



Technical Memorandum

To:	Prado Basin Habitat Sustainability Committee
From:	Watermaster Engineer – Wildermuth Environmental Inc. (WEI)
Date:	March 8, 2017
Subject:	Recommended Scope and Budget of the Prado Basin Habitat Sustainability Program for FY 2017/18 (draft)

Background and Purpose

Pursuant to the Mitigation Measure 4.4-3 of the Peace II Subsequent Environmental Impact Report (SEIR), the Chino Basin Watermaster (Watermaster) and the Inland Empire Utility Agency (IEUA) implement an Adaptive Management Plan (AMP) for the Prado Basin Habitat Sustainability Program (PBHSP) to monitor the riparian habitat in the Prado Basin as a contingency measure to ensure that the riparian habitat will not incur unforeseeable significant adverse effects from Peace II Agreement implementation. The AMP outlines a monitoring program of riparian habitat and the factors that could potentially affect the riparian habitat which include, but are not limited to: groundwater levels, surface-water discharge, weather events, and long-term climate; and annual data analysis and reporting. A key element of the AMP is its adaptive nature—Watermaster and IEUA can adjust the AMP as warranted by the data.

The annual report is prepared under the supervision of the Prado Basin Habitat Sustainability Committee (PBHSC), which include the results and interpretations of the monitoring data, and recommendations for the following fiscal year; including adjustments to the AMP, if any; and mitigation measures if found necessary.

This memorandum describes the recommended activities for the PBHSP for FY 2017/18 in the form of a proposed scope-of-work and budget.

Members of the PBHSC are asked to:

1. Review this memorandum by March 21, 2017.
2. Attend a meeting of the PBHSC at 1:30pm on March 21, 2017 at IEUA to discuss the proposed scope-of-work and budget for FY 2017/18.
3. Submit comments and suggested revisions to scope-of-work and budget for FY 2017/18 by April 4, 2017.

A proposed scope-of-work for the PBHSP for FY 2017/18 is shown in Table 1 as a line-item cost estimate. The ongoing costs of the PBHSP are shared between the Watermaster and IEUA per the 2016 Agreement¹. Watermaster is responsible for the costs associated with Tasks 1 through 3; and IEUA and Watermaster split costs 50/50 for Tasks 4 through 7. The final scope-of-work, schedule, and budget recommended by the PBHSC will go through the IEUA and Watermaster budgeting processes for approval. The final scope-of-work, schedule, and budget for FY 2017/18 will be included in Section 4 of the *Annual Report for Prado Basin Habitat Sustainability Committee for Water Year 2015/16*.

Recommended Scope of Work and Budget – FY 2017/18

The following describes the proposed scope-of-work by major Task for the PBHSP for FY 2017/18 as shown in Table 1:

Task 1—Groundwater-Level Monitoring Program. The monitoring of groundwater levels in the Prado Basin is a key component of the PBHSP, as declining water levels could be a factor related to the Peace II implementation that adversely impacts riparian vegetation. Sixteen monitoring wells were installed specifically for the PBHSP during fiscal year 2014/15. Those wells plus HCMP-5/1 and RP3-MW3, are monitored for groundwater levels. These 18 PBHSP monitoring wells are located at nine sites in the Prado Basin along the fringes of the riparian habitat (see Figure 1). The 18 monitoring wells are equipped with pressure transducers that record water-level measurements every 15 minutes. This task includes quarterly field visits to all 18 PBHSP monitoring wells to download the transducer data, and quarterly processing, checking, and uploading of the data to the database. This task is consistent with the work performed during the previous fiscal year.

Task 2—Groundwater-Quality Monitoring Program. Groundwater-quality data is compared to surface-water quality to characterize groundwater/surface water interactions in the Prado Basin. Understanding these interactions helps to determine whether and to what extent these interactions are critical to the sustainability of riparian habitat. This task includes quarterly monitoring of the 18 PBHSP wells (see Figure 1) for the chemical parameters listed in Table 2. The parameters to be sampled quarterly are a reduced list from the previous fiscal years and only include the general minerals necessary to analyze the groundwater/surface water interactions. The quarterly general mineral data collected during the previous two fiscal years has been informative for the characterization of groundwater/surface interactions, and it is

¹ Agreement Between Chino Basin Watermaster and Inland Empire Utilities Agency Regarding Reimbursement of the Peace II Subsequent Environmental Impact Report Mitigation Measure 4.4.5 (Prado Basin Habitat Sustainability Program). Signed September 2016.

recommend that a quarterly sampling frequency continue through fiscal year 2017/18 to help understand groundwater/surface water interactions.

The reduction in the chemical parameters sampled quarterly translates into a \$30,700 reduction in annual laboratory costs. The chemical parameters removed from the parameter list are constituents of concern in groundwater in the lower Chino Basin which include: VOCs, 1,2,3-trichloroethene (low-level detection limit), perchlorate, total chromium, hexavalent chromium, and arsenic. Previous fiscal year sampling has concluded that these parameters are not of concern in groundwater at the PBHSP wells. However, it may be appropriate to sample for these parameters at a minimum frequency of every three years at a subset of the PBHSP wells in future years.

Task 3—Surface-Water Monitoring Program. Surface-water discharge data are evaluated in the vicinity of the Prado Basin to characterize the historical and current trends, and analyze if these trends contribute to impacts on the riparian habitat. Surface-water quality is also compared to groundwater quality to characterize groundwater/surface interactions in the Prado Basin, and determine whether and to what extent these interactions are critical to the sustainability of riparian habitat. The surface-water monitoring program leverages existing publically available data sets which include: the USGS daily discharge measurements at six sites along the Santa Ana River and tributaries; daily discharge and water-quality data from the Publicly-Owned Treatment Works (POTWs) tributary to Prado Basin; US Army Corps of Engineers (ACOE) daily measurements of reservoir elevation and discharge from behind Prado Dam; and Watermaster quarterly surface-water-quality monitoring at two sites along the Santa Ana River. The locations of all surface water monitoring sites are shown in Figure 1. This task includes the annual collection of the USGS, POTW, and ACOE data for the previous water year 2017 (October 2016 – September 2017), and the processing, checking, and uploading of the data to the PBHSP database. This task does not include the processing, checking, and uploading of the Watermaster-collected Santa Ana River data, which is performed for another Watermaster project. The scope of this task is consistent with the work performed for the previous fiscal year.

Task 4—Riparian Habitat Monitoring Program. Monitoring the extent and quality of the riparian habitat in the Prado Basin is a fundamental component of the PBHSP to characterize how the riparian habitat changes over time. To characterize the impacts of Peace II implementation on the riparian habitat, if any, it is necessary to understand the long-term historical trends of extent and quality and the factors that have affected it. The riparian habitat monitoring program consists of both regional and site-specific components.

The current methods for the regional monitoring of riparian habitat are two independent methods that complement each other: mapping and analysis of the riparian habitat through air photos and through analysis of the normalized distribution vegetation index (NDVI) determined from Landsat remote-sensing data. Tasks 4.1 through 4.4 are for the collection of data for the regional monitoring of riparian vegetation, and include the following:

- A custom flight performed by an outside professional to collect high-resolution air-photo imagery (about 3" resolution) for the entire Prado Basin during the summer of 2017. The cost for the custom flight is being shared with Orange County Water District (OCWD).
- The catalog and review of the 2017 high-resolution air photo, and digitization of the riparian vegetation extent.
- The collection, review, and upload of Landsat NDVI data for water year 2017.
- The collection, review, and upload of additional historical Landsat NDVI data to fill data gaps discovered in fiscal year 2016/17.

The site-specific monitoring of riparian habitat is used to "ground truth" the regional monitoring of air photos and NDVI. To date, the site-specific monitoring of riparian habitat in the Prado Basin includes periodic vegetation surveys performed by the USBR that were initiated prior to the development of the AMP. The NDVI data collected for the regional monitoring program is a valuable method to characterize riparian habitat extent and quality both spatially and temporally, and when possible, NDVI data should be complemented and verified with field measurements. Task 4.5 is for the conceptual design of a site-specific monitoring program that employs methods favorable for the ground truthing of NDVI data other than periodic vegetation surveys.

Task 5 – Climate Monitoring Program. Climate and weather data are evaluated in the vicinity of the Prado Basin to characterize the historical and current trends over time, and analyze if these trends contribute to impacts on the riparian habitat. The climate and weather monitoring program leverages existing publically available data sets. Two types of climatic datasets are compiled: time-series data measured at weather stations and spatially-gridded datasets. Task 5 includes the annual collection of the time-series data and spatially-gridded datasets for water year 2017 (October 2016 – September 2017), and the processing, checking, and uploading of the data to the PBHSP database. The scope of this task is consistent with the work performed for the previous fiscal year.

Task 6—Prepare Annual Report of the PBHSC. This task involves analysis of the data generated by the PBHSP through water year 2017. The data analysis, and the results and interpretations generated from the data analysis will be documented in the *Annual Report for Prado Basin Habitat Sustainability Committee for Water Year 2016/17*. This task includes the effort to prepare an administrator draft for Watermaster and IEUA review, a draft report for the review by the PBHSC, and a final report. A PBHSC meeting will be conducted in March/April 2018 to review the draft report and facilitate comments on the report.

Task 7—Meetings and Administration. This task includes the time for one ad-hoc meeting in addition to the PBHSC meeting to review the draft annual report. This task also includes the effort to prepare the PBHSP scope, schedule, and budget for the subsequent fiscal year. Also included in this task is project administration, including management of staffing and financial reporting.

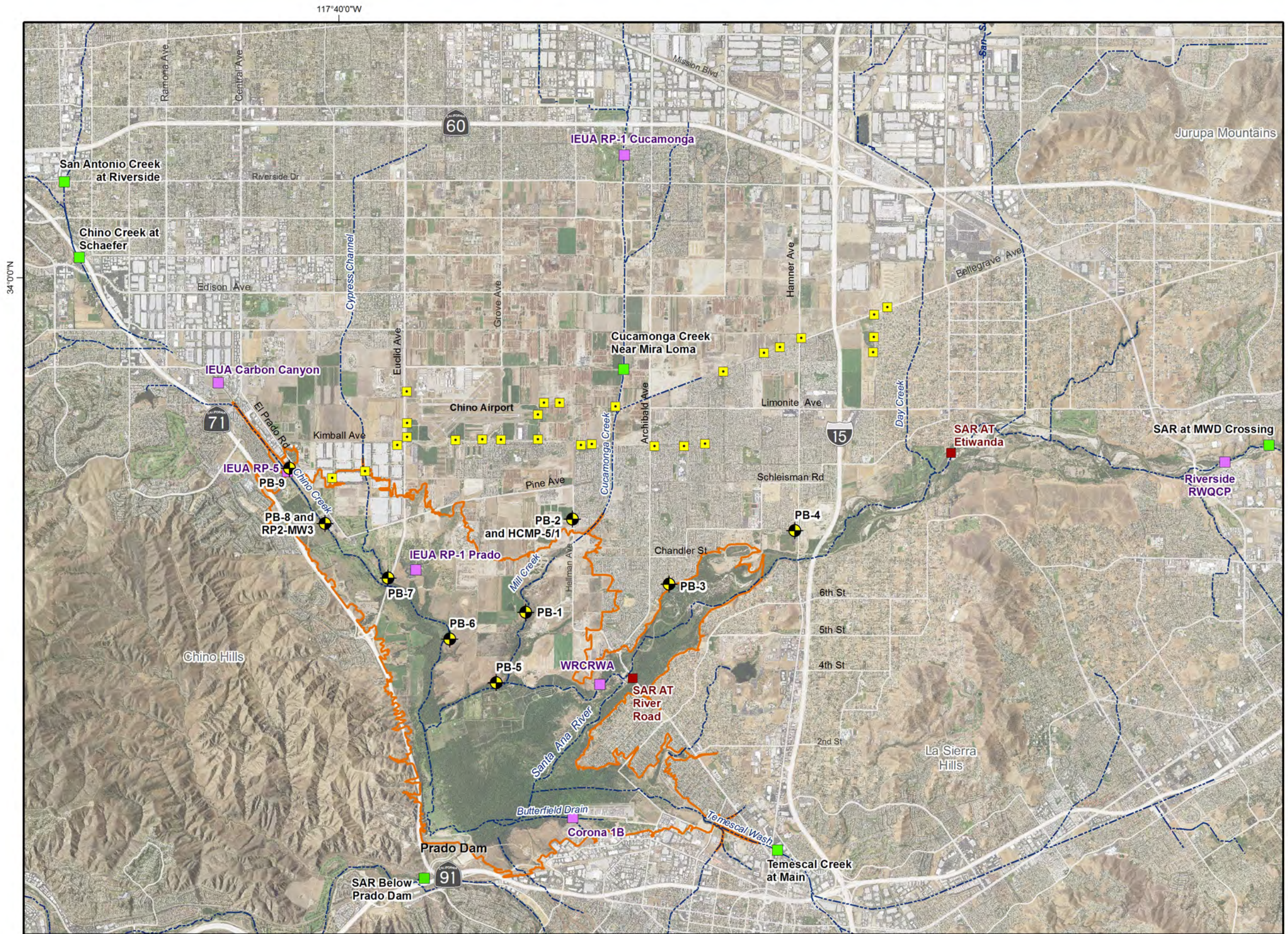
Table 1
Work Breakdown Structure, Cost Estimate, and Schedule
PBHSP Monitoring Program -- FY2017-18





Task Description	Notes	Labor Total			Other Direct Costs					Notes	Totals			50/50 Split Portion FY 2017-18	Schedule												
		No. of sites	Task Rep Multi	Person Days	Travel	Equip. Rental	Lab	Outside Pro	Total		FY 2017-18	FY 2016-17	Difference		Jul 2017	Aug 2017	Sep 2017	Oct 2017	Nov 2017	Dec 2017	Jan 2018	Feb 2018	Mar 2018	Apr 2018	May 2018	Jun 2018	
Task 1: Groundwater Level Monitoring Program																											
1.1 Collect Transducer Data from PBHSP Wells (Quarterly)		18	4	4.8	\$4,304	\$587	\$192			\$779		\$11,931	\$11,721	\$210	-												
1.2 Collect, Check, and Upload Transducer Data from PBHSP Wells (Quarterly)		18	4	5.6	\$6,848					\$0		\$5,083	\$6,848														
Task 2: Groundwater Quality Monitoring Program																											
2.1 Collect Groundwater-Quality from PBHSP Wells (Quarterly)		18	4	18.4	\$15,472	\$2,035	\$4,120	\$18,500		\$24,655		\$49,055	\$77,160	-\$28,105	-												
2.2 Check and Upload Groundwater Quality Field and Lab Data from PBHSP Wells (Quarterly)		18	4	7.2	\$8,928					\$0		\$40,127	\$8,928														
Task 3: Surface Water Monitoring Program																											
3.1 Collect, Check, and Upload Surface Water Discharge and Quality Data from POTWs, and Dam level data from the ACOE (Annual)			1	2.2	\$2,608					\$0		\$3,744	\$3,230	\$514	-												
3.2 Collect, Check, and Upload Surface Water Discharge and Quality Data from USGS gaging stations (Annual)			1	1.0	\$1,136					\$0		\$2,608	\$1,136														
Task 4: Riparian Habitat Monitoring Program																											
4.1 Manage and Perform Custom Flight to Collect a High-Resolution Air Photo of the Prado Basin Region			1	1.0	\$1,816				\$10,000	\$10,000	1	\$50,342	\$199,794	-\$149,452	\$25,171.0												
4.2 Collect, Check, Catalog, and Digitize the 2017 Air Photo for Prado Basin Region			1	4.3	\$5,682					\$0		\$11,816	\$5,682														
4.3 Collect, Check, and Upload 2017 Landsat NDVI Data in the Prado Basin			1	3.8	\$5,262					\$0		\$5,262	\$5,262														
4.4 Collect, Check, and Upload Historical Landsat NDVI Data in the Prado Basin			1	12.2	\$16,074					\$0		\$16,074	\$16,074														
4.5 Design a Site-Specific Vegetation Monitoring Program to Ground-Truth NDVI data			1	7.5	\$11,508					\$0		\$11,508	\$11,508														
Task 5: Climate Monitoring Program																											
5.1 Collect, Check, and Upload Climatic Data (Annual)			1	1.0	\$1,456				\$300	\$300		\$1,756	\$1,368	\$388	\$878.20												
Task 6: Prepare Annual Report of the PBHSC																											
6.1 Analyze Data and Prepare Admin Draft Report for CBWM/IEUA			1	47.0	\$70,308					\$0		\$91,082	\$141,436	-\$50,354	\$45,541.0												
6.2 Meet with CBWM/IEUA to Review Admin Draft Report			1	2.5	\$4,148	\$105				\$105		\$4,253	\$4,253														
6.3 Incorporate CBWM/IEUA Comments and Prepare Draft Report: Submit Draft Report to PBHSC			1	5.0	\$7,200					\$0		\$7,200	\$7,200														
6.4 Meet with PBHSC to Review Draft Report			1	3.0	\$4,888	\$105				\$105		\$4,993	\$4,993														
6.5 Incorporate PBHSC Comments and Finalize Report			1	3.0	\$4,328					\$0		\$4,328	\$4,328														
Task 7: Project Management and Administration																											
7.1 Ad-Hoc Meetings (one meeting)			1	3.0	\$4,888	\$105				\$105		\$19,003	\$18,444	\$559	\$9,501.30												
7.2 Prepare Scope and Budget for FY 2018-19			1	4.0	\$6,368					\$0		\$6,368	\$6,368														
7.3 Project Administration and Financial Reporting			12	4.8	\$7,642					\$0		\$7,642	\$7,642														
Totals				136	\$190,864	\$2,350	\$4,120	\$18,500	\$10,300	\$36,049		\$226,913	\$453,153	-\$226,240	\$81,092												





1- This is half of the cost for the outside professional. OCWD will be paying the other half.

Table 2
Parameter List for the PBHSP

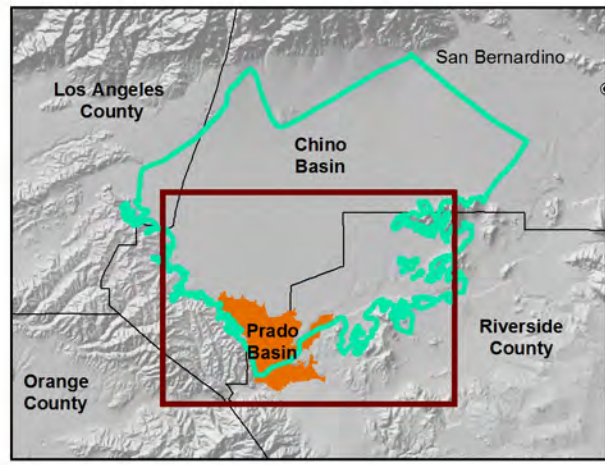
Chemical Parameter	Method Detection Limit	Analysis Method
Alkalinity in CaCO3 units	2	SM2320B
Ammonia Nitrogen	0.05	EPA 350.1
Bicarbonate as HCO3 <i>Calculated</i>	2	SM2320B
Boron Total ICAP	0.05	EPA 200.7
Calcium Total ICAP	1	EPA 200.7
Carbonate as CO3 <i>Calculated</i>	2	SM2320B
Chloride	1	EPA 300.0
Flouride	0.05	SM 4500-C
Hydroxide as OH <i>Calculated</i>	2	SM2320B
Kjeldahl Nitrogen	0.2	EPA 351.2
Magnesium Total ICAP	0.1	EPA 200.7
Nitrate as Nitrogen by IC	0.1	EPA 300.0
Nitrate as NO3 <i>Calculated</i>	0.44	EPA 300.0
Nitrite as Nitrogen by IC	0.05	EPA 300.0
Organic Nitrogen <i>Calculated</i>	0.2	EPA 351.2
PH (H3=past HT not compliant)	0.1	SM4500-HB
Potassium Total ICAP	1	EPA 200.7
Sodium Total ICAP	1	EPA 200.7
Specific Conductance, 25 C	2	SM2510B
Sulfate	0.5	EPA 300.0
Silica	0.5	EPA 200.7
Total Dissolved Solids (TDS)	10	E160.1/SM2540C
Total Hardness as CaCO3 by ICP <i>Calculated</i>	3	SM 2340B
Total Organic Carbon	0.3	SM5310C/E415.3
Turbidity	0.05	EPA 180.1



- Groundwater and Surface Water Monitoring Sites**
-  PBHSP Well Site (Groundwater Levels and Quality)
 -  POTW Discharge Outfall (Discharge and Surface Water Quality)
 -  USGS Stream Gage Station (Discharge)
 -  Watermaster Santa Ana River Sites - Maximum Benefit Monitoring (Surface Water Quality)

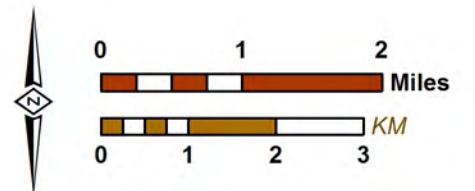
- Other Features**
-  Prado Flood Control Basin
 -  Chino Basin Desalter Authority Well
 -  Concrete-Lined Channels
 -  Unlined Rivers and Streams

Aerial Photo: USDA, 2014. Mosaic of photos from May 13, 2014 to June 3, 2014



Prepared by:

 WILDERMUTH ENVIRONMENTAL, INC.
 Author: VMW
 Date: 3/7/2017
 File: Figure 1 FY 2017-18 Scope



 
Prado Basin Habitat Sustainability Program
 Fiscal Year 2017/18 Scope, Schedule, and Budget

Prado Basin Habitat Sustainability Program
Groundwater and Surface Water
Monitoring Sites - Fiscal Year 2017/18

Figure 1