom sondes may be considered for elimination from the monitoring program through the AMP process.

Vertical-profile measurements of water temperature, DO, specific conductance, chlorophyll-a, and water clarity (Secchi depth) will be conducted at monthly intervals at the two in-lake sampling locations using multi-probe field instruments and a Secchi disk. The vertical profile measurements will be conducted at 1-foot depth intervals concurrent with the monthly grab sampling of Table 1 and Table 2 constituents.

The sampling parameters and frequencies for each monitoring location are summarized in **Table 3**. Each monthly sampling event will occur at approximately the same time of day.

TABLE 3

WATER QUALITY MONITORING SITES, PARAMETERS, AND FREQUENCIES

Source	Sampling Site	Parameter	Sampling Method	Frequency
College Lake (at weir)	CL1 (existing site)	Table 1 (existing) Table 2	Grab	Monthly + First Flush
		Temp, DO, Conductance, Depth, Chlorophyll-a, Phycocyanin	Surface sonde	Continuous
		Temp, DO, Conductance	Bottom sonde	Continuous
		Temp, DO, Conductance, Chlorophyll-a, Clarity (Secchi depth)	1 ft vertical profiles	Monthly
College Lake (mid-lake)	CL2 (new site)	Table 1 (existing) Table 2	Grab	Monthly + First Flush
		Temp, DO, Conductance, Depth, Chlorophyll-a, Phycocyanin	Surface sonde	Continuous
		Temp, DO, Conductance	Bottom sonde	Continuous
		Temp, DO, Conductance, Chlorophyll-a, Clarity (Secchi depth)	1 ft vertical profiles	Monthly
College Lake Inflow	CA2W, CA2E, PLO (existing sites)	Table 1 (existing)	Grab	Monthly + First Flush
College Lake Outflow	SA1 (new site)	Table 1 (existing) Table 2	Grab	Monthly + First Flush

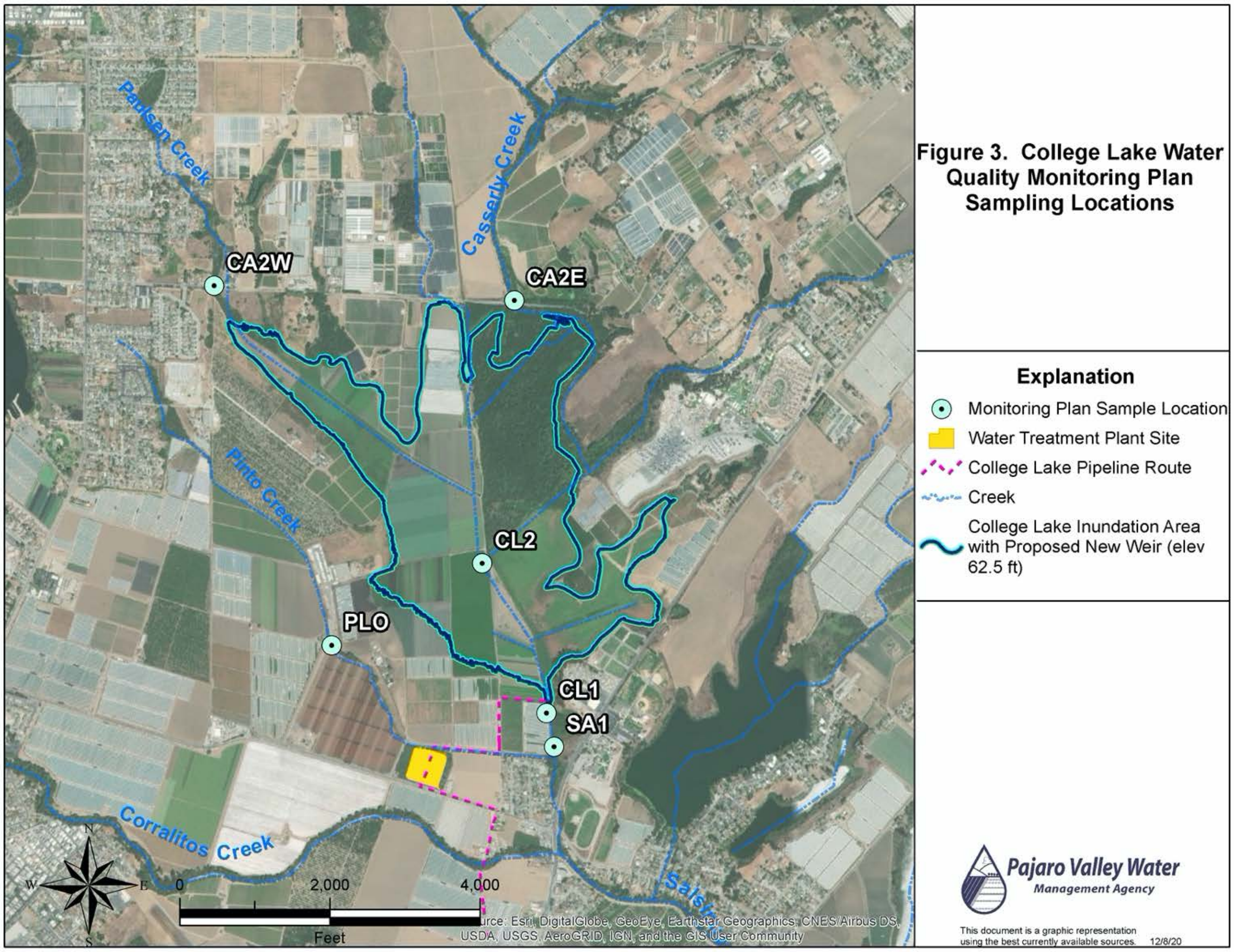

Figure 3. College Lake Water Quality Monitoring Plan Sampling Locations

2.5 Sampling and Analysis Methodologies

2.5.1 Field Measurement Methods

Field measurements will be collected in situ using a multi-parameter water quality meter with probes to record water temperature, DO, and specific conductance in accordance with CDFW's Standard Operating Procedure (SOP) for the *Collections of Water and Bed Sediment Samples with Associated Field Measurements and Physical Habitat in California*.[7] Manufacturer's instructions for instrument setup, calibration, and sample collection will be followed. Ambient data such as date, time, weather conditions (e.g., cloud cover), and air temperature will also be recorded. Depending on sampling location and ambient conditions, samples will be collected from a small boat, wading, or from shore using a pole sampler. During vertical profiling at in-lake sampling sites, probes will be maintained at each sampling depth until readings stabilize. Field measurement instruments will be serviced

[7] California Department of Fish and Wildlife (CDFW). 2014. *Collections of Water and Bed Sediment Samples with Associated Field Measurements and Physical Habitat in California*, Version 1.1 updated March-2014, Surface Water Ambient Monitoring Program, Marine Pollution Studies Laboratory – Department of Fish and Wildlife.

regularly in accordance with manufacturer specifications. Measurement results will be recorded on data sheets and electronically stored on the meter until data is transferred to computer spreadsheet software. Multi-parameter sondes will be downloaded, checked, cleaned, and calibrated on a monthly basis in accordance with manufacturer instructions.

To ensure sampling crew safety during high streamflow events at the lake inflow and outflow sites, extendable dipsticks will be used to collect samples from a distance of up to 16 feet. If conditions are unsafe even for dipstick sample collection, staff will wait for peak flows to pass and sample during receding flows.

2.5.2 Sample Collection for Laboratory Analyses

Surface water samples will be analyzed for the parameters shown in Tables 1 and 2. Grab samples will be collected in accordance with the CDFW SOP for the *Collections of Water and Bed Sediment Samples with Associated Field Measurements and Physical Habitat in California*[8] using laboratory-approved containers appropriate for the analyte and analytical method requirements of the laboratory. Sample bottles (i.e., container type, sample volume, preservative requirements) and holding time until analysis will be provided by the contracted laboratory.

2.5.3 Laboratory Analyses

Water samples will be submitted to a California Environmental Laboratory Accreditation Program (ELAP) ELAP-accredited analytical laboratory within the specified holding time and temperature. ELAP-certified analytical methods, including appropriate detection limits and reporting accuracy, will be applied by the California ELAP-accredited laboratory.

The approved laboratory will perform industry-accepted quality control measures to maintain the analytical testing process within acceptable limits of accuracy and precision. Method blanks, laboratory control samples, second source samples, matrix spikes, duplicates, and replicates will be utilized and analyzed as applicable for each parameter. Quality control requirements for each analytical technique will be provided by the approved laboratory and included in the annual College Lake Water Quality Monitoring Program reports.

2.6 Reporting Procedures

Field and laboratory data from the six sampling sites will be synthesized, analyzed, and reported annually. The analysis will include spatial and temporal comparisons of water quality data and possible sources (e.g., inflows, management practices) of any water quality changes observed. Monitoring results will be compared to relevant habitat suitability thresholds, toxicity thresholds, and Central Coast Regional Water Quality Control Board (CCRWQCB) Basin Plan and Total Maximum Daily Load (TMDL) objectives, where applicable. Site-specific performance criteria will be developed through the AMP process to evaluate whether objectives are being achieved.

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[8] California Department of Fish and Wildlife (CDFW). 2014. *Collections of Water and Bed Sediment Samples with Associated Field Measurements and Physical Habitat in California*, Version 1.1 updated March-2014, Surface Water Ambient Monitoring Program, Marine Pollution Studies Laboratory – Department of Fish and Wildlife.

Given the lack of baseline data directly applicable to future conditions in College Lake under the Project, it is likely that too little data will be available in the first few years to make statistically significant assessments of the results. However, as the datasets grow over several years, confidence in the analysis should increase.

An annual report will describe monitoring efforts over the prior hydrologic year (October 1 – September 30) and will be submitted to CDFW, CCRWQCB, and National Marine Fisheries Service (NMFS) by February 1 of the following year. If requested, raw data collected during monthly in-lake profile measurements will be provided to CDFW, CCRWQCB, and NMFS staff within 7 days of sample collection.

CHAPTER 3
Response Actions

As described in Section 1.3 above, College Lake and the Project will be managed adaptively through an AMP. The AMP will serve as an umbrella document where the data and information generated by various monitoring efforts, including the water quality monitoring program, can be evaluated holistically in the context of the project objectives. The AMP will provide a set of objectives and an associated set of monitored parameters. The AMP will also define thresholds for the monitored parameters that when exceeded would require management actions (i.e., action triggers). The exact management action will depend on the nature of the problem and the appropriate remedies available. Typically, the first management action will be to conduct a thorough review of the available information that can inform project managers regarding the applicability of various actions. Often, technical experts (both associated with and external to the project, as warranted) will be consulted before taking a management action to analyze the relevant information and provide a range of appropriate management actions, including their risks and costs.

Within the context of the AMP, the annual report (Section 2.6) for this water quality monitoring program will provide the values of monitored parameters to be compared to the values of the action triggers, related discussions of the potential reasons for any threshold exceedences and, if warranted, will make recommendations for potential remedial response action for consideration by PV Water and regulatory stakeholders (CDFW, CCRWQCB, NMFS) through the adaptive management process. Depending on the source of the adverse conditions (e.g., lake inflows vs. project operations), PV Water will identify feasible response actions. For example, if lake inflows are found to contain high concentrations of nutrients, PV Water may propose to conduct outreach to upstream landowners to discuss potential remedial actions. If adverse conditions are determined to be the direct cause of lake management practices, PV Water will coordinate with regulatory stakeholders to identify potential response actions that are consistent with Project needs and objectives. It should be noted that some water quality conditions that are typically considered adverse (e.g., high summer water temperatures) are fully expected to occur in this broad, shallow lake and would not require response actions.

CDFW's water right protest dismissal term requests that the College Lake Water Quality Monitoring Plan include "appropriate lake water quality treatment measures". As noted previously, College Lake has not been inundated during the summer and fall for approximately 100 years under current management practices. As such, insufficient data is currently available to allow for meaningful predictions of potential water quality concerns that may arise or how to treat them if they do arise. For example, cyanobacterial blooms that have occurred in nearby Pinto Lake in the past have been successfully treated with aluminum sulfate.[9] However, incorporating a treatment recommendation based on Pinto Lake experiences into this College Lake Water Quality Monitoring Plan prior to implementation of the Project and associated water quality monitoring would be premature as significant difference in Pinto Lake conditions (perennially wetted) and future College Lake conditions (seasonally dry)

[9] Central Coast Regional Water Quality Control Board (CCRWQCB). 2015. *Progress Report to Support Development of Total Maximum Daily Loads Addressing Nutrients and Algal Toxins in Waterbodies of the Pinto Lake Catchment*, CCRWQCB, San Luis Obispo, CA.

could potentially affect treatment effectiveness. Instead, PV Water would outline potential response action alternatives in the annual monitoring reports for consideration by AMP stakeholders, including CDFW, CCRWQCB, and NMFS. In the case of the cyanobacteria bloom example above, such a recommendation may include coordination with the California Cyanobacteria and Harmful Algal Bloom Network (CCHAB), a statewide interagency workgroup assembled to work towards the development and maintenance of a comprehensive, coordinated program to identify and address the causes and impacts of cyanobacteria and harmful algal blooms, to evaluate site-specific College Lake treatment options.

In addition to applying the holistic, ecosystem-level approach of the AMP to resolving potential water quality concerns, the feedback loop aspect of adaptive management may lead to recommendations for modifications to the College Lake Water Quality Monitoring Program itself. For example, the frequency of sample collection may be increased for greater temporal resolution, or parameters may be added to fill data gaps. Conversely, parameters or sampling sites that prove superfluous over time may be eliminated.