

TECHNICAL MEMORANDUM

DATE: March 2, 2022 Project No.: 941-81-20-24
SENT VIA: EMAIL
TO: Prado Basin Habitat Sustainability Committee
FROM: Chino Basin Watermaster Engineer
SUBJECT: Recommended Scope and Budget of the Prado Basin Habitat Sustainability Program for Fiscal Year 2022/23

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 Utilities Agency (IEUA) implement an Adaptive Management Plan (AMP) as a contingency measure to ensure that the riparian habitat in the Prado Basin will not incur significant adverse impacts associated with implementation of the Peace II Agreement. The AMP is implemented under the guidance and supervision of the Prado Basin Habitat Sustainability Committee (PBHSC), which is composed of representatives from all interested Prado Basin stakeholders.

The AMP calls for the implementation of a monitoring and reporting program called the Prado Basin Habitat Sustainability Program (PBHSP). The PBHSP is an effort to monitor the extent and quality of the riparian habitat, and all of the factors that could affect the riparian habitat which include, but are not limited to: changes in groundwater levels, changes in surface-water discharge, weather events, climatic changes, pests, and wildfire. The most likely factor that may be associated with the implementation of the Peace II Agreement is the lowering of groundwater levels.

The AMP calls for annual data analysis and reporting. The annual report describes the results and interpretations of the monitoring data and makes recommendations for adjustments to the monitoring program for the following fiscal year (FY), if appropriate.

This memorandum describes the recommended activities for the PBHSP for FY 2022/23 in the form of a proposed scope-of-work and budget. Members of the PBHSC are being asked to:

1. Review this memorandum by March 9, 2022.
2. Attend virtual meeting of the PBHSC at 2:00 pm on March 9, 2022 to discuss the proposed scope-of-work and budget for FY 2022/23.
3. Submit comments and suggested revisions on the scope-of-work and budget for FY 2022/23 by March 30, 2022.

The final scope-of-work and budget recommended by the PBHSC will go through the IEUA and Watermaster budgeting processes for approval. The final scope-of-work, budget, and schedule for FY 2022/23 will be included in the *Annual Report for Prado Basin Habitat Sustainability Committee for Water Year 2020/21* that will be finalized in June 2022.

RECOMMENDED SCOPE OF WORK AND BUDGET – FY 2022/23

The proposed scope-of-work and budget is shown in Table 1 as a line-item cost estimate for Tasks 1 through 7. The costs of the PBHSP are shared between the Watermaster and IEUA per a 2016 Agreement.¹ Watermaster is responsible for the costs associated with Tasks 1 through 3; IEUA and Watermaster split costs equally for Tasks 4 through 7. The Orange County Water District (OCWD) also is a cost-sharing partner and provides in-kind services for sub-tasks in Task 5.

The monitoring and analysis proposed for FY 2022/23 for the PBHSP is generally the same scope as the previous year, except for the inclusion of the periodic field vegetation surveys that are done every three years. Thus far the monitoring and analysis of the riparian habitat, groundwater levels, precipitation, temperature, and surface-water discharge has been successful in identifying: (i) changes in the health and extent of the riparian habitat (ii) changes in groundwater levels in the Prado Basin, and (iii) relationships between the riparian habitat and the factors that influence it. The continuation of the monitoring and analyses as done in previous fiscal years is necessary to identify potential changes in the riparian habitat and the specific causes of those changes during the implementation of the Peace II Agreement. The PBHSP results will assist in the development of mitigation measures if such measures are ever determined to be necessary. In FY 2022/23, there continues to be cost savings due to efficiencies in conducting this monitoring and reporting program over the years.

Monitoring of the riparian habitat and changes in groundwater levels remain as the most critical components of the PBHSP. Over the last two years, groundwater levels have declined about six feet near the riparian habitat in the northern portion of Mill Creek, to historical lows below the model-predicted levels through 2030 that are assumed to not impact the habitat. Thus far, the monitoring of riparian habitat using remote sensing data and air photos indicates a decrease in the vegetation greenness over this past year in the northern Mill Creek area. Vegetation greenness remains within the range of variability observed historically, and the decrease is not considered significant. During FY 2022/23, continued monitoring and additional focused monitoring in this area are recommended to monitor for any potential impact to the riparian habitat from declining groundwater levels.

The proposed scope of work is described below by task:

Task 1. Groundwater-Level Monitoring Program

The monitoring of groundwater levels in the Prado Basin is a key component of the PBHSP because declining groundwater levels could be a factor related to Peace II implementation that adversely impacts riparian vegetation. Sixteen monitoring wells were installed specifically for the PBHSP in 2015. These wells, plus monitoring wells HCMP-5/1 and RP2-MW3, are monitored for groundwater levels. Figure 1 shows these 18 PBHSP monitoring wells located at nine sites in the Prado Basin along the fringes of the riparian habitat. The 18 monitoring wells are equipped with integrated pressure-transducers/data-loggers that measure and record water-level measurements every 15 minutes. This task includes quarterly field visits to all 18 PBHSP monitoring wells to download data. All data will be checked and uploaded to the PBHSP database. This task is consistent with the work performed for the PBHSP for all previous fiscal years.

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.

Task 2. Groundwater-Quality Monitoring Program

Since the PBHSP monitoring wells were constructed in 2015, groundwater-quality monitoring has been tailored to discern the groundwater/surface-water interactions that are important to the sustainability of the riparian habitat in Prado Basin. From FY 2015/16 through 2017/18, quarterly groundwater samples were collected from the 18 PBHSP monitoring wells and analyzed at a minimum for general minerals. The general mineral chemistry data collected was analyzed along with groundwater-level data, model-generated groundwater-flow directions, and surface-water quality and flow data to help characterize groundwater/surface-water interactions in the Prado Basin and determine the source of the shallow groundwater that is available for consumptive use by the riparian vegetation.

During FY 2018/19, a pilot monitoring program was initiated at four monitoring wells at two locations along Chino Creek (PB-7 and PB-8) where the data loggers that measure groundwater levels at 15-minute intervals were replaced with data loggers that measure and record EC, temperature, and water levels at 15-minute intervals. The same high-frequency monitoring was initiated at two nearby surface water sites in Chino Creek (Task 3.2). Additionally, groundwater-quality samples were collected at these wells for the first two years either quarterly (FY 2018/19) or semi-annually (FY 2019/20) and were analyzed for EC, temperature, and general minerals to validate and support the high-frequency data, along with the collection of field measurements of EC and temperature. The purpose of the pilot monitoring program is to determine if the high-frequency data better reveals the groundwater/surface-water interactions and enhances the interpretation of the general mineral data derived from sampling. The data collected thus far as a part of the pilot monitoring program has provided more support for the characterization of groundwater/surface water interactions at these locations and warrants the continuation of the pilot program to collect more data. The effort to collect and review the high-frequency data is minimal as the installed data loggers are also part of the groundwater-level monitoring (Task 1) at these four wells.

Tasks 2.1 is to continue the pilot monitoring program in FY 2022/23 to collect and review the high-frequency data in groundwater to help discern the groundwater/surface water interactions near PB-7 and PB-8. The monitoring wells will be visited quarterly to download the data from the data loggers, and the costs to do so is assumed with Task 1. All data will be checked and uploaded to the PBHSP database.

Task 3. Surface-Water Monitoring Program

Surface-water discharge data from the Santa Ana River and the tributaries that cross Prado Basin are evaluated to characterize the influence of surface-water discharge on the riparian habitat. The surface-water monitoring program utilizes publicly-available data sets which include: the USGS daily discharge measurements at six sites along the Santa Ana River and its tributaries; daily discharge and water-quality data from Publicly-Owned Treatment Works (POTWs) that are tributary to Prado Basin; US Army Corps of Engineers (ACOE) daily measurements of reservoir elevation and releases from the reservoir at Prado Dam; and Watermaster's quarterly surface-water-quality monitoring at two sites along the Santa Ana River. The locations of these surface-water monitoring sites are shown on Figure 1.

Task 3.1 includes the annual collection of the USGS, POTW, and ACOE data for water year 2022, and the processing, checking, and uploading of these data to the PBHSP database. These tasks do not include the processing, checking, and uploading of the Watermaster-collected Santa Ana River data, which is performed for another Watermaster task. The scope of these tasks is consistent with the work performed for the previous fiscal year.

High-frequency surface water-quality data are also collected and analyzed in the pilot monitoring program to help characterize groundwater/surface water interactions. As described in Task 2, a pilot monitoring

program was initiated in FY 2018/19 at two locations along Chino Creek adjacent to wells PB-7 and PB-8. At these locations, data loggers were installed in Chino Creek to measure and record EC, temperature, and stage at 15-minute intervals in coordination with the similar high-frequency monitoring in groundwater at PB-7 and PB-8 (Task 2). Grab samples of surface water were also collected quarterly for EC, temperature, and general mineral analyses, along with field measurements of EC and temperature. As described above for *Task 2 – Groundwater-Quality Monitoring Program*, the purpose of the pilot monitoring program is to determine if the high-frequency data better reveals the groundwater/surface-water interactions and enhances the interpretation of the general mineral data derived from grab sampling. Periodically, the data loggers within the creek have been lost during large storm events and the casing that house the probes have experienced the accumulation of mud which has compromised the accuracy of the collected data. These monitoring challenges in the field have resulted in extended periods of no data or erroneous data and have necessitated additional field work to resolve. The data collected thus far for the pilot monitoring program has provided more support for the characterization of groundwater/surface water interactions at these locations and warrants the continuation of the pilot program to collect more data to draw defensible conclusions. The effort to continue to collect and review the high-frequency data from the surface water probes is minimal since the installed data loggers can be visited in the field at the same time as the four nearby monitoring wells (Tasks 1 and 2).

Tasks 3.2 is to continue the pilot monitoring program in FY 2022/23 to collect and review the high-frequency data in the surface water to help discern the groundwater/surface water interactions near wells PB-7 and PB-8. The probes will be visited quarterly at the same time as the nearby wells to download the data, collect field measurements for temperature and EC, and clean the probes and their housing to prevent the buildup of residue. There will be four additional field visits for routine cleaning of the probes and housing. All data will be checked and uploaded to the PBHSP database. The scope is consistent with the work performed for the previous fiscal year.

Task 4. Climate Monitoring Program

Climatic data are evaluated in the vicinity of the Prado Basin to characterize trends, and to determine if these trends contribute to impacts on the riparian habitat. The climate monitoring program utilizes two types of publicly available, spatially-gridded datasets. Task 4 includes the annual collection of the spatially-gridded datasets for water year 2022 (October 2021 – September 2022), and the 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 5. 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 its extent and quality and the factors that have affected it. The current riparian habitat monitoring program consists of both regional and site-specific components. The proposed riparian habitat monitoring program for FY 2022/23 is described in the subsections below.

Regional Monitoring

The regional monitoring of riparian habitat is performed via two independent methods that complement each other: mapping and analysis of the riparian habitat using (i) air photos and (ii) the normalized distribution vegetation index (NDVI) derived from the Landsat remote-sensing program. Tasks 5.1, 5.2, and 5.3 are for the collection and compilation of the regional monitoring data, including:

- Perform a custom flight (via outside professional services) to acquire a high-resolution air photo (three-inch pixel) of the Prado Basin during summer 2022. The cost for the air photo is shared with OCWD.
- Catalog and review the 2022 high-resolution air photo in ArcGIS and digitize the extent of the riparian habitat.
- Collect, review, and upload the Landsat NDVI data for water year 2022.

Site-Specific Monitoring

The site-specific monitoring of the riparian habitat consists of periodic field surveys of the riparian vegetation at selected locations. These surveys provide an independent measurement of vegetation quality that can be used to “ground truth” the regional monitoring of the riparian habitat. To date, the United States Bureau of Reclamation (USBR) along with the OCWD² has conducted field surveys once every three years. The most recent triennial field survey was conducted in the summer of 2019. Task 5.4 is to conduct the field surveys during the summer of 2022 at the 36 sites monitored in 2019 and up to three additional sites in the target area shown on Figure 1 along the north portion of Mill Creek. As described above some additional focused monitoring in this area of Mill Creek is recommended to monitor for the potential impact to the riparian habitat from the observed decline in groundwater levels.

The proposed methodology for the 2022 field surveys is modified from the previous surveys to a reduced set of representative measurements and data to collect in the field that are best fit to ground truth the air photos and remote sensing data, and measure and track the quality of the riparian vegetation.³ This reduced methodology is a cost savings of \$10,000. The field surveys will be performed by the USBR staff. Assistance from the OCWD staff in the field as needed, will be provided as in-kind services, and also results in a cost savings.

Task 6. Prepare Annual Report of the PBHSC

This task involves the analysis of the data sets collected by the PBHSP through water year 2022. 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 2021/22*. This task includes the effort to prepare an administrative draft report for Watermaster and IEUA staff review, a draft report for the review by the PBHSC, and a final report including comments and responses. A PBHSC meeting will be conducted in May 2023 to review the draft report and facilitate comments on the report. The scope of this task is consistent with the work performed for the previous fiscal year.

Task 7. Project Management and Administration

This task includes the effort to prepare the PBHSP scope, schedule, and budget for the subsequent fiscal year. A draft *Technical Memorandum Recommended Scope and Budget of the Prado Basin Habitat*

² OCWD staff provides assistance to the USBR in the field as in-kind services.

³ The field vegetation surveys were set up and conducted two times prior to the developed of the AMP, and there are measurements that were collected by the USBR in the field during previous surveys that have not been used in the PBHSP analysis and reporting and are no longer needed for the PBHSP. These include: tree/sapling diameter at breast height (DBH); shrub diameter at root collar (DRC); height of a tree, sapling, or shrub; and measurement of the lowest leaf level of a tree to calculate a crown ratio.

Sustainability Program for FY 2023/24 will be submitted to the PBHSC in February 2023. A PBHSC meeting will be conducted in March 2023 to review the draft recommended scope and budget and facilitate comments. Also included in this task is project administration, including management of staffing and monthly financial reporting. The scope of this task is consistent with the work performed for the previous fiscal year.

Attachments:

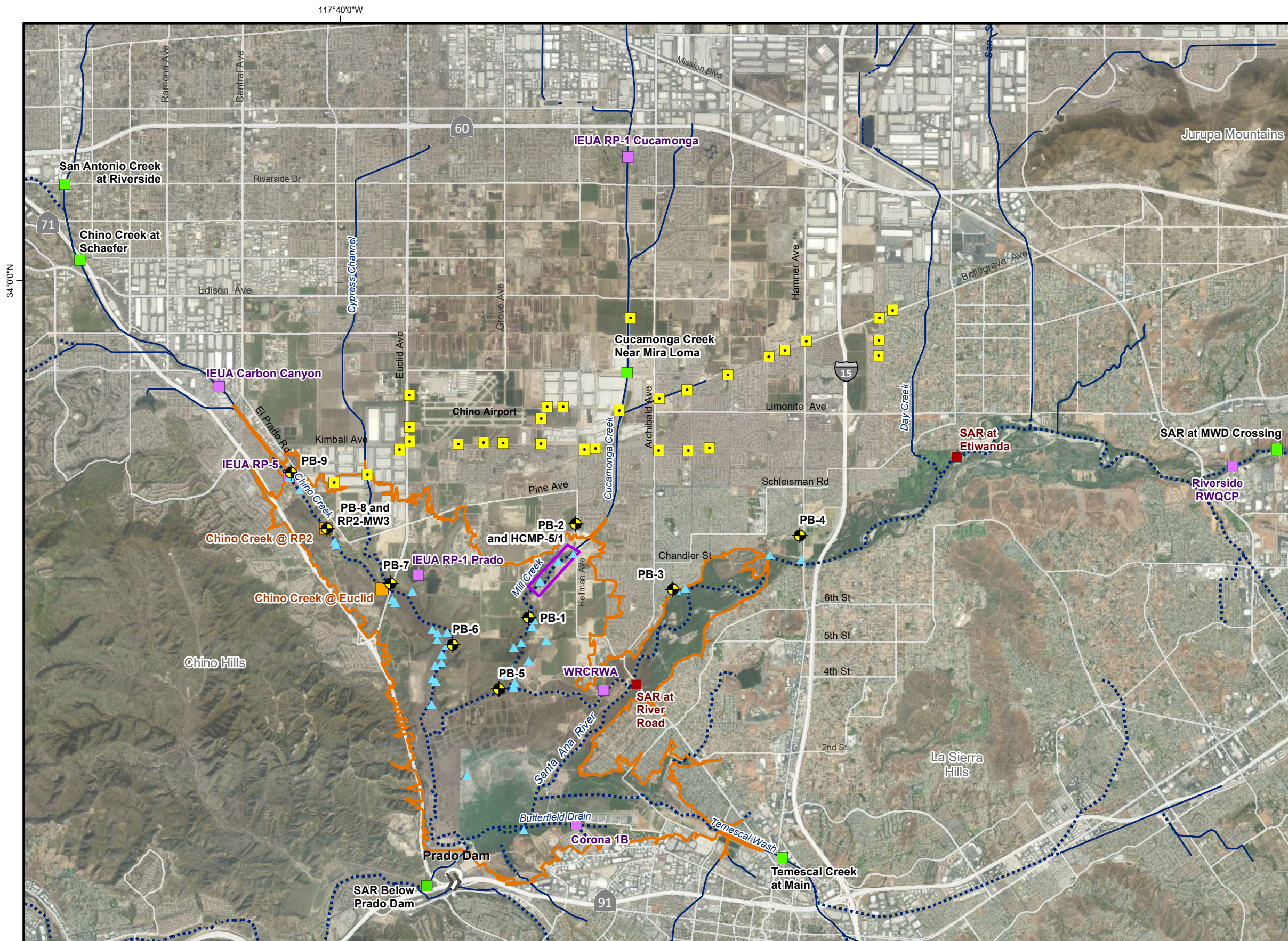
Table 1. Work Breakdown Structure and Cost Estimate – Prado Basin Habitat Sustainability Program – Fiscal Year 2022/23

Figure 1. Prado Basin Habitat Sustainability Program Monitoring Sites – Fiscal Year 2022/23

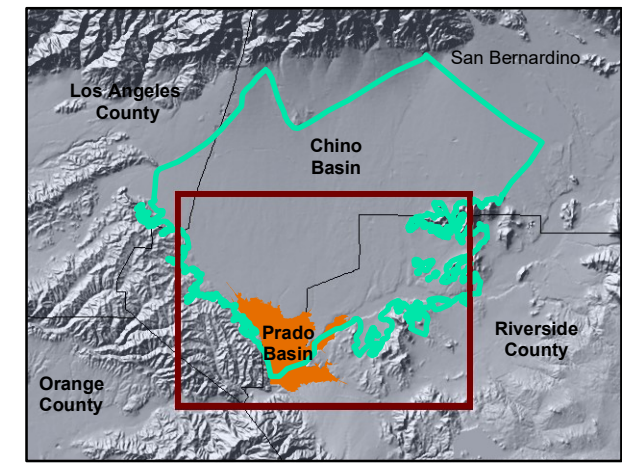
**Table 1. Work Breakdown Structure and Cost Estimate
Prado Basin Habitat Sustainability Program - Fiscal Year 2022/23**

Task Description	Labor Total		Other Costs, dollars						Notes	Totals, dollars				
	Person Days	Total, dollars	Travel	Equipment Rental	Lab	Outside Pro	Equipment	Total		Recommended Budget, dollars 2022/23	Budget 2021/22	Variance from Prior FY	IEUA Share 2022/23	CBWM Share 2022/23
Task 1. Groundwater Level Monitoring Program	14.0	17,136						660		17,796	13,785	4,011	-	17,796
1.1 Collect Transducer Data from PBHSP Wells (Quarterly)	7.8	8,234	500	160				660		8,894	5,538			
1.2 Collect, Check, and Upload Transducer Data from PBHSP Wells (Quarterly)	6.2	8,902						0		8,902	8,246			
Task 2. Groundwater Quality Monitoring Program	0.0	5,253						0		5,253	5,373	-120	-	5,253
2.1 Check and Upload High-Frequency Probe Data from Pilot Monitoring Program (Quarterly)	3.4	5,253						0		5,253	5,373			
Task 3. Surface Water Monitoring Program	11	14,329						245		14,574	9,807	4,767	-	14,574
3.1 Collect, Check, and Upload Surface Water Discharge and Quality Data from POTWs, USGS; and Dam Level data from the ACOE (Annual)	2.5	3,564						0		3,564	3,562			
3.2 Collect, Check, and Upload High-Frequency Probe Data for Chino Creek from Pilot Monitoring Program (Quarterly)	8.8	10,765	125	120				245		11,010	6,245			
Task 4. Climate Monitoring Program	1.3	1,870						275		2,145	2,081	64	1,073	1,073
4.1 Collect, Check, and Upload Climatic Data (Annual)	1.3	1,870					275	275		2,145	2,081			
Task 5. Riparian Habitat Monitoring Program	17.3	29,920						53,500		83,420	32,696	50,724	41,710	41,710
5.1 Perform a Custom Flight to Acquire a High-Resolution 2022 Air Photo of the Prado Basin	1.3	2,464					13,500	13,500	(a)	15,964	11,386			
5.2 Catalog, and Review the Extent of the Riparian Vegetation in the 2022 Air Photo of the Prado Basin	3.5	6,306						0		6,306	6,104			
5.3 Collect, Check, and Upload 2022 Landsat NDVI Data to the PBHSP Database	9.8	16,412						0		16,412	15,206			
5.4 Conduct the Field Vegetation Monitoring for Summer 2022	2.8	4,738					40,000	40,000		44,738	0			
Task 6. Prepare Annual Report of the PBHSC	52.5	86,200						180		86,380	88,628	-2,248	43,190	43,190
6.1 Analyze Data and Prepare Admin Draft Report for CBWM/IEUA	38.0	59,984						0		59,984	63,060			
6.2 Meet with CBWM/IEUA to Review Admin Draft Report	2.0	4,120	90					90		4,210	4,090			
6.3 Incorporate CBWM/IEUA Comments and Prepare Draft Report: Submit Draft Report to PBHSC	5.0	8,176						0		8,176	7,904			
6.4 Meet with PBHSC to Review Draft Report	3.0	6,032	90					90		6,122	5,938			
6.5 Incorporate PBHSC Comments and Finalize Report	4.5	7,888						0		7,888	7,636			
Task 7. Project Management and Administration	10.3	19,840						90		19,930	20,102	-172	9,965	9,965
7.1 Prepare Scope and Budget for FY 2022/23	4.0	7,668						0		7,668	7,696			
7.2 Meet with PBHSC to Review Scope and Budget for FY 2022/23	3.3	6,436	90					90		6,526	6,862			
7.3 Project Administration and Financial Reporting	3.0	5,736						0		5,736	5,544			
Totals	195	\$ 174,548	\$ 395	120	0	\$ 53,775	0	\$ 54,950		\$ 229,498	\$ 172,471	\$ 57,026	\$ 95,938	\$ 133,560

(a) This is half of the cost for the outside professional. OCWD will pay the other half.

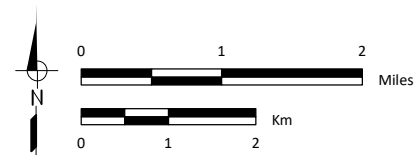


- Groundwater and Surface Water Monitoring Sites**
- PBHSP Well Site (High-Frequency Groundwater Levels)
 - POTW Discharge Outfall (Discharge and Surface Water Quality)
 - USGS Stream Gage Station (Discharge)
 - Watermaster Santa Ana River Sites - Maximum Benefit Monitoring (Surface Water Quality)
 - PBHSP Surface Water Site on Chino Creek (High-Frequency Temperature, EC, and Levels)
- Vegetation Field Survey Sites**
- Active Survey Location Last Monitored in 2019
 - Target Area for up to 3 New Survey Locations in 2022
- Other Features**
- Prado Basin Management Zone (Prado Basin)
 - Chino Basin Desalter Authority Well
 - Concrete-Lined Channels
 - Unlined Rivers and Streams



Author: VW
Date: 2/15/2022

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Prado Basin Habitat Sustainability Committee
Fiscal Year 2022/23 Scope and Budget



**Prado Basin Habitat Sustainability Program
Monitoring Sites - Fiscal Year 2022/23**

Figure 1