2016 Adaptive Management Plan

for the

Prado Basin Habitat Sustainability Program

August 1, 2016

Prepared for:

Inland Empire Utilities Agency
&
Chino Basin Watermaster

Prepared by:

Wildermuth Environmental, Inc.

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Acronyms, Abbreviations, and Initialisms

acre-ft/yr	acre-feet per year
AMP	Adaptive Management Plan
CBWM	Chino Basin Watermaster
IEUA	Inland Empire Utilities Agency
OBMP	Optimum Basin Management Plan
OCWD	Orange County Water District
PBHSC	Prado Basin Habitat Sustainability Committee
PBHSP	Prado Basin Habitat Sustainability Program
POTWs	Publically owned treatment works
SAR	Santa Ana River
SEIR	Subsequent Environmental Impact Report
TDS	Total Dissolved Solids
WEI	Wildermuth Environmental Inc.
MWDSC	Metropolitan Water District of Southern California

Section 1 – Background and Objectives

Pursuant to the monitoring and mitigation requirements of the Peace II Subsequent Environmental Impact Report (SEIR) (Tom Dodson, 2010), the Inland Empire Utilities Agency (IEUA) and the Chino Basin Watermaster (Watermaster) convened the Prado Basin Habitat Sustainability Committee (PBHSC) to develop the Prado Basin Habitat Sustainability Program (PBHSP). The PBHSP is an adaptive management program to ensure that the Prado Flood Control Basin (Prado Basin) riparian habitat will not incur unforeseeable significant adverse effects due to implementation of the Peace II Agreement (CBWM, 2007). The Adaptive Management Plan (AMP) described herein was developed to describe the PBHSP and facilitate its implementation.

1.1 Environmental Setting – Chino Basin and Prado Basin

Figure 1-1 shows the location of the Chino Basin in western Riverside and southwestern San Bernardino Counties within the central portion of the Santa Ana River Watershed. The Chino Basin is a large alluvial groundwater basin with storage in excess of five million acre-feet.

Figure 1-1 also shows the principal surface-water features that overlie the Chino Basin, including the Santa Ana River (SAR) and its tributaries to Prado Dam. The main tributaries that flow into the Prado Basin include the San Antonio/Chino Creeks, Cucamonga/Mill Creeks, and Temescal Creek that drains the Temescal Valley from the south. Flow within the middle SAR and its tributaries discharge into and through the Prado Basin behind Prado Dam, the main flood-control facility on the middle SAR. The US Army Corps of Engineers, in coordination with the Orange County Water District (OCWD), regulates releases from Prado Dam for the purposes of flood control and groundwater recharge in Orange County. The major components of flow within the SAR and its tributaries are: runoff from precipitation, discharge of tertiary-treated effluent from wastewater treatment plants, rising groundwater, discharge of untreated imported water for groundwater recharge, and other dry-weather runoff.

Figure 1-2 shows that the SAR and its tributaries are unlined across the Prado Basin, which allows for groundwater/surface-water interaction. Groundwater in Chino Basin generally flows from the forebay regions in the north towards Prado Basin in the south. Figure 1-3 shows that depth to groundwater is relatively shallow in the Prado Basin area, where groundwater losses can occur via evapotranspiration by riparian vegetation and rising-groundwater outflow to the SAR and its tributaries. Groundwater-modeling studies of Chino Basin have estimated that in 2011 groundwater losses were about 36,000 acre-ft/yr, with 18,000 acre-ft/yr lost to evapotranspiration and about 18,000 acre-ft/yr lost to rising-groundwater outflow (WEI, 2014). Most of these groundwater losses from Chino Basin occur in the Prado Basin area.

1.2 Chino Basin Judgment, OBMP, and Peace Agreement

A 1978 Judgment entered in the Superior Court of the State of California for the County of San Bernardino (Chino Basin Municipal Water District *v.* City of Chino et al.) established pumping and storage rights in the Chino Basin. The Judgment established the Watermaster to oversee the implementation of the Judgment, and provided Watermaster with the discretionary authority to develop an Optimum Basin Management Plan (OBMP) to maximize the beneficial use of the Basin. The OBMP was developed by Watermaster and the parties to the Judgment in the late 1990s (WEI, 1999). The OBMP mapped a strategy to provide for enhanced yield of the Chino Basin and reliable water supplies for the development that was expected to occur. The goals of the OBMP are: to enhance basin water supplies, to protect and enhance water quality, to enhance the management of the Basin, and to equitably finance the OBMP.

In 2000, the Chino Basin parties executed the so-called Peace Agreement (CBWM, 2000), which codified the Parties' intent to implement the OBMP. The Peace Agreement included an OBMP Implementation Plan, which outlined the time frames for implementing tasks and projects in accordance with the Peace Agreement and OBMP. The OBMP Implementation Plan is a comprehensive, long-range water-management plan for the Chino Basin and includes: the use of recycled water for direct reuse and artificial recharge, the capture of increased quantities of high-quality storm-water runoff, the recharge of imported water when total dissolved solids (TDS) concentrations are low, the desalting of poor-quality groundwater, the support of regulatory efforts to improve water quality in the Basin, and the implementation of management activities that will result in the reduced outflow of high-TDS/high-nitrate groundwater to the SAR, thus ensuring the protection of downstream beneficial uses in Orange County.

The IEUA, then named the Chino Basin Municipal Water District, is plaintiff in the legal action that resulted in the Judgment, and is the major regional wastewater treatment/recycling agency and wholesale supplemental-water supplier in the Chino Basin. For OBMP implementation, IEUA has served as the lead agency for compliance with the California Environmental Quality Act (CEQA). IEUA certified the Program Environmental Impact Report for the OBMP (SCH#2000041047) in July 2000 (Tom Dodson, 2000).

1.3 The Peace II Agreement and its Subsequent EIR

To further implement the goals and objectives of the OBMP, Watermaster executed the so-called Peace II Agreement in 2007, which modified the OBMP Implementation Plan (CBWM, 2007). The Peace II Agreement is an update and revision of the OBMP. In 2010, IEUA certified the Peace II SEIR (Tom Dodson, 2010) to address the potential significant adverse environmental impacts that could result from implementing the Peace II Agreement.

The Peace II SEIR describes the main activities of the Peace II Agreement:

> *Watermaster and the parties to the Judgment have been working to develop changes to the original Peace Agreement that, among other things, provide for Re-Operation and the attainment of hydraulic control for the Chino Groundwater Basin. "Hydraulic control" is defined as the reduction of groundwater discharge from the Chino North Management Zone to the Santa Ana River to de minimis quantities. Hydraulic control ensures that the water management activities in the Chino North Management Zone will not impair the beneficial*

> *uses designated for water quality of the Santa Ana River downstream of Prado Dam. "Re-Operation" means the increase in controlled overdraft of the Chino Basin, as defined in the Judgment, from 200,000 acre-ft over the period of 1978 through 2017 to 600,000 acre-ft through 2030. Both of these program components, hydraulic control through desalter expansion in the southwestern portion of the Chino Basin and Re-operation (controlled overdraft over the whole of the Chino Basin) are required to achieve hydraulic control, which is the primary objective of the Peace II Agreement. Hydraulic control would be achieved through expansion of the desalter program from its current approximate 27,000 acre feet per year (afy) of production to 40,000 afy, and additional groundwater extractions throughout the Basin to increase overdraft to 600,000 acre-feet (total cumulative overdraft) through 2030.*
>
> *The proposed project has two main features: the expansion of the desalter program such that the groundwater pumping for the desalters will reach 40,000 afy and that the pumping will occur in amounts and at locations (southwestern Chino Basin) that contribute to the achievement of hydraulic control; and the strategic reduction in groundwater storage (Re-Operation) by an additional 400,000 acre-feet (cumulative total overdraft of 600,000 through 2030) that, along with the expanded desalter program, substantially achieves hydraulic control for the Chino Groundwater Basin.*
>
> *Expansion of the desalter program would be accomplished with the installation and operation of a new well field, referred to as the Chino Creek Well Field (CCWF). The actual capacity of the CCWF will be determined during the design of the well field, but the available groundwater data estimates the capacity of this well field could range from about 5,000 acre-ft/yr to 7,700 acre-ft/yr […].*

One of the potential impacts of the Peace II activities described above is the lowering of groundwater levels (drawdown) in the Prado Basin area, which may impact riparian vegetation that is dependent upon groundwater. Watermaster performed modeling studies to predict the extent and magnitude of the drawdown associated with the implementation of the Peace II Agreement. Figure 1-4 (Figure 4.4-10 from the Peace II SEIR) shows the model-predicted drawdown in the Prado Basin area for the period of 2005-2030. In general, the drawdown in the Prado Basin area was predicted to be less than five feet by 2030.

The production capacity of the final CCWF is approximately 1,500 acre-ft/yr. This is significantly less than the planned capacity of 5,000 to 7,700 acre-ft/yr assumed in the Peace II SEIR. Figure 1-5 shows more recent model results of predicted change in groundwater levels in the Prado Basin area for the period of 2011-2030 assuming a final CCWF production capacity of 1,500 acre-ft/yr (WEI, 2014). In this scenario, groundwater levels are predicted to rise in the Prado Basin area by up to five feet by 2030.

To address the potential drawdown and its impact on riparian vegetation, the monitoring and mitigation requirements in the Peace II SEIR (Biological Resources/Land Use & Planning—Section 4.4-3) call for the development and implementation of an adaptive management program for the Prado Basin habitat—the PBHSP:

The Chino Basin Stakeholders are committed to ensuring that the Peace II Agreement actions will not significantly adversely impact the Prado Basin riparian habitat. This includes the riparian portions of Chino and Mill Creek's between the terminus of hard lined channels and Prado Basin proper.

The available modeling data in the SEIR indicates that Peace II Agreement implementation will not cause significant adverse effects on the Prado Basin riparian habitat. However, the following contingency measure will be implemented to ensure that the Prado Basin riparian habitat will not incur unforeseeable significant adverse effects, due to implementation of Peace II. IEUA, Watermaster, OCWD and individual stakeholders, that choose to participate, will jointly fund and develop an adaptive management program that will include, but not be limited to:

- *monitoring riparian habitat quality and extent;*
- *investigating and identifying essential factors to long-term sustainability of Prado Basin riparian habitat;*
- *identification of specific parameters that can be monitored to measure potential effects of Peace II Agreement implementation effects on Prado Basin; and*
- *identification of water management options to minimize the Peace II Agreement effects on Prado Basin.*

This adaptive management program will be prepared as a contingency to define available management actions by Prado Basin stakeholders to address unforeseeable significant adverse impacts, as well as to contribute to the long-term sustainability of the Prado Basin riparian habitat.

The above effort will be implemented under the supervision of a newly-formed Prado Basin Habitat Sustainability Committee. This Committee will include representatives from all interested parties and will be convened by the Watermaster and IEUA. Annual reports will be prepared and will include recommendations for ongoing monitoring and any adaptive management actions required to mitigate any measured loss or prospective loss of riparian habitat that may be attributable to the Peace II Agreement. As determined by Watermaster and IEUA, significant adverse impacts to riparian habitat that are attributable to the Peace II Agreement will be mitigated.

1.4 Adaptive Management Plan for the PBHSP

Pursuant to the monitoring and mitigation requirements stated above, IEUA and Watermaster convened three meetings of the PBHSC to develop the PBHSP.

The PBHSP is an adaptive management program that will answer the following questions to satisfy the monitoring and mitigation requirements of the Peace II SEIR:

1. *What are the factors that potentially can affect the extent and quality of the riparian habitat?*
2. *What is a consistent, quantifiable definition of "riparian habitat quality," including metrics and measurement criteria?*
3. *What has been the historical extent and quality of the riparian habitat in the Prado Basin?*
4. *How has the extent and quality of the riparian habitat changed during implementation of Peace II?*
5. *How have groundwater levels and quality, surface-water discharge, weather, and climate changed over time? What were the causes of the changes? And, did those changes result in an adverse impact to riparian habitat in the Prado Basin?*
6. *Are there other factors besides groundwater levels, surface-water discharge, weather, and climate that affect riparian habitat in the Prado Basin? What are those factors? And, did they (or do they) result in an adverse impact to riparian habitat in the Prado Basin?*
7. *Are the factors that result in an adverse impact to riparian habitat in the Prado Basin related to Peace II implementation?*
8. *Are there areas of prospective loss of riparian habitat that may be attributable to the Peace II Agreement?*
9. *What are the potential mitigation actions that can be implemented if Peace II implementation results in an adverse impact to the riparian habitat?*

IEUA and Watermaster prepared this AMP to answer the questions above and to facilitate the implementation the PBHSP.

This AMP is organized into the following sections:

Section 1 – Background and Objectives. This section describes the historical context for the AMP and its objectives.

Section 2 – Monitoring Program for the PBHSP. This section outlines the PBHSP monitoring program, which includes the monitoring of riparian habitat, groundwater, surface water, weather, and climate. Because the PBHSP monitoring program may adjust from year to year, the detailed description of the 2016 monitoring program has been included herewith as Appendix A.

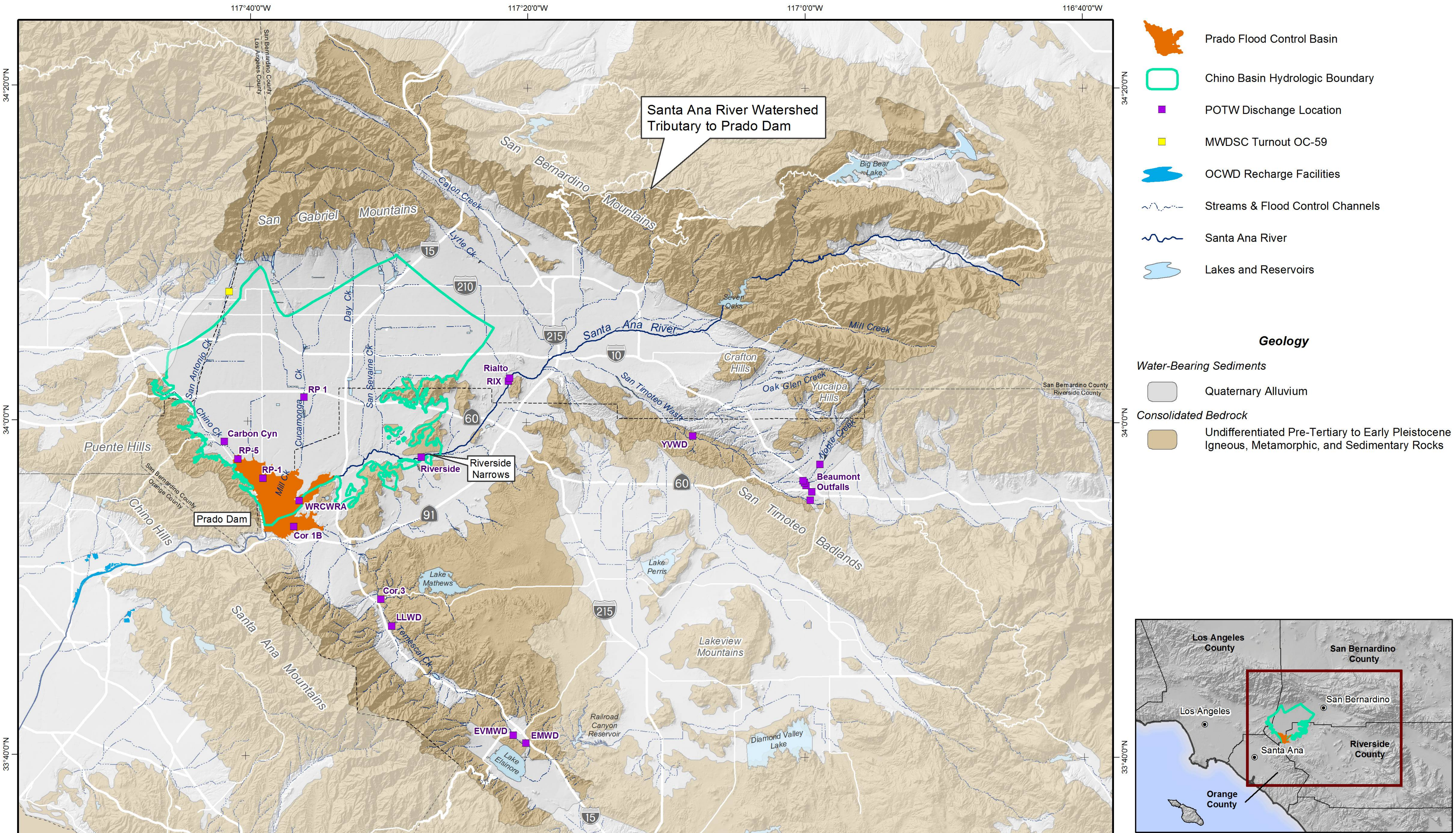
Section 3 – Predictive Groundwater Modeling. This section describes the needs and methods for predictive groundwater modeling to identify areas (if any) of prospective loss of riparian habitat due to the implementation of the Peace II Agreement.

Section 4 – Annual Reporting. This section describes the process for the annual review and analysis of the data generated from the PBHSP monitoring program and the annual reporting on results, interpretations, and recommendations.

Section 5 – Process to Revise the AMP. This section describes the process to revise the AMP in the future, if necessary.

Section 6 – Mitigation Measures. This section provides a list of potential strategies to mitigate adverse impacts to riparian habitat in Prado Basin in the event that such impacts are documented and attributed to the implementation of the Peace II Agreement.

Section 7 – References. This section lists the publications referenced within this document.



Prepared by:

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Date: 1/28/2016
File: Figure 1-1_SARWtrsd

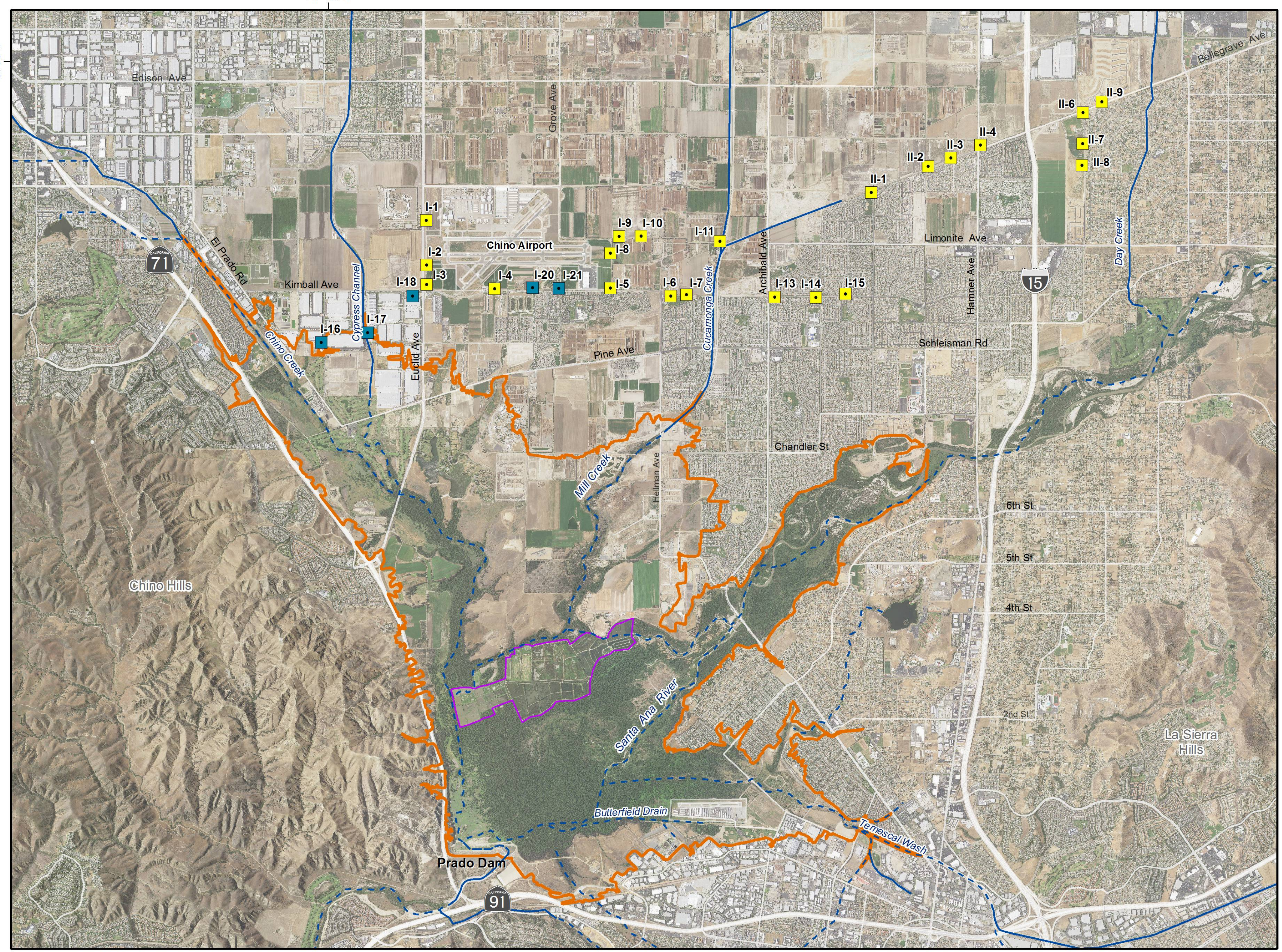
0 5 10 15 Miles

0 10 20 KM

2016 PBHSP Adaptive Managment Plan
Prado Basin Habitat Sustainability Committee

Santa Ana River Watershed Tributary to Prado Dam

Figure 1-1



Prado Flood Control Basin

Chino Basin Desalter Authority Well

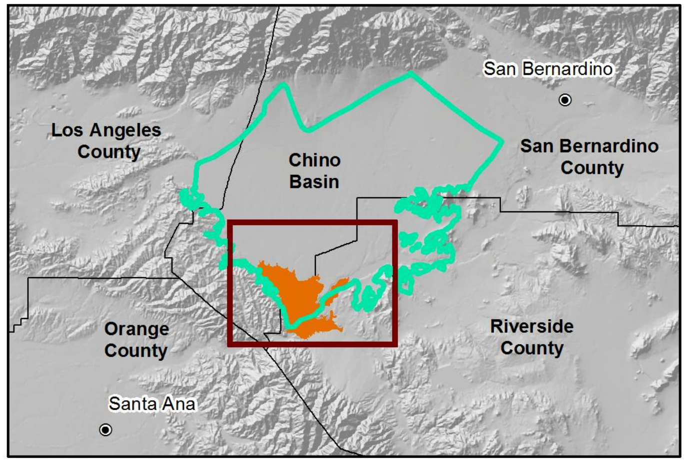
Chino Creek Well Field

OCWD Prado Wetlands

Concrete-Lined Channels

Unlined Rivers and Streams

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



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File: Figure 1-2_StudyArea

0 1 2 Miles

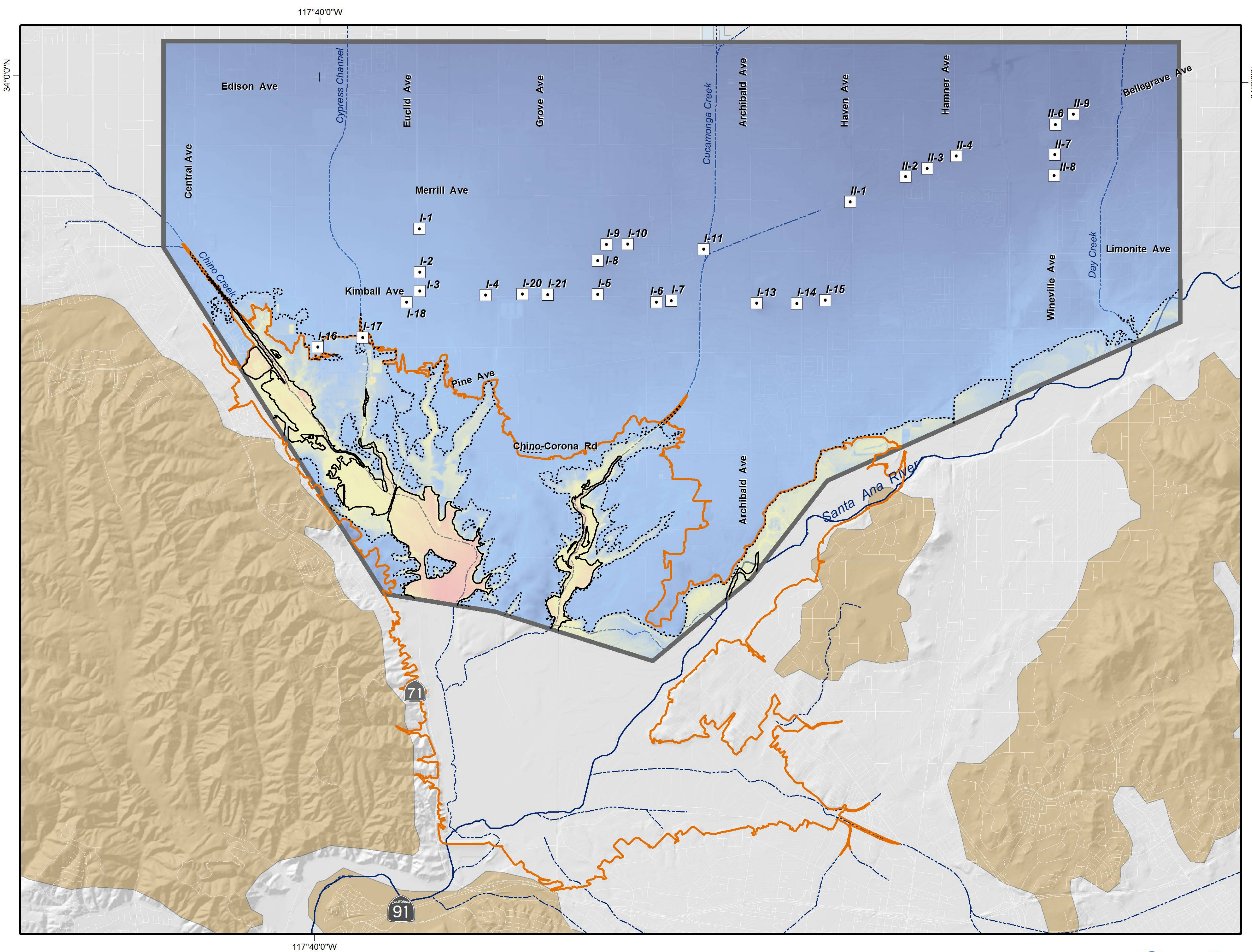
0 1 2 3 KM

2016 PBHSP Adaptive Managment Plan

Prado Basin Habitat Sustainability Committee

Prado Basin and the Chino Desalter Wells

Figure 1-2



Depth to Groundwater Spring 2011

(feet below ground surface)

-20 ft — Areas of rising groundwater
0
20 — +20 ft
+200 ft

Extent of Groundwater Level Data Used in Mapping Depth to Groundwater

Chino Desalter Well

Streams & Flood Control Channels

Santa Ana River

Prado Flood Control Basin

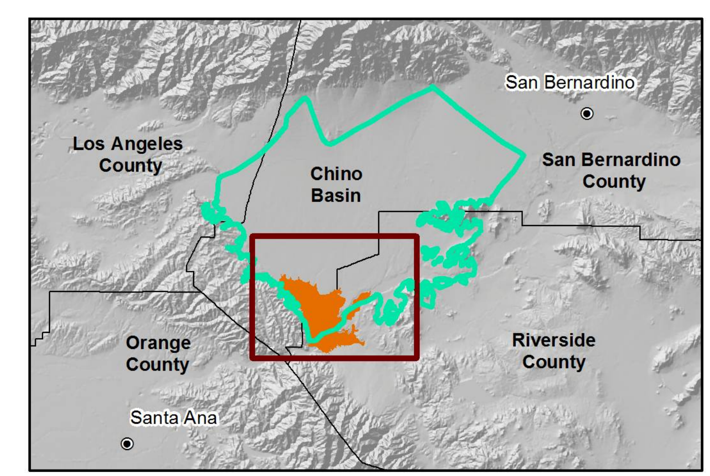
Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks



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File: Figure 1-3_DTW

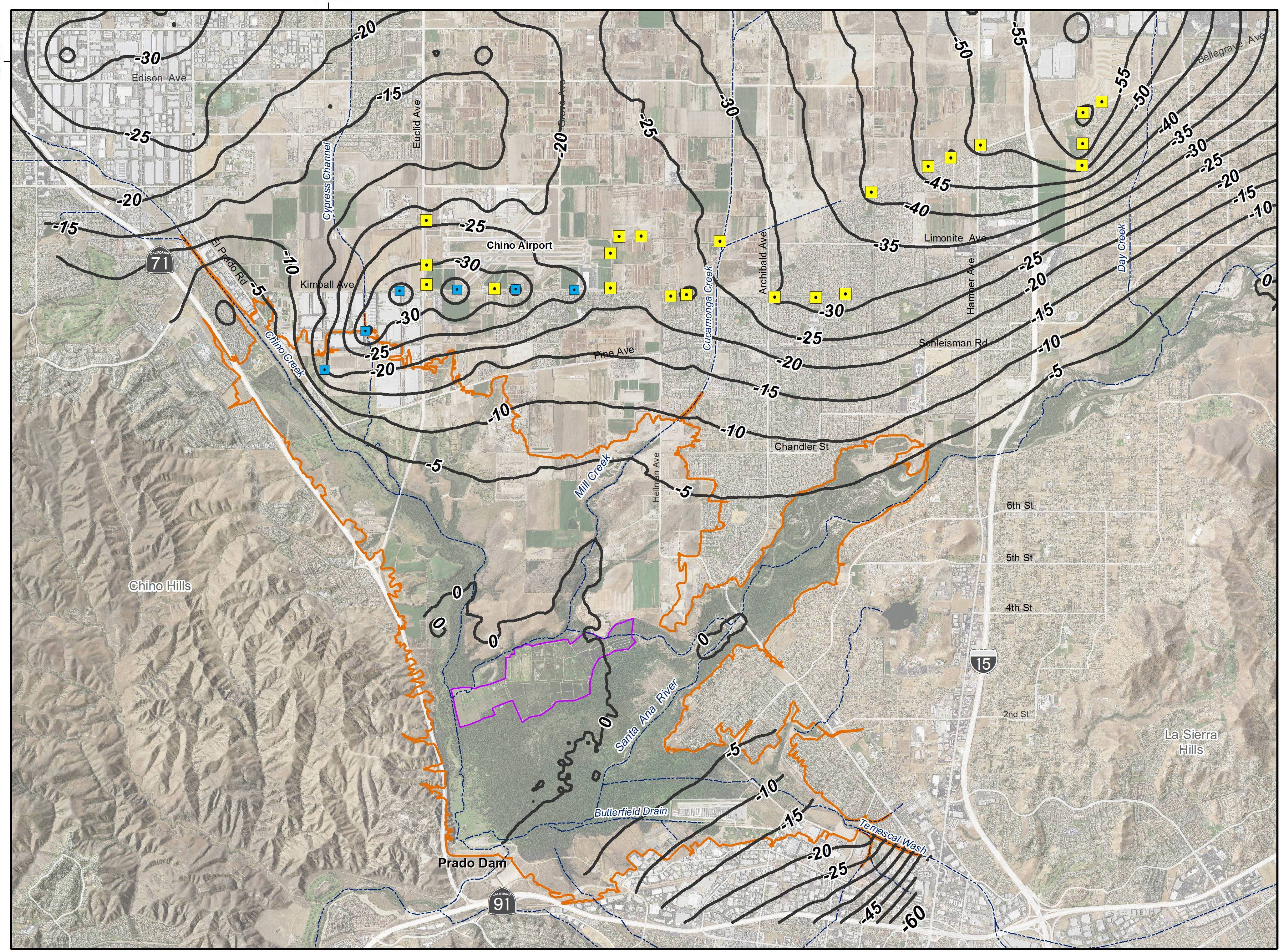
0 1 2 Miles

0 1 2 3 KM

2016 PBHSP Adaptive Managment Plan
Prado Basin Habitat Sustainability Committee

Depth to Groundwater for Spring 2011
Shallow Aquifer System

Figure 1-3



Change in Groundwater Levels *FY2005 to 2030, feet*

Prado Flood Control Basin

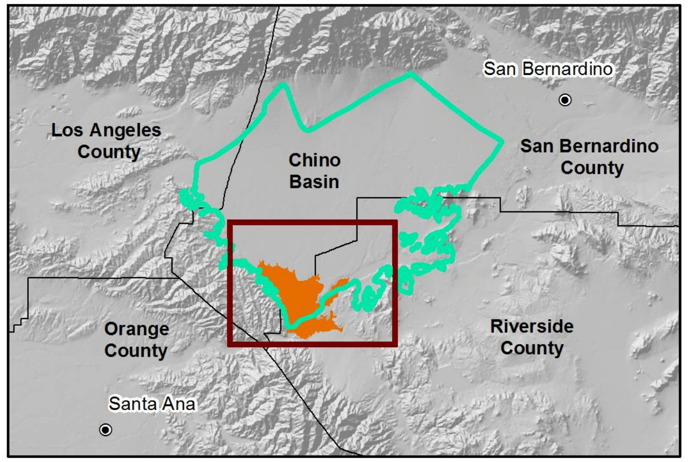
Chino Basin Desalter Authority Well

Chino Creek Well Field (as modeled for the Peace II SEIR)

OCWD Prado Wetlands

Rivers and Streams

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



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File: Figure 1-4_PeaceII_slideshow

0 1 2 Miles
0 1 2 3 KM

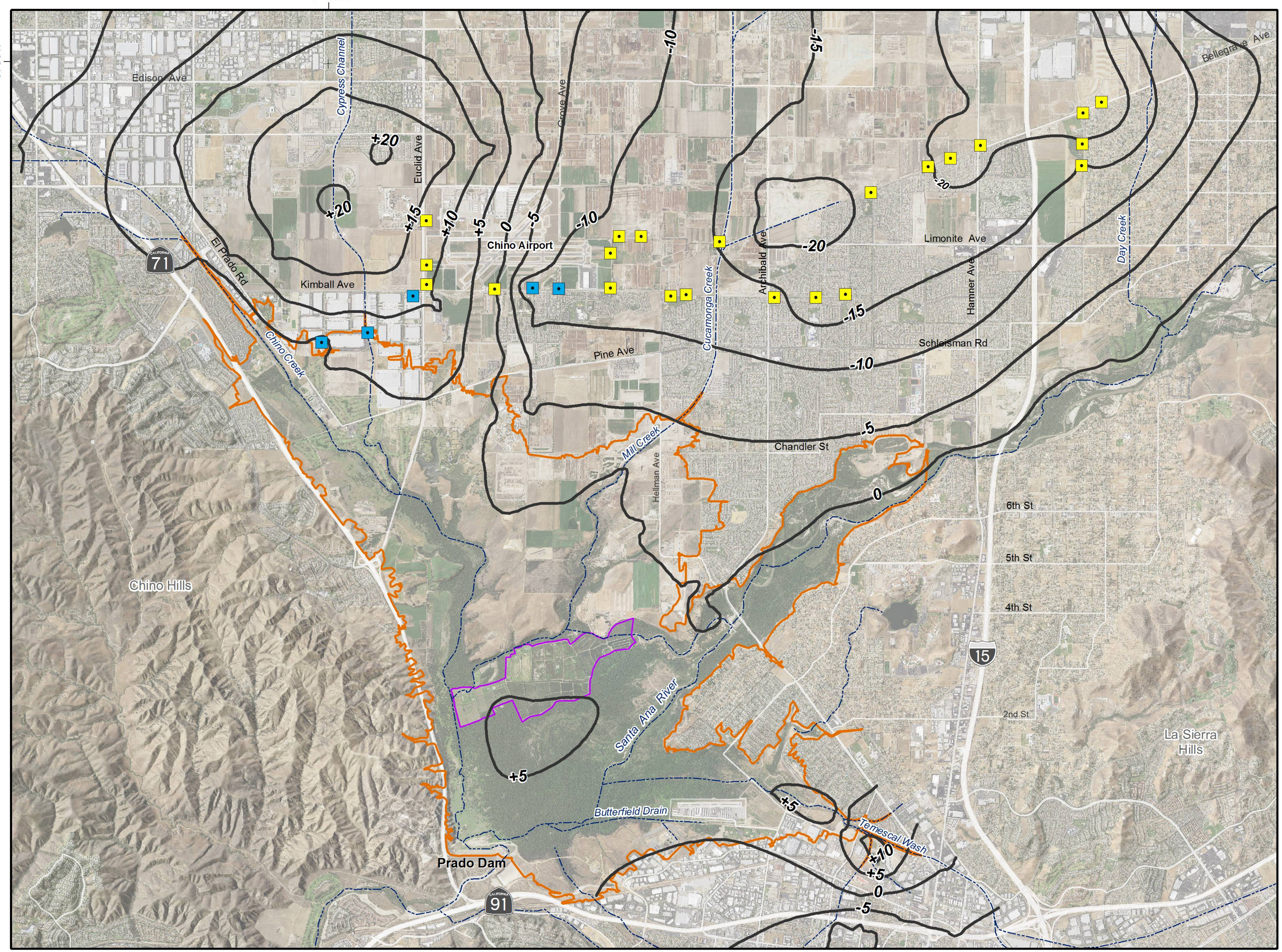
2016 PBHSP Adaptive Managment Plan
Prado Basin Habitat Sustainability Committee

Projected Change in Groundwater-Levels
FY2005 to 2030 -- Peace II Alternative

Figure 1-4

117°40'0"W

34°0'0"N



Change in Groundwater Levels
Spring 2011 to Spring 2030, feet

Prado Flood Control Basin

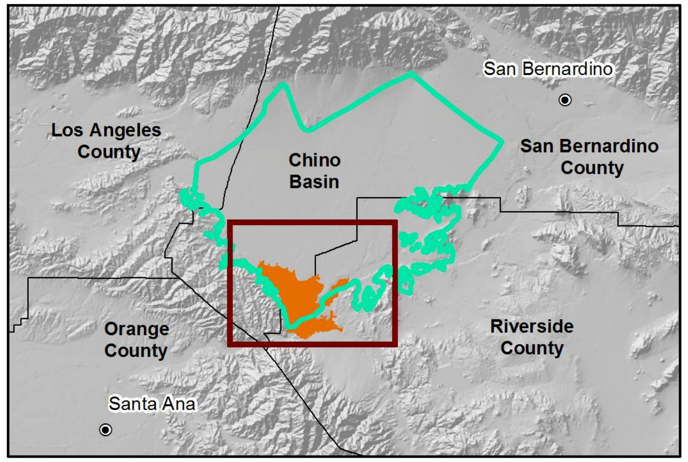
Chino Basin Desalter Authority Well

Chino Creek Well Field (actual)

OCWD Prado Wetlands

Rivers and Streams

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



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File: Figure 1-5_Scenario5a_slideshow

0 1 2 Miles

0 1 2 3 KM

2016 PBHSP Adaptive Managment Plan
Prado Basin Habitat Sustainability Committee

Projected Change in Groundwater-Levels

2011 to 2030 -- Senario 5A

Figure 1-5

Section 2 – Monitoring Program for the PBHSP

IEUA and Watermaster developed the initial monitoring program for the PBHSP. The intent of the monitoring program is to characterize the historical, current, and future extent and quality of riparian habitat in Prado Basin, and if the degradation of the riparian habitat is documented, to provide information on the cause(s) of that degradation. If the cause(s) of degradation are attributed to Peace II implementation, the data from the monitoring program will aid in the development of efficient and effective mitigation measures.

The design of the initial monitoring program was based on the answer to Question 1 from Section 1:

1. *What are the factors that potentially can affect the extent and quality of the riparian habitat?*

The main factors that potentially can affect riparian habitat in the Prado Basin include, but are not limited to: groundwater levels, surface-water discharge, weather events, and long-term climate. Therefore, the initial monitoring program must include, at a minimum, integrated programs for the monitoring of the riparian habitat, groundwater, surface-water, weather, and climate.

The monitoring data will be stored in a centralized, relational PBHSP database. The data will be analyzed, interpreted, and reported on annually. Annual reporting will form the basis to adjust the monitoring program in future years, if necessary, to achieve the objectives of the PBHSP. Each year, the monitoring program may increase, decrease, or remain unchanged based on the analysis of the data and model results within the annual report. Because the PBHSP monitoring program may adjust from year to year, the detailed description of the monitoring program is a stand-alone document. The 2016 PBHSP monitoring program is attached herewith as Appendix A.

Section 3 – Predictive Groundwater Modeling

The monitoring and mitigation requirements in the Peace II SEIR (Biological Resources/Land Use & Planning—Section 4.4-3) call for annual reporting for the PBHSP that will include the following:

> *Annual reports will be prepared and will include recommendations for ongoing monitoring and any adaptive management actions required to mitigate any measured loss or* ***prospective loss*** *of riparian habitat that may be attributable to the Peace II Agreement (emphasis added).*

The meaning of "prospective loss" in this context is "future potential loss" of riparian habitat. A method to identify areas of prospective loss of riparian habitat is to use Watermaster's groundwater model to predict groundwater-level changes within the Prado Basin under the current and projected future conditions in the Basin, including but not limited to, the plans for pumping, storm-water recharge and supplemental-water recharge.

Most recently, Watermaster's 2013 groundwater model was used to evaluate past and future conditions in the Chino Basin, including, but not limited to, net recharge, the state of hydraulic control, and time histories of groundwater levels and storage (WEI, 2014). Figure 1-5 shows the model results of predicted change in groundwater levels in the Prado Basin area over the period of 2011-2030 (WEI, 2014). In this scenario, groundwater levels are predicted to rise in the Prado Basin area by up to five feet by 2030, which is not suggestive of prospective loss of riparian habitat due to declining groundwater levels.

Under Watermaster's proposed 2015 Safe Yield Reset Agreement, Watermaster's groundwater model will be updated every five years at a minimum, starting in 2019/20. The model updates will utilize all available information collected since the prior update, including the data collected for the PBHSP. The model results will be used to project the future hydrology of the Chino Basin for the purpose of redetermination of Safe Yield. The model will also be updated periodically, and used for other purposes, including assessment of hydraulic control, management of land subsidence, assessment of the balance of recharge and discharge, among others.

For the PBHSP, the Watermaster's most recent predictive modeling results will be used to answer the following question from Section 1 of the AMP:

8. *Are there areas of prospective loss of riparian habitat that may be attributable to the Peace II Agreement?*

The model results will be mapped and analyzed to identify areas (if any) where groundwater levels are projected to decline to depths that may negatively impact the riparian habitat in Prado Basin. The results and interpretations of this effort will be included in the Annual Report.

Section 4 – Annual Reporting

The monitoring and mitigation requirements in the Peace II SEIR (Biological Resources/Land Use & Planning—Section 4.4-3) call for annual reporting for the PBHSP that will include the following:

> *Annual reports will be prepared and will include recommendations for ongoing monitoring and any adaptive management actions required to mitigate any measured loss or prospective loss of riparian habitat that may be attributable to the Peace II Agreement.*

4.1 Annual Report of the Prado Basin Habitat Sustainability Committee

During the fourth quarter of each calendar year, Watermaster and IEUA will analyze the data and information generated from the monitoring and modeling activities performed during the prior water year ending on September 30, and will prepare a draft *Annual Report of the Prado Basin Habitat Sustainability Committee* (Annual Report). The draft Annual Report will include the following sections:

Section 1 – Introduction. This section will describe the background and objectives of the PBHSP and the Annual Report.

Section 2 – Monitoring and Modeling Activities. This section will describe the monitoring and groundwater-modeling activities performed during the previous water year for the PBHSP.

Section 3 – Results and Interpretations. This section will discuss and interpret the monitoring data and groundwater-modeling results analyzed during the previous water year and prior years. The types of data graphics and tables prepared for this section may include, but will not be limited to, the following:

- Maps, charts, and/or tables that depict the extent and quality of the riparian habitat, and how the riparian habitat has changed over time.
- Maps, charts, and/or tables that describe the factors that influence the riparian habitat (e.g. groundwater, surface water, weather, and climate) and how these factors have changed over time, and are predicted to change over time.
- Maps, charts, and/or tables that describe the relationships between the factors that impact the riparian habitat and observed changes in the riparian habitat, if any.
- Maps, charts, and/or tables that describe the predictive model results for future groundwater levels in the Prado Basin, and identify areas of prospective loss of riparian habitat.

Section 4 – Conclusions and Recommendations. This section will summarize the main conclusions derived from the monitoring and modeling efforts through the previous water year, and will recommend activities for the monitoring program and annual reporting for the following fiscal year(s).

Section 5 – Mitigation Measures. This section will describe recommended measures to mitigate significant adverse impacts to the riparian habitat that have been attributed to Peace II implementation, if any. The Annual Report shall:

- Document the measured loss or prospective loss of riparian habitat.
- Describe how the implementation of the Peace II Agreement contributed to the measured or prospective loss of riparian habitat.
- Describe the specific mitigation measure(s), or the process and schedule to develop and implement mitigation measure(s), and how it is expected to mitigate the measured or prospective loss of riparian habitat.

Section 6 – Scope, Schedule, and Budget for Subsequent Fiscal Year. This section will describe scope-of-work, schedule, and budget for the PBHSP monitoring program, reporting, and mitigation measures for the subsequent fiscal year.

Section 7 – References. This section will list the publications cited in the report.

Appendix A – Monitoring Program for the PBHSP. This appendix will describe the current PBHSP monitoring program, which will include the recommended changes to the monitoring program described in *Section 4 – Conclusions and Recommendations*.

The draft Annual Report will be submitted to PBHSC members on or around January 31 of each year. Watermaster and IEUA will convene an annual meeting of the PBHSC in February of each year to review the draft Annual Report and call for comments and suggested revisions. Watermaster and IEUA will prepare a final Annual Report on or around April 1 of each fiscal year based on feedback from the PBHSC. The final Annual Report will be presented to the Watermaster and IEUA Boards for their receipt and filing by the end of each fiscal year (June 30).

4.2 Scope and Budget for Future Fiscal Years

Sections 4 and 5 of the draft Annual Report will describe recommended activities for the monitoring program, annual reporting, and mitigation measures, if any, for future fiscal year(s). Section 6 of the draft Annual Report will describe these recommendations in the form of a proposed scope-of-work, schedule, and budget. The recommended scope-of-work and budget will be included for consideration by the Watermaster Pool Committees, Advisory Committee and Watermaster Board (and IEUA if necessary) for revisions and approval, as part of its regular budget approval process. Watermaster's budgeting process typically occurs during the fourth quarter of each fiscal year, and will coincide with schedule for drafting and approval of the Annual Report, described in Section 4.1, above.

Section 5 – Process to Revise the AMP

The main goal of the AMP is to continually verify its protective nature against adverse impacts to the riparian habitat caused by the implementation of the Peace II Agreement. Initially, this verification is accomplished through monitoring and annual reporting, and revision of the monitoring program and/or the AMP when appropriate.

The process to revise the AMP begins with recommendations in the Annual Report. These recommendations may include, but are not limited to, adjustments to the annual reporting and/or the implementation of mitigation measures. It is the sole discretion of Watermaster and IEUA to implement the mitigation measures and/or other revisions to the AMP recommended in the Annual Report. Decisions regarding implementation of the mitigation measures and/or other revisions to the AMP will be made in good faith and coordinated with the Prado Basin Habitat Sustainability Committee. To the extent that the recommendations in the Annual Report does not follow the recommendations of the PBHSC, a written statement explaining the differences will be provided in the Annual Report by the Watermaster and IEUA. Adjustments to the PBHSP monitoring program will be documented in the Annual Report in *Appendix A – Monitoring Program for the PBHSP*, which will not be considered a revision to the AMP.

Upon the recommendation of the PBHSC, IEUA and Watermaster will prepare a draft revised AMP, addressing any recommendations in the Annual Report. IEUA and Watermaster staff will prepare staff reports describing the recommended changes to the AMP and their fiscal impact, for consideration by the Watermaster and IEUA Boards.

Section 6 – Mitigation Measures

The monitoring and mitigation requirements in the Peace II SEIR (Biological Resources/Land Use & Planning—Section 4.4-3) call for the:

> *[…] identification of water management options to minimize the Peace II Agreement effects on Prado Basin.*

And, they state that:

> *Annual reports will be prepared and will include recommendations for ongoing monitoring and any adaptive management actions required to mitigate any measured loss or prospective loss of riparian habitat that may be attributable to the Peace II Agreement. As determined by Watermaster and IEUA, significant adverse impacts to riparian habitat that are attributable to the Peace II Agreement will be mitigated.*

"Water management options" are herein referred to as "mitigation measures" and may include, but are not limited to, the following:

- Modification of groundwater production patterns, rates, and/or schedules.
- Modification of surface-water discharge in tributaries that flow through the Prado Basin.
- Targeted irrigation of impacted riparian habitat.

Specific mitigation measures will be developed and implemented to mitigate any measured loss or prospective loss of riparian habitat that is attributed to the implementation of the Peace II Agreement. Currently, there are no documented measured or prospective losses of riparian habitat that are attributable to the Peace II Agreement; hence, there are no mitigation measures being implemented. Future mitigation measures, if any, will be developed jointly by IEUA and Watermaster through the annual reporting process and will be recommended in the Annual Report.

The description of specific mitigation measures, if such measures are necessary, will be added to this section of AMP pursuant to the process described in *Section 5 – Process to Revise the AMP*.

Section 7 – References

Chino Basin Watermaster (CBWM). 2000. Peace Agreement, Chino Basin. SB 240104 v 1:08350.0001. 29 June 2000.

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Appendix A

2016 Monitoring Program for the PBHSP

2016

Monitoring Program for the

Prado Basin Habitat Sustainability Program

August 1, 2016

Prepared for:

Inland Empire Utilities Agency
&
Chino Basin Watermaster

Prepared by:

Wildermuth Environmental, Inc.

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Acronyms, Abbreviations, and Initialisms

AMP	Adaptive Management Plan
CBWM	Chino Basin Watermaster
CIMIS	California Irrigation Management Information System
CIWQS	California Integrated Water Quality System Project
GHCN	Global Historical Climatology Network
GMP	Groundwater Monitoring Program
IEUA	Inland Empire Utilities Agency
MPE	Multisensor Precipitation Estimator
NEXRAD	Next Generation Radar
NWIS	National Water Information System
NWS	National Weather Service
OCWD	Orange County Water District
PBHSC	Prado Basin Habitat Sustainability Committee
PBHSP	Prado Basin Habitat Sustainability Program
POTWs	Publically owned treatment works
RHMP	Riparian Habitat Monitoring Program
SAR	Santa Ana River
SWMP	Surface-Water Monitoring Program
TDS	Total Dissolved Solids
USBR	United States Bureau of Reclamation
USGS	United States Geological Survey
WCMP	Weather and Climate Monitoring Program
WEI	Wildermuth Environmental Inc.

Appendix A – 2016 Monitoring Program for the PBHSP

The Inland Empire Utilities Agency (IEUA) and the Chino Basin Watermaster (Watermaster) developed this initial monitoring program (2016 monitoring program) for the Prado Basin Habitat Sustainability Program (PBHSP). The intent of this monitoring program is to characterize the historical, current, and future extent and quality of the riparian habitat in Prado Basin, and if degradation of the riparian habitat is documented, to provide the data necessary to describe the cause(s) of that degradation. If the cause(s) of degradation is conclusively attributed to Peace II implementation (CBWM, 2007), then the data from the monitoring program will aid in the development of the most efficient and effective mitigation measures.

The monitoring data will be stored in a centralized, relational PBHSP database. The data will be analyzed, interpreted, and reported on annually pursuant to Section 4 of the Adaptive Management Plan (AMP) for the PBHSP. Annual reporting will form the basis to adjust the monitoring program in future years, if necessary, to achieve the objectives of the PBHSP. Each year, the monitoring program may increase, decrease, or remain unchanged based on the analysis of the data and model results within the annual report. Because the PBHSP monitoring program may adjust from year to year, the detailed description of the monitoring program is a stand-alone document. The 2016 monitoring program is described herein (Appendix A) and Exhibit A shows the main monitoring locations of the 2016 monitoring program.

The design of the 2016 monitoring program was based on the answers to Question [1] from Section 1 of the AMP:

1. *What are the factors that potentially can affect the extent and quality of the riparian habitat?*

The main factors that potentially can affect the riparian habitat in the Prado Basin include, but are not limited to: groundwater-levels, surface-water discharge, weather events, and the long-term climate. As such, the 2016 monitoring program includes integrated programs for the monitoring of the riparian habitat, groundwater, surface-water, weather, and climate.

A.1 Riparian Habitat Monitoring Program

The objective of the Riparian Habitat Monitoring Program (RHMP) is to collect data to help answer the following questions from Section 1 of the AMP:

2. *What is a consistent quantifiable definition of "riparian habitat quality," including metrics and measurement criteria?*
3. *What has been the historical extent and quality of the riparian habitat in the Prado Basin?*
4. *How has the extent and quality of the riparian habitat changed during the implementation of Peace II?*

To answer these questions, the RHMP will produce a time-series of data and information on the extent and quality of the riparian habitat.

The RHMP will be collaboratively prepared by the Watermaster, IEUA, and OCWD. Thus, the RHMP as described herein is conceptual, and is referred to as the "Conceptual RHMP." The Conceptual RHMP includes two main types of monitoring and assessment of the riparian habitat: regional and site-specific.

A.1.1 Regional Assessment of Riparian Habitat

The objective of the regional assessment of riparian habitat will be to identify regional changes in the extent and quality of the riparian habitat in Prado Basin. Two potential methods for the regional assessment of the riparian habitat are:

1. Periodic mapping of the extent and quality of the riparian habitat through GIS analysis of high-resolution air photos. This type of analysis has been performed previously in the Prado Basin for the IEUA (USBR, 2008a). IEUA has retained the USBR to conduct similar surveys in 2015, 2018, and 2021.

2. Periodic mapping of the extent and quality of the riparian habitat through GIS analysis of multi-spectral remote-sensing data. This type of analysis has been performed previously in the Prado Basin for OCWD (Intera, 2015).

A.1.2 Site-Specific Assessment of Riparian Habitat

The objectives of the site-specific assessment of riparian habitat will be to ground-truth the changes identified in the regional assessment of the riparian habitat and to characterize those changes.

The methods of site-specific monitoring and assessment can be qualitative (such as repeated terrestrial photography) and/or quantitative (such as vegetation surveys). These types of site-specific monitoring and assessment have been performed previously in the Prado Basin for IEUA through vegetation surveys (USBR, 2008b) and by OCWD in its seasonal photo-monitoring program (OCWD, 2015; Harvey, 2015). Figure A-1 shows a composite high-resolution air photo of the Prado Basin taken during May and June 2014 and the locations where existing or historical site-specific riparian habitat monitoring has been performed.

A.1.3 Collect and Compile Historical Vegetation Data

To definitively characterize the impacts of Peace II implementation on the riparian habitat, it is necessary to understand the long-term historical extent and quality of riparian habitat and the factors that have affected it. This understanding can only be achieved through analysis of the historical data.

Existing data and information that has been collected, analyzed, or can be analyzed, to characterize the historical extent and quality of riparian habitat in the Prado Basin will be compiled into the PBHSP database. This effort is necessary because the riparian habitat in the

Prado Basin has changed in response to long-term anthropogenic and natural factors. The Peace II Agreement was signed in 2007, but Basin Re-Operation and progress toward Hydraulic Control functionally began in 2000 when the Chino Desalter wells began pumping.

A.2 Groundwater Monitoring Program

The implementation of the Peace II Agreement will change groundwater levels in the Chino Basin, which may influence the extent and quality of riparian habitat in the Prado Basin. The objective of the Groundwater Monitoring Program (GMP) is to help answer the following questions from Section 1 of the AMP:

5. *How have groundwater levels and quality, surface-water discharge, weather, and climate changed over time? What were the causes of the changes? And, did those changes result in an adverse impact to riparian habitat in the Prado Basin?*

7. *Are the factors that result in an adverse impact to riparian habitat in the Prado Basin related to Peace II implementation?*

9. *What are the potential mitigation actions that can be implemented if Peace II implementation results in an adverse impact to the riparian habitat?*

The intent of the GMP is to create a time-series of groundwater-production, groundwater-level, and groundwater-quality data that, in conjunction with analytical tools, will be used answer the above questions. Figure A-2 shows the locations of the monitoring wells in the GMP. The wells listed in Table A-1 were installed specifically for the GMP. Those wells, plus HCMP-5/1 and RP2-MW3, are specifically being monitored for groundwater levels and quality as part of the PBHSP monitoring program.

The wells shown in Figure A-2 are symbolized by the type of data collected, which include:

- *Groundwater Production.* Groundwater production is a major stress that affects groundwater levels. Watermaster collects groundwater-production data quarterly from all active production wells within the Chino Basin. Production data from all active wells, including and between the Chino Basin Desalter Wells and Prado Dam, will be collected and analyzed for the PBHSP.

- *Groundwater Levels.* Declining groundwater levels can be a factor related to Peace II implementation that adversely impacts the riparian habitat. Watermaster collects groundwater-level data at various wells in the vicinity of the Prado Basin to support its various monitoring programs. At many wells, groundwater-level data are collected by pressure transducers once every 15 minutes, including all of the wells listed on Table A-1. These data are retrieved on a quarterly basis. At some wells, groundwater levels are measured and recorded monthly by manual methods.

- *Groundwater Quality.* Groundwater-quality data will be compared to surface-water quality data to characterize groundwater/surface-water interactions in the Prado Basin, which will help to determine whether and to what extent these interactions are important to the sustainability of the riparian habitat. The 2016 monitoring program for the PBHSP includes quarterly sampling and analysis at all 18 of the wells listed in Table A-1 for the chemical parameters listed in Table A-2. Future Annual Reports for the PBHSP will likely recommend changes to the frequency of sampling and the parameters analyzed. Watermaster also collects groundwater-quality data at other wells in the vicinity of the Prado Basin quarterly, annually and triennially to support its various monitoring programs. These other data may also be used in the analyses performed for the Annual Reports.

A.3 Surface-Water Monitoring Program

There are three primary components of surface-water discharge in the SAR and its tributaries above Prado Dam: storm flow, non-tributary flow, and base flow. Storm flow is rainfall runoff. Non-tributary flow typically originates from outside the watershed, such as imported water, or is an episodic transfer of water within the watershed. Base flow is the remainder and mainly includes tertiary-treated wastewater discharge from Publicly-Owned Treatment Works (POTWs), rising groundwater, and dry-weather runoff. Surface-water discharge that flows into the Prado Basin is either lost to evapotranspiration, percolates to groundwater, or becomes impounded behind Prado Dam. The US Army Corps of Engineers, in coordination with OCWD, controls the release of surface water through Prado Dam to Orange County.

The surface-water hydrology of the southern Chino Basin affects riparian habitat in the Prado Basin. For example, flood events can inundate portions of the Prado Basin and damage the riparian habitat. Surface water can also provide source water that supports riparian habitat. The full implementation of the Peace II Agreement will change groundwater levels in the Chino Basin, which may change the surface-water hydrology in the southern Chino Basin and in turn, may influence the extent and quality of riparian habitat in the Prado Basin. The surface-water hydrology must be tracked to ascertain its impact on the riparian habitat relative to other factors.

The objective of the Surface-Water Monitoring Program (SWMP) is to help answer the following questions from Section 1 of the AMP:

5. *How have groundwater levels and quality, surface-water discharge, weather, and climate changed over time? What were the causes of the changes? And, did those changes result in an adverse impact to riparian habitat in the Prado Basin?*

7. *Are the factors that result in an adverse impact to riparian habitat in the Prado Basin related to Peace II implementation?*

9. *What are the potential mitigation actions that can be implemented if Peace II implementation results in an adverse impact to the riparian habitat?*

The intent of the SWMP is to create a time-series of surface-water parameters in the vicinity of the Prado Basin that, in conjunction with analytical tools, can be used to answer the above questions. The main surface-water parameters of interest include discharge in the SAR and its tributaries, the reservoir elevation behind Prado Dam, and water quality. No new surface-water monitoring sites are proposed as part of the 2016 PBHSP monitoring program. The SWMP will leverage publically-available datasets to create a historical and ongoing time-series of these parameters. Specific data sources include:

1. The United States Geological Survey (USGS) collects and compiles daily surface-water discharge rates and water-quality data at seven monitoring stations along the SAR and its tributaries in the vicinity of the Prado Basin. These data will be collected from the USGS's National Water Information System (NWIS). Figure A-3 shows the monitoring station locations. Table A-3 summarizes the data available from each of the USGS sites.

2. POTWs located upstream of Prado Dam record discharge rates and water-quality data for tertiary-treated effluent discharged to the SAR and its tributaries. Data already recorded by the POTWs will be collected and compiled quarterly from the State Water Resources Control Board's California Integrated Water Quality System Project (CIWQS) online database. Figure A-3 shows the POTW discharge outfall locations. Table A-4 lists the monitoring sites for the POTW discharge outfalls. Table A-5 summarizes the frequency that grab-sample parameters are collected from each of the POTWs sites and Table A-6 lists the parameters and calculation types available from composite-sample data measured at each of the POTWs sites.

3. Watermaster measures surface-water quality quarterly at two sites along the SAR as part of its Chino Basin Maximum Benefit Monitoring Program pursuant to the 2014 Work Plan (WEI, 2013). Figure A-3 shows the monitoring site locations. Table A-7 lists the analytes collected at these sites.

4. The US Army Corps of Engineers measures and records the elevation of the reservoir behind Prado Dam.

A.4 Weather and Climate Monitoring Program

Weather and climate are factors that can affect riparian habitat in the Prado Basin. Parameters that describe weather and climate are: air temperature, precipitation, humidity, solar radiation, and wind. The difference between weather and climate is duration. Weather is the atmospheric conditions over short periods of time (i.e. minutes to months). Climate describes the long-term behavior of atmospheric conditions (i.e. years to decades). Weather and climate are not factors related to Peace II implementation. That said, the historical, current, and future conditions for weather and climate must be characterized to ascertain their impact on riparian habitat in the Prado Basin relative to other factors.

The objective of the Weather and Climate Monitoring Program (WCMP) is to help answer the following questions from Section 1 of the AMP:

5. *How have groundwater levels and quality, surface-water discharge, weather, and climate*

changed over time? What were the causes of the changes? And, did those changes result in an adverse impact to riparian habitat in the Prado Basin?

7. *Are the factors that result in an adverse impact to riparian habitat in the Prado Basin related to Peace II implementation?*

9. *What are the potential mitigation actions that can be implemented if Peace II implementation results in an adverse impact to the riparian habitat?*

The WCMP of the PBHSP includes the monitoring of the following parameters in the vicinity of the Prado Basin: precipitation, temperature, and potential evapotranspiration. The WCMP will leverage publically-available datasets that are published online to create a historical and ongoing time-series of these parameters. Figure A-4 shows the locations of the climatic monitoring stations.

Two types of publically-available climatic datasets will be collected and compiled:

- *Time-series data measured at weather stations.* Available data will be acquired from monitoring stations in the Global Historical Climatology Network (GHCN), the National Weather Service (NWS) Cooperative Observer Program, the California Irrigation Management Information System (CIMIS), and the San Bernardino County Flood Control District (SBCFCD).

  The data from GHCN stations include: precipitation (daily), evaporation (daily), minimum temperature (daily), and maximum temperature (daily) from 1900 to the present. The data from NWS stations include: 15-minute and hourly precipitation from 1900 to the present. Based on their proximity to the Prado Basin and the quality of the historical data, the most important stations in these programs for the PBHSP are:

  - Prado Dam
  - Ontario Airport
  - Chino Airport
  - San Bernardino Hospital

  Data from CIMIS stations include: daily maximum and minimum values for measured parameters (air temperature, relative humidity, solar radiation, and wind speed) and calculated parameters (reference evapotranspiration [ETo], net radiation, and dew point temperature). Based on their proximity to the Prado Basin and the quality of the historical data, the most important CIMIS stations for the PBHSP are:

  - Pomona

- Riverside

- *Spatially-gridded datasets*. Available data come from radar scans of the high-resolution Multisensor Precipitation Estimator (MPE, also known as NEXRAD Stage IV) and from the PRISM Climate Group.

  The NEXRAD datasets include: hourly, 6-hour interval, and daily precipitation on a 4-kilometer grid within the continental US from 2002 to the present.

  The PRISM datasets include: monthly precipitation, minimum temperature, and maximum temperature on an 800-meter grid within California from 1895 to present. Figure A-4 displays an example of a gridded dataset of annual precipitation from PRISM across the Chino Basin area.

A.5 Other Factors that can Affect the Riparian Habitat

There are other potential factors that can affect riparian habitat in the Prado Basin. These factors may include, but are not limited to: fire, disease, pests, invasive species, and anthropogenic activities. To the extent necessary and possible, information on other factors that can affect the riparian habitat will be collected, compiled, and analyzed in the annual reporting described in Section 4 of the AMP.

The objective of this effort is to help answer the following question from Section 1 of the AMP:

6. *Are there other factors besides groundwater levels, surface-water discharge, weather, and climate that affect riparian habitat in the Prado Basin? What are those factors? And, did they (or do they) result in an adverse impact to riparian habitat in the Prado Basin?*

A.6 PBHSP Database

All data, information, imagery, and GIS layers collected under the monitoring program will be uploaded into a centralized, relational PBHSP database maintained by Watermaster. The database will be made available to the Prado Basin Habitat Sustainability Committee (PBHSC) upon request. Private well information obtained by Watermaster will be excluded from the PBHSP database unless authorization is obtained through Watermaster's process to release such information.

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Table A-1
Monitoring Wells Installed for the
Monitoring Program for the Prado Basin Habitat Sustainability Program

Well Name	Well Owner	Latitude	Longitude	Ground Surface Elevation	Reference Point Elevation	Well Depth	Nominal Well Diameter	Minimum Perforation Depth	Maximum Perforation Depth
		decimal degrees	*decimal degrees*	*ft-bgs*	*ft-bgs*	*ft-bgs*	*inches*	*ft-bgs*	*ft-bgs*
PB-1/1	IEUA	33.935322	-117.622051	536.65	538.32	60	4	25	55
PB-1/2	IEUA	33.935322	-117.622051	536.99	538.67	100	4	75	95
PB-2	IEUA	33.953535	-117.611258	575.22	577.02	67	4	42	62
PB-3/1	IEUA	33.940928	-117.588583	584.13	583.13	60	4	44.5	54.5
PB-3/2	IEUA	33.940928	-117.588583	583.96	583.96	105	4	80	100
PB-4/1	IEUA	33.951528	-117.559210	579.67	581.27	30	4	15	25
PB-4/2	IEUA	33.951528	-117.559210	579.72	581.34	70	4	45	75
PB-5/1	IEUA	33.921525	-117.628847	525.75	527.5	55	4	30	50
PB-5/2	IEUA	33.921525	-117.628847	525.8	527.58	85	4	60	80
PB-6/1	IEUA	33.930003	-117.639720	520.08	521.74	45	4	30	40
PB-6/2	IEUA	33.930003	-117.639720	520.25	521.72	95	4	58.5	88.5
PB-7/1	IEUA	33.941830	-117.654240	517.68	520.03	20	4	10	15
PB-7/2	IEUA	33.941830	-117.654240	517.94	520.06	90	4	60	85
PB-8	IEUA	33.952388	-117.669068	537.22	536.95	95	4	60	90
PB-9/1	IEUA	33.963099	-117.677509	560.31	561.95	45	4	30	40
PB-9/2	IEUA	33.963099	-117.677509	560.4	562.17	100	4	70	95

Table A-2
Groundwater Quality Analyte List
Monitoring Program for the Prado Basin Habitat Sustainability Program

Analyte	MRL	Units	Analysis Method
Alkalinity in CaCO3 units	2	mg/L	SM2320B
Ammonia Nitrogen	0.05	mg/L	EPA 350.1
Arsenic Total ICAP/MS	1	ug/L	EPA 200.8
Bicarbonate as HCO3 *Calculated*	2	mg/L	SM2320B
Boron Total ICAP	0.05	mg/L	EPA 200.7
Calcium Total ICAP	1	mg/L	EPA 200.7
Carbonate as CO3 *Calculated*	2	mg/L	SM2320B
Chloride	1	mg/L	EPA 300.0
Chromium Total ICAP/MS	1	ug/L	EPA 200.8
Fluoride	0.05	mg/L	SM 4500-C
Hexavalent Chromium (Dissolved)	0.02	ug/L	EPA 218.6
Hydroxide as OH *Calculated*	2	mg/L	SM2320B
Kjeldahl Nitrogen	0.2	mg/L	EPA 351.2
Magnesium Total ICAP	0.1	mg/L	EPA 200.7
Nitrate as Nitrogen by IC	0.1	mg/L	EPA 300.0
Nitrate as NO3 *Calculated*	0.44	mg/L	EPA 300.0
Nitrite as Nitrogen by IC	0.05	mg/L	EPA 300.0
Organic Nitrogen *Calculated*	0.2	mg/L	EPA 351.2
Perchlorate	4	ug/L	EPA 314.0
pH (H3=past HT not compliant)	0.1	Units	SM4500-HB
Potassium Total ICAP	1	mg/L	EPA 200.7
Sodium Total ICAP	1	mg/L	EPA 200.7
Specific Conductance, 25 C	2	umho/cm	SM2510B
Sulfate	0.5	mg/L	EPA 300.0
Silica	0.5	mg/L	EPA 200.7
Total Dissolved Solids (TDS)	10	mg/L	E160.1/SM2540C
Total Hardness as CaCO3 by ICP *Calcula*	3	mg/L	SM 2340B
Total Organic Carbon	0.3	mg/L	SM5310C/E415.3
Turbidity	0.05	NTU	EPA 180.1
Volatile Organic Compounds		ug/L	EPA 524.2
1,2,3-Trichloropropane (Low Level)	0.01	ug/L	CASRL-524M-TCP

Table A-3
Parameters Measured at USGS Gaging Stations
Monitoring Program for the Prado Basin Habitat Sustainability Program

Parameter	Measurement Frequency at USGS Gaging Stations*					
	SAR at MWD Xing	Temescal Creek above Main Street	San Antonio Creek at Riverside Drive	Chino Creek at Schaeffer Avenue	Cucamonga Creek	Santa Ana River below Prado Dam
Absorbance, 254 nm						irregular
Absorbance, UV, organic constituents, 280 nm, 1 cm path length						irregular
Alkalinity, field as calcium carbonate						irregular
Alkalinity, laboratory as calcium carbonate						irregular
Aminomethylphosphonic acid, filtered (0.7 micron glass fiber filter), recoverable						irregular
Ammonia as N						irregular
Ammonia as NH4						irregular
Ammonia plus organic nitrogen, as N, filtered						irregular
Ammonia plus organic nitrogen, as N, unfiltered						irregular
Arsenic						irregular
Barometric pressure						irregular
Bicarbonate						irregular
Boron						irregular
Calcium						irregular
Carbon dioxide, water						irregular
Carbonate						irregular
Chloride						irregular
Cloud cover, percent						irregular
Discharge (mean)	daily	daily	daily	daily	daily	daily
Dissolved oxygen						irregular
Dissolved oxygen, unfiltered, percent of saturation						irregular
Dissolved solids dried at 180 degrees Celsius	irregular					irregular
Dissolved solids	irregular					irregular
Fluoride						irregular
Gage height	instantaneous (15-min)	irregular		irregular	irregular	irregular
Glufosinate, (0.7 micron glass fiber filter), recoverable						irregular
Glyphosate (0.7 micron glass fiber filter), recoverable						irregular
Hardness as calcium carbonate						irregular
Hydrogen ion						irregular
Iron						irregular
Lithium						irregular
Magnesium						irregular
Nitrate as N						irregular
Nitrate plus nitrite, as N						irregular
Nitrate as nitrate						irregular
Nitrite as N						irregular
Nitrite as nitrite						irregular
Noncarbonate hardness as calcium carbonate, field						irregular
Noncarbonate hardness as calcium carbonate, lab						irregular
Organic carbon						irregular
Organic nitrogen as N, filtered						irregular
Organic nitrogen as N, unfiltered						irregular
Orthophosphate as phosphorus						irregular
Orthophosphate as PO4,						irregular
Particulate nitrogen, suspended						irregular
pH, field						irregular
pH, laboratory						irregular
Phosphorus as phosphorus, filtered						irregular

Table A-3

Parameters Measured at USGS Gaging Stations

Monitoring Program for the Prado Basin Habitat Sustainability Program

Parameter	Measurement Frequency at USGS Gaging Stations*					
	SAR at MWD Xing	Temescal Creek above Main Street	San Antonio Creek at Riverside Drive	Chino Creek at Schaeffer Avenue	Cucamonga Creek	Santa Ana River below Prado Dam
Phosphorus as phosphorus, unfiltered						irregular
Potassium						irregular
Ratio of particulate nitrogen to particulate organic carbon						irregular
Selenium						irregular
Silica as SiO2						irregular
Sodium adsorption ratio						irregular
Sodium fraction of cations						irregular
Sodium						irregular
Specific conductance, field	irregular					irregular
Specific conductance, laboratory	irregular					irregular
Specific UV Absorbance, 254 nm, 1 cm path length, calculated						irregular
Stream width	irregular					irregular
Strontium						irregular
Sulfate						irregular
Suspended sediment concentration						irregular
Suspended sediment discharge						irregular
Suspended sediment, sieve diameter, percent smaller than 0.0625 millimeters						irregular
Temperature, air	irregular					irregular
Temperature, water	irregular					irregular
Total carbon [inorganic plus organic], suspended sediment						irregular
Total dissolved solids						irregular
Total inorganic carbon, suspended sediment						irregular
Total nitrogen [nitrate + nitrite + ammonia + organic-N], analytically determined						irregular
Total nitrogen [nitrate + nitrite + ammonia + organic-N], filtered						irregular
Total nitrogen [nitrate + nitrite + ammonia + organic-N], unfiltered						irregular
Total organic carbon, suspended sediment						irregular
Turbidity, unfiltered						irregular
Vanadium						irregular
Velocity at point in stream	irregular					irregular
Weather, World Meteorological Organization code	irregular					irregular
Wind speed						irregular

* "Irregular" frequency is typically several times per month

Table A-4
Monitoring Sites for POTW Discharge Outfalls Tributary to Prado Dam
Monitoring Program for the Prado Basin Habitat Sustainability Program

POTW	Monitoring Site	Site Type	Associated Effluent Monitoring Site	Receiving Water	Site Description
City of Corona WWTP #1	M-001	Effluent Monitoring	001	Reach 3 of Santa Ana River	Tertiary effluent to Butterfield Drain (to Temescal Creek) after dechlorination chamber
	R-001D	Receiving Water Monitoring	001	Prado Basin	500 feet downstream of outfall to Butterflied Drain
	R-001U	Receiving Water Monitoring	001	Prado Basin	100 feet upstream of outfall to Butterfield Drain
Western Riverside County Regional Wastewater Treatment Plant (WRCRWTP)	M-001	Effluent Monitoring	001	Prado Basin Management Zone and Reach 3 of the Santa Ana River	Effluent pump station for discharge to Reach 3 of Santa Ana River
	R-001D	Receiving Water Monitoring	None	Santa Ana River Reach 3	Receiving water, 500 feet downstream of the discharge to Reach 3 of Santa Ana River
	R-001U	Receiving Water Monitoring	None	Santa Ana River Reach 3	Receiving water, approximately 100 feet upstream of the discharge to Reach 3 of Santa Ana River
City of Riverside Regional Water Quality Control Plant (RCWRF)	M-001A	Effluent Monitoring	001, 002	Santa Ana River Reach 3	Effluent to Reach 3 of Santa Ana River, close to the end of effluent pipeline
	M-001B	Effluent Monitoring	001, 002	Santa Ana River Reach 3	At the end of the chlorine contact tank 3. This station is for coliform testing
	R-001D	Receiving Water Monitoring	None	Santa Ana River Reach 3	Santa Ana River, downstream of the most downstream point of discharge
	R-001U	Receiving Water Monitoring	None	Santa Ana River Reach 3	Receiving surface water, upstream of Santa Ana River at the Metropolitan Water District pipeline crossing
RIX	M-001	Effluent Monitoring	001	Santa Ana River Reach 4, which overlies the Riverside-A Groundwater Management Zone	Extracted tertiary treated and disinfected effluent
Rialto	M-001	Effluent Monitoring	001	Lined flood control channel tributary to Santa Ana River, Reach 4, which overlies the Riverside-A Groundwater Management Zone	Final effluent downstream of dechlorination
	M-001A	Effluent Monitoring	001	"	Immediately downstream of filters
	M-001B	Effluent Monitoring	001	"	Discharge weir of chlorine contact tank
IEUA	M-001A	Effluent Monitoring	001	Prado Park Lake	RP-1 effluent Outfall to Prado Park Lake
	M-001B	Effluent Monitoring	001	N/A	At the RP-1 splitter box
	M-002A	Effluent Monitoring	002	Reach 1 of Cucamonga Creek	RP-1 and RP-4 Effluent outfall to Reach 1 of Cucamonga Creek
	M-003	Effluent Monitoring	003	Reach 2 of Chino Creek	RP-5 Effluent to Reach 2 of Chino Creek
	M-004	Effluent Monitoring	004	Reach 2 of Chino Creek	CCWRF Effluent to Reach 2 of Chino Creek
	R-002D	Receiving Water Monitoring	002	Cucamonga Creek	Cucamonga Creek within 500 feet downstream of DP 002 after blending
	R-002U	Receiving Water Monitoring	002	Cucamonga Creek	Cucamonga Creek within 100 feet upstream of the DP 002
	R-003D	Receiving Water Monitoring	003	Chino Creek	Chino Creek within 500 feet downstream of DP 003 in
	R-003U	Receiving Water Monitoring	003	Chino Creek	Chino Creek within 100 feet upstream of DP 003
	R-004U	Receiving Water Monitoring	004	Chino Creek	Chino Creek within 100 feet upstream of DP 004

Table A-5
Grab-Sample Parameters Measured at POTW Outfalls
Monitoring Program for the Prado Basin Habitat Sustainability Program

Parameter	Corona			WRCRWTP			RCWRF				RIX	Rialto		IEUA									
	M-001	R-001D	R-001U	M-001	R-001D	R-001U	M-001A	M-001B	R-001D	R-001U	M-001	M-001	M-001B	M-001A	M-001B	M-002A	M-003	M-004	R-002D	R-002U	R-003D	R-003U	R-004U
1,1,1-Trichloroethane			Quarterly	Annual			Annual			Annual													
1,1,2,2-Tetrachloroethane			Quarterly	Annual			Annual			Annual													
1,1,2-Trichloroethane			Quarterly	Annual			Annual			Annual													
1,1-Dichloroethane			Quarterly	Annual			Annual			Annual													
1,1-Dichloroethylene			Quarterly	Annual			Annual			Annual													
1,2,4-Trichlorobenzene			Quarterly	Annual			Annual			Annual													
1,2-Dichlorobenzene			Quarterly	Annual			Annual			Annual													
1,2-Dichloroethane			Quarterly	Annual			Annual			Annual													
1,2-Dichloropropane			Quarterly	Annual			Annual			Annual													
1,2-Diphenylhydrazine			Quarterly	Annual			Annual			Annual													
1,3-Dichlorobenzene			Quarterly	Annual			Annual			Annual													
1,3-Dichloropropylenes, Sum			Quarterly	Annual			Annual			Annual													
1,4-Dichlorobenzene			Quarterly	Annual			Annual			Annual													
2,3,7,8-TCDD (Dioxin)	Monthly		Quarterly	Annual			Quarterly																
2,4,6-Trichlorophenol			Quarterly	Annual			Annual			Annual													
2,4-Dichlorophenol			Quarterly	Annual			Annual			Annual													
2,4-Dimethylphenol			Quarterly	Annual			Annual			Annual													
2,4-Dinitrophenol			Quarterly	Annual			Annual			Annual													
2,4-Dinitrotoluene			Quarterly	Annual			Annual			Annual													
2,6-Dinitrotoluene			Quarterly	Annual			Annual			Annual													
2-Chloroethylvinyl Ether			Quarterly	Annual			Annual			Annual													
2-Chloronaphthalene			Quarterly	Annual			Annual			Annual													
2-Chlorophenol			Quarterly	Annual			Annual			Annual													
2-Nitrophenol			Quarterly	Annual			Annual			Annual													
3,3-Dichlorobenzidine			Quarterly	Annual			Annual			Annual													
4,4-DDD			Quarterly	Annual			Annual			Annual													
4,4-DDE			Quarterly	Annual			Annual			Annual													
4,4-DDT	Quarterly		Quarterly	Annual			Annual			Annual													
4,6-Dinitro-2-methylphenol			Quarterly	Annual			Annual			Annual													
4-Bromophenyl Phenyl Ether			Quarterly	Annual			Annual			Annual													
4-Chloro-3-methylphenol			Quarterly	Annual			Annual			Annual													
4-Chlorophenyl Phenyl Ether			Quarterly	Annual			Annual			Annual													
4-Nitrophenol			Quarterly	Annual			Annual			Annual													
Acenaphthene			Quarterly	Annual			Annual			Annual													
Acenaphthylene			Quarterly	Annual			Annual			Annual													
Acrolein			Quarterly	Annual			Annual			Annual													
Acrylonitrile			Quarterly	Annual			Annual			Annual													
Acute Toxicity												Monthly		Biweekly		Weekly		Monthly					
Aldrin			Quarterly	Annual			Annual			Annual													
Alkalinity, Bicarbonate (as CaCO3)															Biweekly	Weekly	Monthly	Monthly					
Alkalinity, Carbonate (as CaCO3)															Monthly	Weekly	Monthly	Monthly					
alpha-BHC			Quarterly	Annual			Annual			Annual													
Aluminum, Total Recoverable	Quarterly						Quarterly								Monthly	Monthly	Monthly	Monthly					
Ammonia, Total (as N)	Daily			Monthly			Daily				Weekly	Weekly			Monthly	Monthly	Monthly	Monthly					
Anthracene			Quarterly	Annual			Annual			Annual													
Antimony, Total			Quarterly																				
Antimony, Total Recoverable	Quarterly			Annual			Annual			Annual					Monthly	Monthly	Monthly	Monthly					
Arsenic, Total			Quarterly																				
Arsenic, Total Recoverable	Quarterly			Annual			Quarterly								Monthly	Monthly	Monthly	Biweekly					
Barium, Total Recoverable	Quarterly						Quarterly								Monthly	Monthly	Monthly	Monthly					
Benzene			Quarterly	Annual			Annual			Annual													
Benzidine			Quarterly	Annual			Annual			Annual													
Benzo(a)anthracene			Quarterly	Annual			Annual			Annual													
Benzo(a)pyrene			Quarterly	Annual			Annual			Annual													
Benzo(b)fluoranthene			Quarterly	Annual			Annual			Annual													
Benzo(ghi)perylene			Quarterly	Annual			Annual			Annual													
Benzo(k)fluoranthene			Quarterly	Annual			Annual			Annual													
Beryllium, Total			Quarterly																				
Beryllium, Total Recoverable				Annual			Annual			Annual					Monthly	Monthly	Monthly	Monthly					
beta-BHC	Quarterly		Quarterly	Annual			Quarterly			Quarterly													
Bicarbonate Ion (as HCO3)	Quarterly										Weekly												
Biochemical Oxygen Demand (BOD) (5-day @ 20 Deg. C)	Weekly			Monthly			Daily					Weekly			Monthly	Monthly	Monthly	Monthly					
Bis (2-Chloroethoxy) Methane			Quarterly	Annual			Annual			Annual													
Bis (2-Chloroethyl) Ether			Quarterly	Annual			Annual			Annual													
Bis (2-Chloroisopropyl) Ether			Quarterly	Annual			Annual			Annual													
Bis (2-Ethylhexyl) Phthalate	Weekly		Quarterly	Monthly			Annual			Annual		Monthly			Monthly	Monthly		Monthly					
BOD5 @ 20 Deg. C, Percent Removal												Weekly											
Boron, Total Recoverable	Quarterly						Quarterly								Monthly	Monthly	Monthly	Monthly					
Bromoform			Quarterly	Annual			Annual			Annual							Monthly						
Bromomethane			Quarterly	Annual			Annual			Annual													
Butylbenzyl Phthalate			Quarterly	Annual			Annual			Annual													

Table A-5
Grab-Sample Parameters Measured at POTW Outfalls
Monitoring Program for the Prado Basin Habitat Sustainability Program

Parameter	Corona			WRCRWTP			RCWRF				RIX	Rialto		IEUA								
	M-001	R-001D	R-001U	M-001	R-001D	R-001U	M-001A	M-001B	R-001D	R-001U	M-001	M-001	M-001B	M-001A	M-001B	M-002A	M-003	M-004	R-002D	R-002U	R-003D	R-003U	R-004U
Cadmium, Total			Quarterly																				
Cadmium, Total Recoverable	Quarterly			Annual			Quarterly								Monthly	Monthly	Monthly	Monthly					
Calcium, Total Recoverable							Monthly				Monthly				Monthly	Monthly	Monthly	Monthly					
Carbon Tetrachloride			Quarterly	Annual			Annual			Annual													
Carbonate Ion (as CO3)	Quarterly						Quarterly				Weekly												
Chemical Oxygen Demand (COD)															Monthly								
Chlordane			Quarterly	Annual			Annual			Annual													
Chloride	Quarterly						Monthly				Monthly				Monthly	Monthly	Monthly	Monthly					
Chlorine, Total Residual	Daily																						
Chlorobenzene			Quarterly	Annual			Annual			Annual													
Chloroethane			Quarterly	Annual			Annual			Annual													
Chloroform			Quarterly	Annual			Quarterly										Monthly						
Chloromethane			Quarterly	Annual			Annual			Annual													
Chromium (III)			Quarterly	Annual			Annual																
Chromium (VI)			Quarterly	Annual			Annual																
Chromium (VI) Total Recoverable	Quarterly																						
Chromium, Total Recoverable							Quarterly								Monthly	Monthly	Monthly	Monthly					
Chronic Toxicity	Monthly						Monthly							Monthly	Monthly	Monthly	Monthly	Monthly					
Chrysene			Quarterly	Annual			Annual			Annual													
Cobalt, Total Recoverable	Quarterly						Quarterly								Monthly	Monthly	Monthly	Monthly					
Copper, Total			Quarterly									Monthly											
Copper, Total Recoverable	Quarterly			Annual			Quarterly								Monthly	Monthly	Monthly	Monthly					
Cyanide, Free Available	Monthly			Monthly			Quarterly								Monthly	Daily	Monthly	Monthly					
Cyanide, Total (as CN)	Monthly		Quarterly				Quarterly					Monthly											
delta-BHC			Quarterly	Annual			Annual			Annual													
Dibenzo(a,h)anthracene	Monthly			Annual			Annual			Annual													
Dibenzo(a,h)anthracene	Quarterly		Quarterly	Annual			Annual			Annual													
Dibromochloromethane	Quarterly		Quarterly	Annual			Quarterly										Monthly						
Dichlorobromomethane			Quarterly	Annual			Quarterly										Monthly						
Dieldrin			Quarterly	Annual			Annual			Annual													
Diethyl Phthalate			Quarterly	Annual			Annual			Annual													
Dimethyl Phthalate			Quarterly	Annual			Annual			Annual													
Di-n-butyl Phthalate			Quarterly	Annual			Annual			Annual													
Di-n-octyl Phthalate			Quarterly	Annual			Annual			Annual													
Dissolved Oxygen		Weekly			Monthly	Monthly			Weekly	Weekly									Daily	Weekly	Weekly	Weekly	Weekly
Electrical Conductivity @ 25 Deg. C	Daily										Daily												
Endosulfan I			Quarterly	Annual			Quarterly																
Endosulfan II			Quarterly	Annual			Annual			Annual													
Endosulfan Sulfate			Quarterly	Annual			Annual			Annual													
Endrin			Quarterly	Annual			Annual			Annual													
Endrin Aldehyde			Quarterly	Annual			Quarterly			Quarterly													
Ethylbenzene			Quarterly	Annual			Annual			Annual													
Fecal Coliform	Daily																						
Flow	Daily			Monthly		Monthly	Daily				Daily									Monthly		Monthly	Twice per Week
Fluoranthene			Quarterly	Annual			Quarterly			Quarterly													
Fluorene			Quarterly	Annual			Annual			Annual													
Fluoride, Total	Quarterly						Monthly				Monthly				Monthly	Daily	Monthly	Monthly					
gamma-BHC			Quarterly	Annual			Annual			Annual													
Hardness, Total (as CaCO3)	Monthly			Monthly	Monthly	Monthly	Monthly				Monthly	Monthly			Monthly	Daily	Monthly	Monthly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly
Heptachlor			Quarterly	Annual			Quarterly																
Heptachlor Epoxide			Quarterly	Annual			Quarterly																
Hexachlorobenzene			Quarterly	Annual			Annual			Annual													
Hexachlorobutadiene			Quarterly	Annual			Annual			Annual													
Hexachlorocyclopentadiene			Quarterly	Annual			Annual			Annual													
Hexachloroethane			Quarterly	Annual			Annual			Annual													
Indeno (1,2,3-cd) Pyrene			Quarterly	Annual			Annual			Annual													
Iron, Total Recoverable	Quarterly						Quarterly																
Isophorone			Quarterly	Annual			Annual			Annual													
Lead, Total			Quarterly																				
Lead, Total Recoverable	Quarterly			Annual			Quarterly								Monthly	Daily	Monthly	Monthly					
Magnesium, Total Recoverable	Monthly						Monthly				Monthly				Monthly	Twice per week	Monthly	Monthly					
Manganese, Total Recoverable	Quarterly																						
Mercury, Total	Monthly		Quarterly	Monthly								Monthly											
Mercury, Total Recoverable				Annual			Quarterly								Monthly	Twice per week	Monthly	Monthly					
Methylene Chloride			Quarterly	Annual			Annual			Annual													
Naphthalene			Quarterly	Annual			Annual			Annual													
Nickel, Total			Quarterly																				
Nickel, Total Recoverable	Quarterly			Annual			Quarterly								Monthly	Twice per week	Monthly	Monthly					
Nitrate, Total (as N)	Monthly						Daily				Weekly	Monthly											
Nitrobenzene			Quarterly	Annual			Annual			Annual													
Nitrogen, Total (as N)															Monthly	Twice per week	Monthly	Monthly					

Table A-5
Grab-Sample Parameters Measured at POTW Outfalls
Monitoring Program for the Prado Basin Habitat Sustainability Program

Parameter	Corona			WRCRWTP			RCWRF				RIX	Rialto		IEUA									
	M-001	R-001D	R-001U	M-001	R-001D	R-001U	M-001A	M-001B	R-001D	R-001U	M-001	M-001	M-001B	M-001A	M-001B	M-002A	M-003	M-004	R-002D	R-002U	R-003D	R-003U	R-004U
Nitrogen, Total Inorganic (as N)	Monthly			Monthly			Daily				Weekly	Twice per month			Monthly	Twice per week	Monthly	Monthly		Weekly		Monthly	Twice per week
N-Nitrosodimethylamine	Quarterly		Quarterly	Annual			Annual			Annual	Monthly												
N-Nitrosodi-n-Propylamine			Quarterly	Annual			Annual			Annual													
N-Nitrosodiphenylamine			Quarterly	Annual			Annual			Annual													
PCB-1016			Quarterly	Annual			Annual			Annual													
PCB-1221			Quarterly	Annual			Annual			Annual													
PCB-1232			Quarterly	Annual			Annual			Annual													
PCB-1242			Quarterly	Annual			Annual			Annual													
PCB-1248			Quarterly	Annual			Annual			Annual													
PCB-1254			Quarterly	Annual			Annual			Annual													
PCB-1260			Quarterly	Annual			Annual			Annual													
Pentachlorophenol			Quarterly	Annual			Annual			Annual													
pH	Daily	Weekly			Monthly	Monthly			Weekly	Weekly	Daily								Weekly	Weekly	Weekly	Monthly	Twice per week
Phenanthrene			Quarterly	Annual			Annual			Annual													
Phenol, Single Compound				Annual			Annual			Annual													
Phenols, Total			Quarterly				Quarterly																
Pyrene			Quarterly	Annual			Annual			Annual													
Selenium, Total			Quarterly																				
Selenium, Total Recoverable	Quarterly			Annual			Quarterly								Monthly	Daily		Monthly					
Silver, Total			Quarterly																				
Silver, Total Recoverable	Quarterly			Annual			Quarterly								Monthly	Daily	Monthly	Weekly					
Sodium, Total Recoverable	Quarterly						Quarterly				Monthly				Weekly	Twice per week	Monthly	Weekly					
Sulfate, Total (as SO4)	Quarterly						Monthly				Monthly				Weekly	Monthly	Monthly	bimonthly					
Temperature		Weekly		Monthly	Monthly	Monthly	Weekly		Weekly	Weekly		Daily							Weekly	Weekly	Weekly	Weekly	Twice per week
Tetrachloroethene			Quarterly	Annual			Annual			Annual													
Thallium, Total			Quarterly																				
Thallium, Total Recoverable				Annual			Quarterly			Quarterly					Weekly	Monthly	Monthly	Weekly					
Toluene	Quarterly		Quarterly	Annual			Annual			Annual													
Total Coliform				Monthly				Daily			Daily		Daily		Weekly	Weekly	Twice per week	Daily					
Total Dissolved Solids (TDS)	Monthly			Monthly			Twice Weekly				Monthly	Monthly		Biweekly	Weekly	Monthly	Monthly	Daily		Weekly		Weekly	Twice per week
Total Organic Carbon (TOC)	Daily			Monthly			Quarterly				Monthly				Weekly	Monthly	Monthly	Daily					
Total Suspended Solids (TSS)	Daily			Monthly			Daily					Weekly			Weekly	Monthly	Monthly	Daily	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly
Total Suspended Solids (TSS), Percent Removal												Weekly											
Toxaphene			Quarterly	Annual			Annual			Annual													
trans-1,2-Dichloroethene			Quarterly	Annual			Annual			Annual													
Trichloroethene			Quarterly	Annual			Annual			Annual													
Turbidity	Daily										Daily												
Vinyl Chloride			Quarterly	Annual			Quarterly			Quarterly													
Zinc, Total			Quarterly																				
Zinc, Total Recoverable	Quarterly			Annual			Quarterly								Weekly	Monthly	Monthly	Monthly					

Table A-6
Composite-Sample Parameters Measured at POTW Outfalls
Monitoring Program for the Prado Basin Habitat Sustainability Program

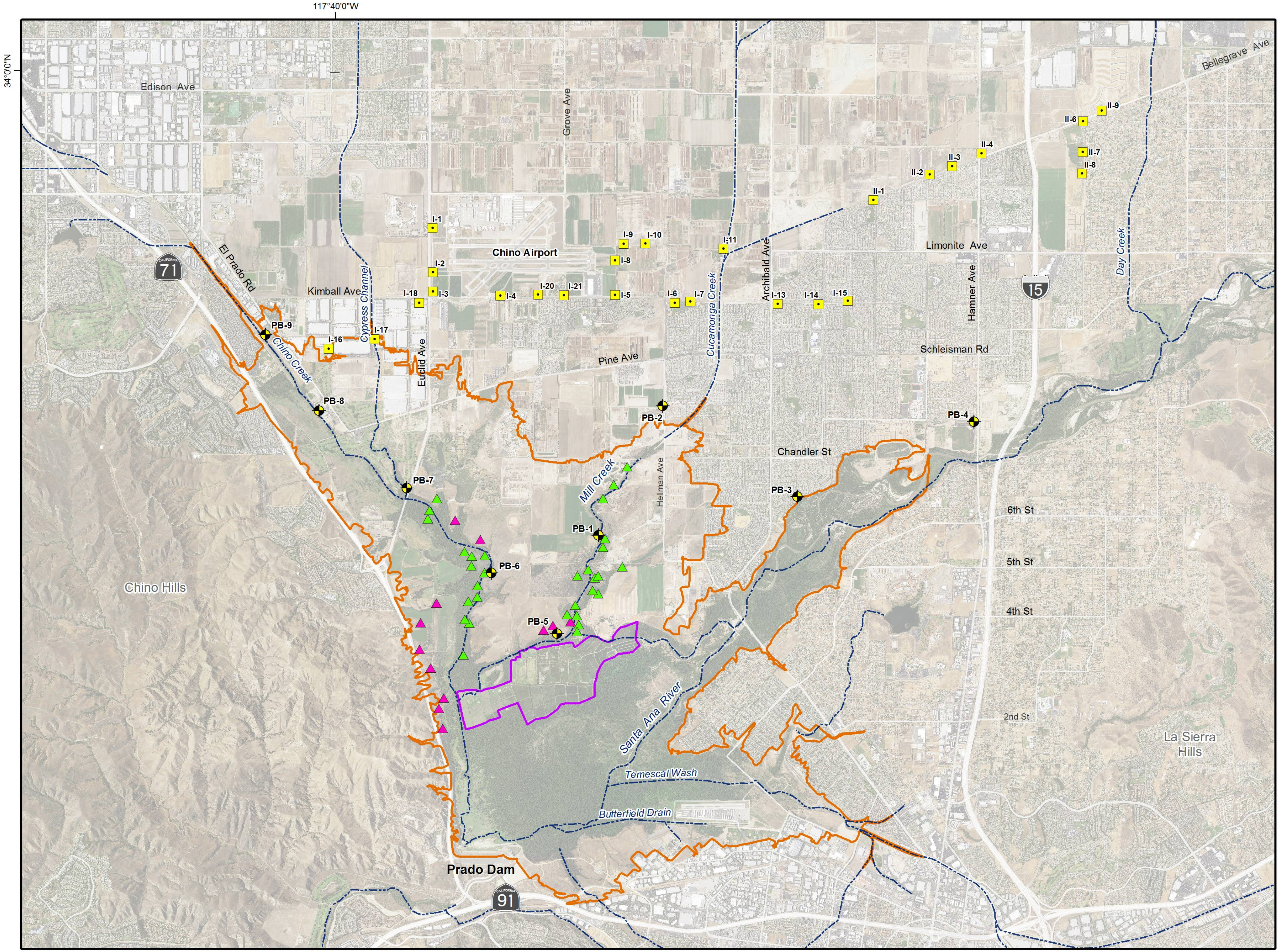
Parameter	Calculation Type	Corona			WRCRWTP			RCWRF				RIX	Rialto			IEUA				
		M-001	R-001D	R-001U	M-001	R-001D	R-001U	M-001A	M-001B	R-001D	R-001U	M-001	M-001	M-001A	M-001B	M-001A	M-001B	M-002A	M-003	M-004
2,3,7,8-TCDD (Dioxin)	Daily Maximum	x																		
2,3,7,8-TCDD (Dioxin)	Monthly Average (Mean)	x																		
Aluminum, Total Recoverable	Daily Maximum							x												
Ammonia, Total (as N)	Average Monthly (AMEL)				x			x												
Ammonia, Total (as N)	Daily Maximum	x						x												
Ammonia, Total (as N)	Monthly Average (Mean)	x										x								
Arsenic, Total Recoverable	Daily Maximum							x												
Barium, Total Recoverable	Daily Maximum							x												
Biochemical Oxygen Demand (BOD) (5-day @ 20 Deg. C)	7-Day Average of Daily Maximums											x								
Biochemical Oxygen Demand (BOD) (5-day @ 20 Deg. C)	Average Monthly (AMEL)							x												
Biochemical Oxygen Demand (BOD) (5-day @ 20 Deg. C)	Average Weekly (AWEL)				x			x					x							
Biochemical Oxygen Demand (BOD) (5-day @ 20 Deg. C)	High Weekly Average	x																		
Biochemical Oxygen Demand (BOD) (5-day @ 20 Deg. C)	Monthly Average (Mean)	x										x								
Bis (2-Ethylhexyl) Phthalate	Average Monthly (AMEL)				x															
Bis (2-Ethylhexyl) Phthalate	Maximum Daily (MDEL)				x															
BOD5 @ 20 Deg. C, Percent Removal	Average Monthly (AMEL)							x									x	x	x	x
BOD5 @ 20 Deg. C, Percent Removal	Percent Reduction	x						x												
BOD5 @ 20 Deg. C, Percent Removal	Percent Reduction (Daily)							x												
Boron, Total Recoverable	Daily Maximum							x												
Cadmium, Total Recoverable	Daily Maximum							x												
Calcium, Total Recoverable	Daily Maximum	x						x												
Carbonate Ion (as CO3)	Daily Maximum							x												
Chloride	Daily Maximum							x												
Chlorine, Total Residual	Daily Average (Mean)															x		x	x	x
Chlorine, Total Residual	Daily Maximum	x														x		x	x	x
Chlorine, Total Residual	Instantaneous Maximum (IMAX)							x					x							
Chloroform	Daily Maximum							x												
Chromium, Total Recoverable	Daily Maximum							x												
Chronic Toxicity	Average Monthly (AMEL)				x															
Chronic Toxicity	Daily Maximum							x												
Chronic Toxicity	Monthly Median of Mean Daily											x								
Cobalt, Total Recoverable	Daily Maximum							x												
Copper, Total Recoverable	Daily Maximum							x												
Cyanide, Free Available	Average Monthly (AMEL)				x			x												
Cyanide, Free Available	Daily Maximum							x												
Cyanide, Free Available	Maximum Daily (MDEL)				x															
Dibenzo(a,h)anthracene	Daily Maximum	x																		
Dibenzo(a,h)anthracene	Monthly Average (Mean)	x																		
Dissolved Oxygen	Daily Maximum									x	x									
Electrical Conductivity @ 25 Deg. C	Average Monthly (AMEL)							x												
Electrical Conductivity @ 25 Deg. C	Daily Average (Mean)				x			x					x			x		x	x	x
Electrical Conductivity @ 25 Deg. C	Daily Maximum							x				x	x			x		x	x	x
Electrical Conductivity @ 25 Deg. C	Instantaneous Maximum (IMAX)				x															
Electrical Conductivity @ 25 Deg. C	Monthly Average (Mean)											x								
Flow	Average Monthly (AMEL)				x			x												
Flow	Daily Average (Mean)															x		x	x	x
Flow	Daily Discharge												x							
Flow	Daily Maximum				x			x				x								
Flow	Monthly Average (Mean)											x								
Fluoride, Total	Daily Maximum							x												
Hardness, Total (as CaCO3)	Daily Maximum							x												
Iron, Total Recoverable	Daily Maximum							x												
Lead, Total Recoverable	Daily Maximum							x												
Magnesium, Total Recoverable	Daily Maximum							x												
Manganese, Total Recoverable	Daily Maximum							x												
Mercury, Total	Daily Maximum	x																		
Mercury, Total	Monthly Average (Mean)	x																		
Mercury, Total Recoverable	Daily Maximum							x												
Nickel, Total Recoverable	Daily Maximum							x												
Nitrate, Total (as N)	Average Monthly (AMEL)							x												
Nitrate, Total (as N)	Daily Maximum							x												
Nitrogen, Total Inorganic (as N)	12-Month Average	x			x			x				x				x				
Nitrogen, Total Inorganic (as N)	Average Monthly (AMEL)							x												
Nitrogen, Total Inorganic (as N)	Daily Maximum							x												
pH	24-hour Average												x							
pH	Daily Average (Mean)															x		x	x	x
pH	Daily Instantaneous Maximum (IMAX)							x												

Table A-6
Composite-Sample Parameters Measured at POTW Outfalls
Monitoring Program for the Prado Basin Habitat Sustainability Program

Parameter	Calculation Type	Corona			WRCRWTP			RCWRF				RIX	Rialto			IEUA				
		M-001	R-001D	R-001U	M-001	R-001D	R-001U	M-001A	M-001B	R-001D	R-001U	M-001	M-001	M-001A	M-001B	M-001A	M-001B	M-002A	M-003	M-004
pH	Daily Instantaneous Minimum (IMIN)							x												
pH	Daily Maximum							x		x	x					x		x	x	x
pH	Daily Minimum							x								x		x	x	x
pH	Instantaneous Maximum (IMAX)				x			x				x								
pH	Instantaneous Minimum (IMIN)				x			x				x								
Phenols, Total	Daily Maximum							x												
Selenium, Total Recoverable	Daily Maximum							x												
Silver, Total Recoverable	Daily Maximum							x												
Sodium, Total Recoverable	Daily Maximum							x												
Sulfate, Total (as SO4)	Daily Maximum							x												
Temperature	Daily Average (Mean)															x		x	x	x
Temperature	Daily Maximum							x		x	x									
Total Coliform	7-Day Average of Daily Maximums											x								
Total Coliform	7-Day Median				x				x						x		x		x	x
Total Coliform	Instantaneous Maximum (IMAX)											x								
Total Dissolved Solids (TDS)	12-Month Average	x			x			x				x				x				
Total Dissolved Solids (TDS)	Average Monthly (AMEL)							x												
Total Dissolved Solids (TDS)	Daily Maximum							x												
Total Dissolved Solids (TDS)	Delta from Background				x															
Total Organic Carbon (TOC)	Daily Maximum							x												
Total Suspended Solids (TSS)	7-Day Average of Daily Maximums											x								
Total Suspended Solids (TSS)	Average Monthly (AMEL)				x			x					x							
Total Suspended Solids (TSS)	Average Weekly (AWEL)				x								x							
Total Suspended Solids (TSS)	High Weekly Average	x																		
Total Suspended Solids (TSS)	Monthly Average (Mean)	x										x								
Total Suspended Solids (TSS)	Weekly Average (Mean)							x												
Total Suspended Solids (TSS), Percent Removal	Average Monthly (AMEL)							x									x	x	x	x
Total Suspended Solids (TSS), Percent Removal	Percent Reduction	x						x												
Total Suspended Solids (TSS), Percent Removal	Percent Reduction (Weekly)							x												
Turbidity	24-hour Average													x						
Turbidity	Daily Average (Mean)							x								x		x	x	x
Turbidity	Daily Maximum	x										x				x		x	x	x
Turbidity	Instantaneous Maximum (IMAX)							x												
Turbidity	Monthly Average (Mean)											x								
Zinc, Total Recoverable	Daily Maximum							x												

Table A-7
Surface-Water Quality Analyte List
Monitoring Program for the Prado Basin Habitat Sustainability Program

Analytes	Method
Major cations: K, Na, Ca, Mg	EPA 200.7
Major anions: Cl, SO_4, NO_2, NO_3	EPA 300.0
Total Hardness	SM 2340B
Total Alkalinity (incl. Carbonate, Bicarbonate, Hydroxide)	SM 2320B
Boron	EPA 200.7
Ammonia-Nitrogen	EPA 350.1
pH	SM 4500-HB
Specific Conductance	SM 2510B
Total Dissolved Solids	E160.1/SM2540C
Total Kjeldahl Nitrogen (TKN)	EPA 351.2
Organic Nitrogen	EPA 351.2
Turbidity	EPA 180.1
Total Organic Carbon	SM5310C/E415.3



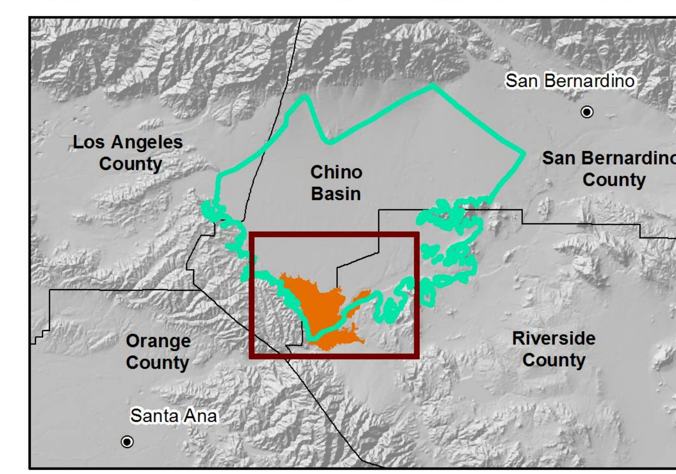
Current and Historical Vegetation Monitoring Sites

- USBR Vegetation Monitoring Site
- OCWD Photo-Monitoring Site

Other Features

- Prado Flood Control Basin
- Chino Basin Desalter Authority Well
- PBHSP Monitoring Well
- OCWD Prado Wetlands
- Rivers and Streams

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



Prepared by:

WEI
Wildermuth Environmental, Inc.

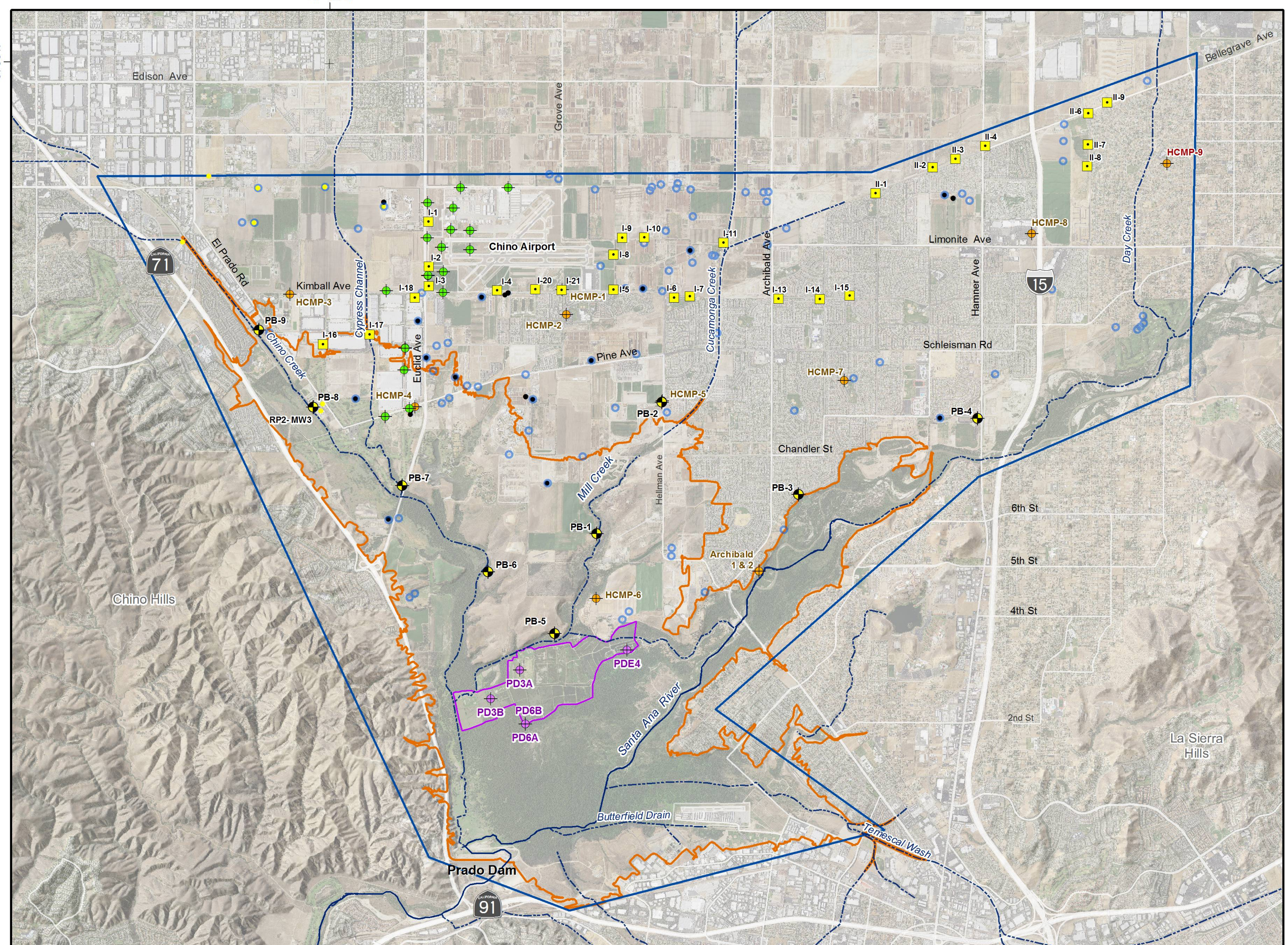
Author: TCR
Date: 4/28/2016
File: Figure A-1_Veg_slideshow

0 1 2 Miles
0 1 2 3 KM

PBHSP 2016 Monitoring Program
Prado Basin Habitat Sustainability Committee

Current and Historical Vegetation Monitoring Sites in Prado Basin

Figure A-1



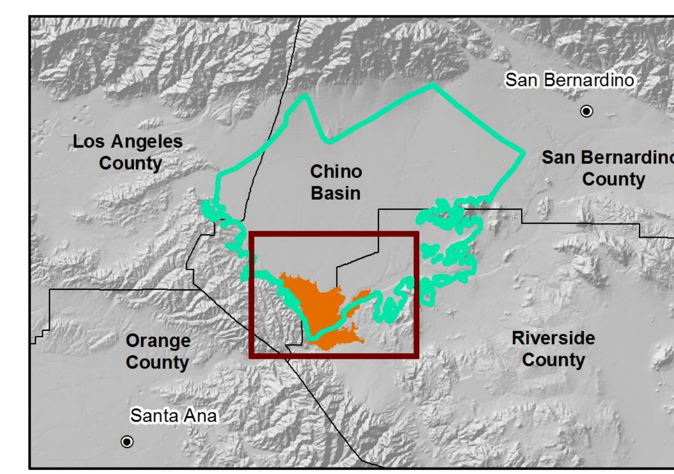
Groundwater Monitoring Sites

- PBHSP Monitoring Well Site
- Hydraulic Control Monitoring Program Well Site
- Chino Airport Monitoring Well Site
- OCWD Prado Wetlands Monitoring Well
- Public Well Monitored by CBWM for Groundwater Levels and/or Quality
- Private Well Monitored by CBWM for Groundwater Levels and/or Quality
- Chino Basin Desalter Authority Well
- Active Well Monitored by CBWM for Groundwater Production (water year 2015)

Other Features

- Groundwater Monitoring Program Study Area
- Prado Flood Control Basin
- OCWD Prado Wetlands
- Streams & Flood Control Channels
- Santa Ana River

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



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WILDERMUTH ENVIRONMENTAL, INC.

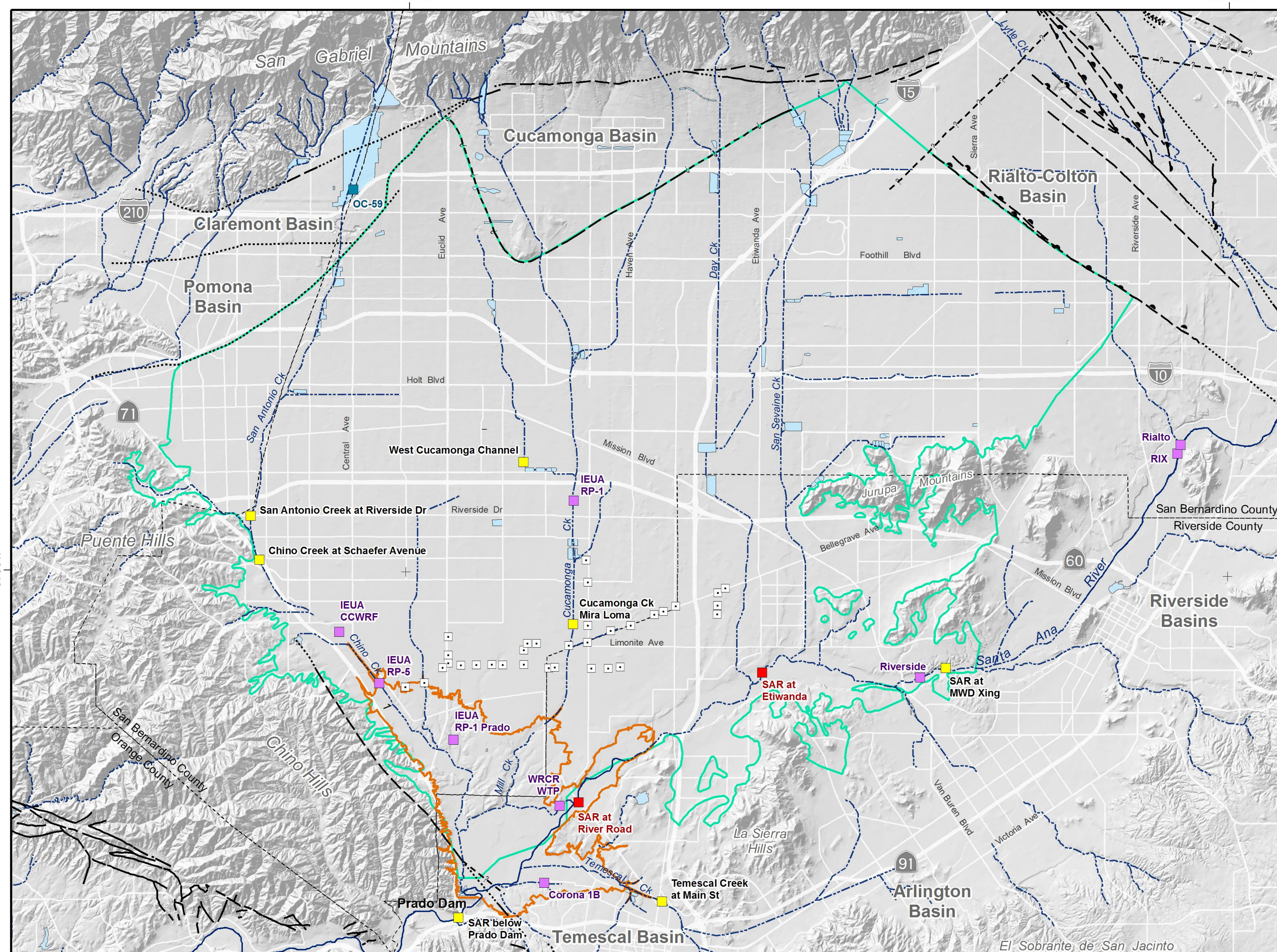
Author: TCR
Date: 4/28/2016
File: Figure A-2_Groundwaters_slideshow

0 1 2 Miles
0 1 2 3 KM

PBHSP 2016 Monitoring Program
Prado Basin Habitat Sustainability Committee

Groundwater Monitoring Program

Figure A-2



Surface-Water Monitoring Sites

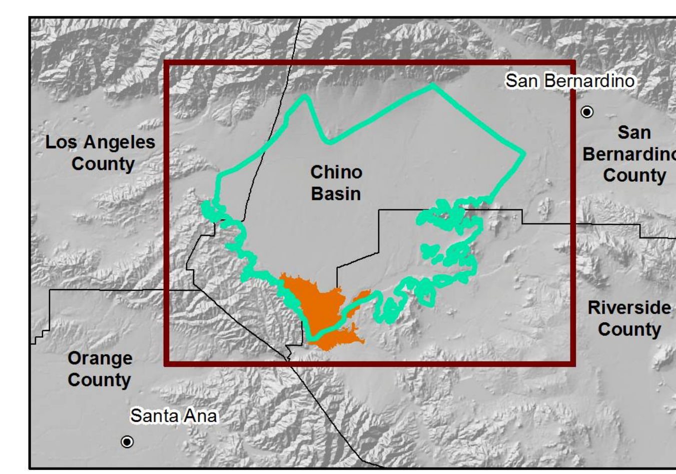
- POTW Discharge Outfall
- USGS Stream Gage Station
- Maximum Benefit Monitoring Program Site
- MWDSC Imported Water Turnout

Other Features

- Chino Basin Hydrologic Boundary
- Prado Flood Control Basin
- Rivers and Streams
- Flood Control & Conservation Basins
- Chino Basin Desalter Authority Well

Faults

- Location Certain
- Location Approximate
- Location Concealed
- Location Uncertain
- Approximate Location of Groundwater Barrier



Prepared by:

WEI
WILDERMUTH ENVIRONMENTAL, INC.

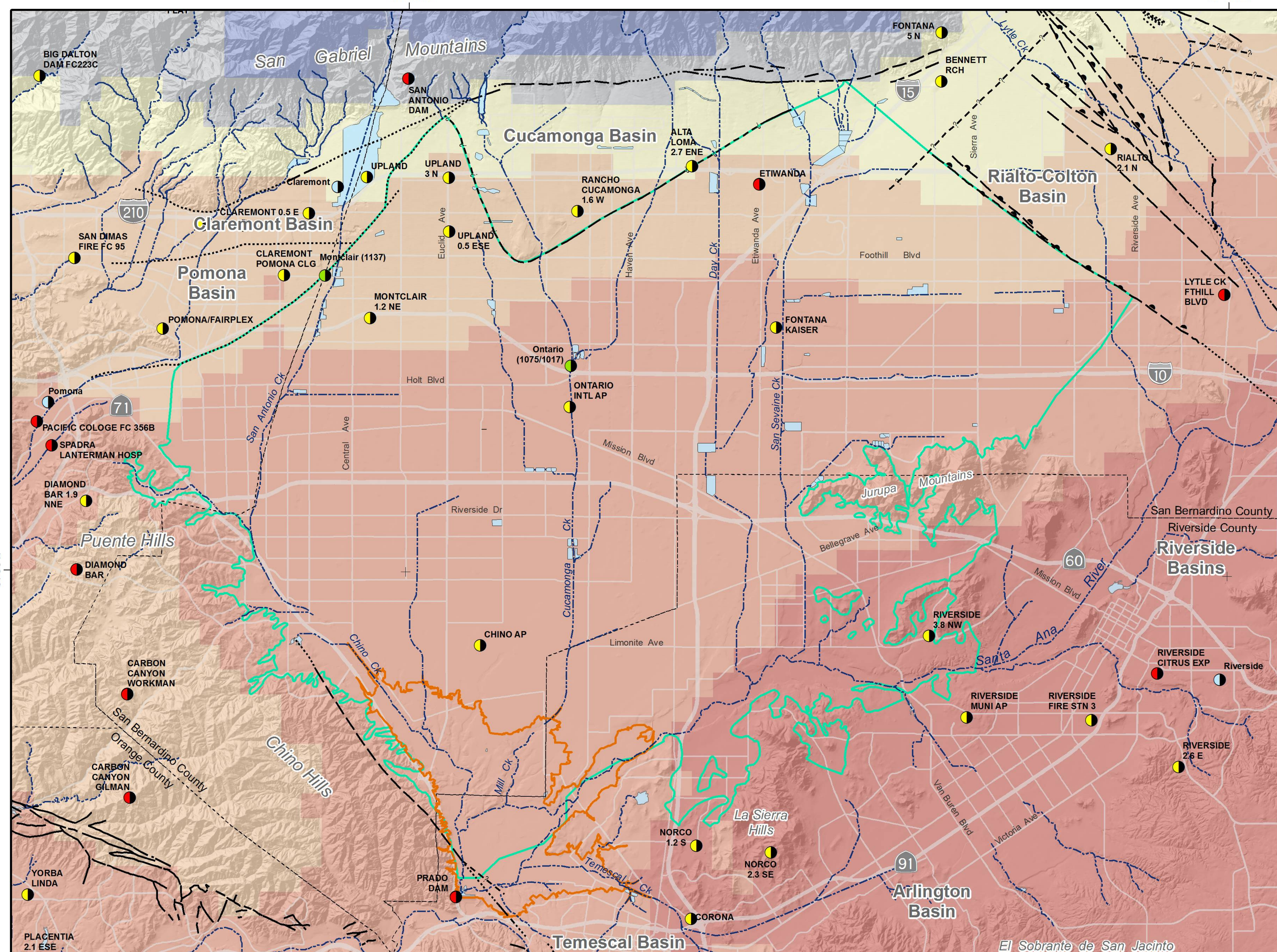
Author: TCR
Date: 8/1/2016
File: Figure A-3_SW

0 1 2 3 4 5 Miles
0 2 4 6 8 KM

PBHSP 2016 Monitoring Program
Prado Basin Habitat Sustainability Committee

Surface-Water Monitoring Program

Figure A-3



Climatic Monitoring Stations

- NWS Cooperative Observer Program
- Global Historical Climatology Network
- CIMIS
- SBCFCD Precipitation Station

Average Annual Precipitation for Water Year 2009-10 from PRISM Climate Group (inches, 800 x 800 meter grid)

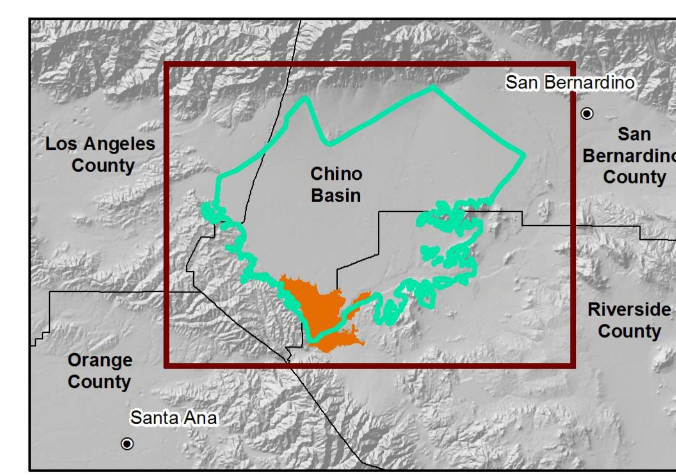
- <15
- 15 - 20
- 20 - 25
- 25 - 30
- 30 - 35
- >35

Other Features

- Prado Flood Control Basin
- Chino Basin Hydrologic Boundary
- Streams & Flood Control Channels
- Flood Control & Conservation Basins

Faults

- Location Certain
- Location Approximate
- Location Concealed
- Location Uncertain
- Approximate Location of Groundwater Barrier



0 1 2 3 4 5 Miles

0 2 4 6 8 KM

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Wildermuth Environmental, Inc.

Author: TCR
Date: 4/28/2016
File: Figure A-4_Climate_final

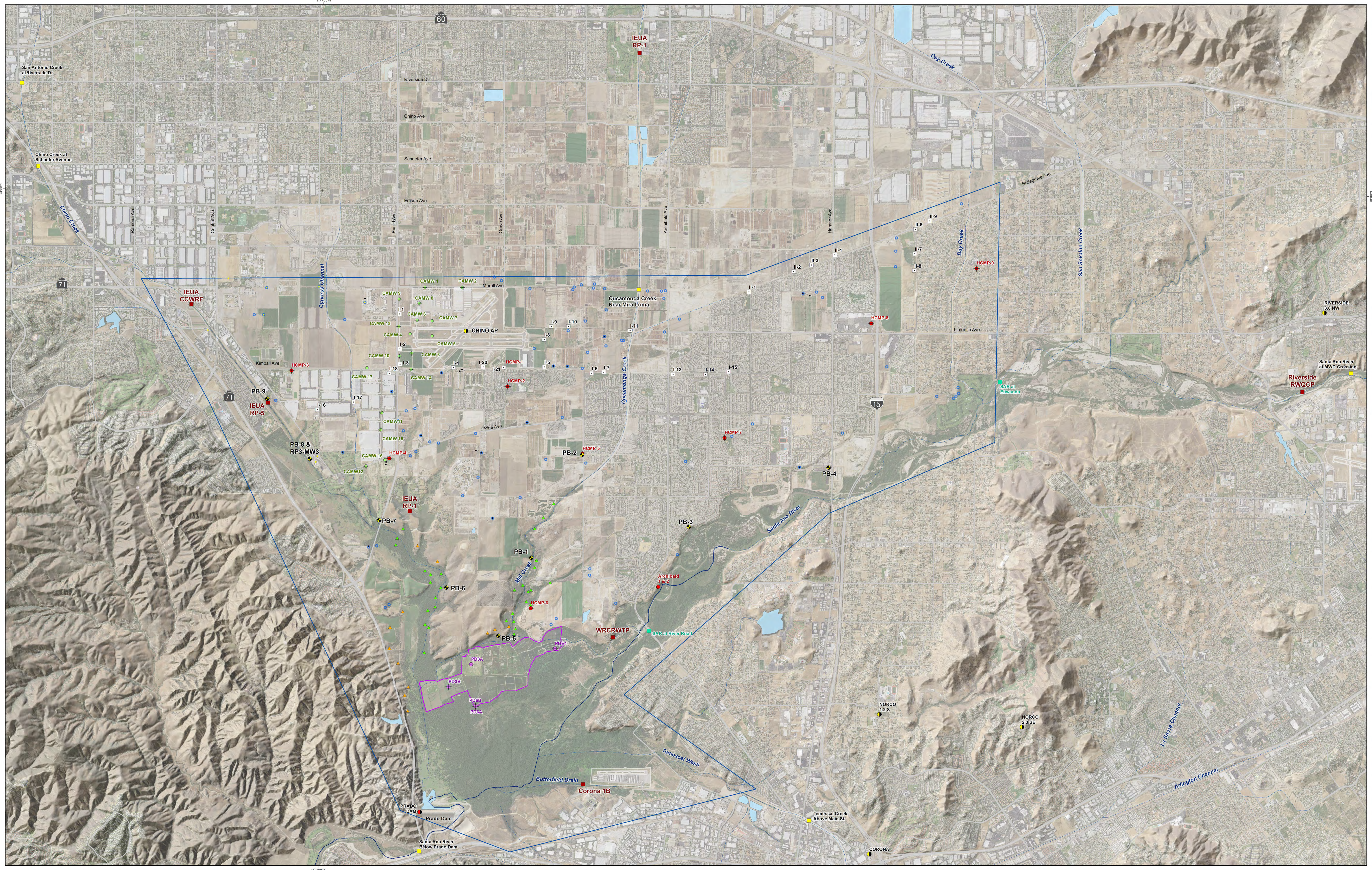
PBHSP 2016 Monitoring Program
Prado Basin Habitat Sustainability Committee

Weather and Climate Monitoring Program

Figure A-4

Exhibit A

2016 Monitoring Program for the PBHSP



Riparian-Vegitation Monitoring

- USBR Vegetation Monitoring Site
- OCWD Photo-Monitoring Stations

Boundaries

- Groundwater Monitoring Program Study Area
- OCWD Prado Wetlands

Groundwater Monitoring

- Desalter Well
- HCMP Monitoring Well
- PBHSP Monitoring Well
- Chino Airport Monitoring Well
- OCWD Prado Wetlands Monitoring Well
- Public Well Monitored by CBWM for Groundwater Production, Levels, and/or Quality
- Private Well Monitored by CBWM for Groundwater Production, Levels, and/or Quality
- Active Production Well (water year 2015)

Surface-Water Monitoring Stations

- POTW Discharge Outfall
- USGS Stream Gage Station
- Maximum Benefit Monitoring Program Site

Climatic Monitoring Stations

- NWS Cooperative Observer Program
- Global Historical Climatology Network

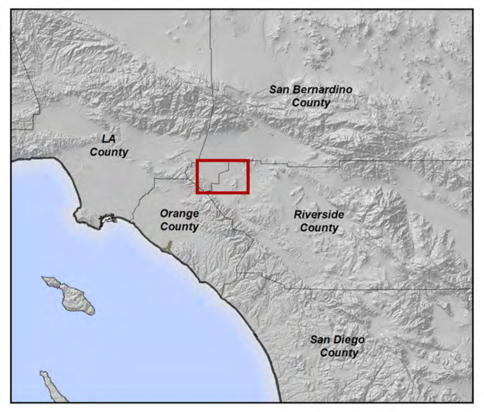
0 1 2 Miles

0 1 2 Kilometers

Author: TCR
Date: 20160523
File: Exhibit_A.mxd

Prepared by:

WEI
Wildermuth Environmental, Inc.



2016 PBHSP Adaptive Management Plan
Prado Basin Habitat Sustainability Committee

2016 Monitoring Program for the PBHSP

Exhibit A

Appendix B

Comments and Responses

Appendix B

Comments and Responses

on the Draft 2016 Adaptive Management Plan for the Prado Basin Habitat Sustainability Program

B-1 Santa Ana Watershed Project Authority

Comment Number	Reference	Comment	Response
1	Appendix A, Section A.4	The draft AMP on page 2-1 states that some of the main factors that potentially can affect riparian habitat in the Study Area are weather events and long-term climate. It would increase the strength of the monitoring to establish an evapotranspiration monitoring station in or near the Study Area. There is a Department of Water Resources CIMIS station near Claremont/Pomona, but to rely on that station, an agency would need to use "spatial CIMIS" which the Department of Water Resources also manages. Spatial CIMIS is increasingly accurate when there are other stations located near each other. For the Claremont/Pomona Station, the nearby station would be in the City of Riverside. Spatial CIMIS relies on interpolation and interpolation accuracy is affected by the density of the CIMIS stations and geographic features of the region. Since there are few CIMIS stations near the Study Area, the accuracy of spatial CIMIS is reduced. A map of ET monitoring stations in the Santa Ana River Watershed is attached.	We agree that a CIMIS station at or near the Prado Basin would strengthen the weather/climate monitoring program. We recommend that the PBHSC discuss, and consider for recommendation, the construction of a CIMIS-type station at or near Prado Basin at a future meeting. No changes to the AMP text were made to address the comment.
2	Appendix A, Sections A.1 and A.4	There are private sector firms as well as publicly available satellite data that provide remote sensing data that can also be used. For example, Landsat satellite collects data related to vegetation coverage seen from its flight path. This vegetation coverage data can be used as part of a regression analysis creating a relationship to weather data that is collected in the field to the satellite data, thereby creating an estimated evapotranspiration rate value. Local professor Dr. Michael Goulden of UC Irvine has done this regression analysis before while analyzing the national forest.	Comment noted, but no changes to the AMP text were made to address this comment. As stated in Section A.1 "…the RHMP [Riparian Habitat Monitoring Program] as described herein is conceptual, and is referred to as the 'Conceptual RHMP'." That said, analysis of remote-sensing data to detect changes in the extent and quality of the riparian habitat is contemplated in the AMP. The RHMP is currently being collaboratively developed by the Watermaster, IEUA, and OCWD. Analysis of remote-sensing data will be assessed for its possible use in the PBHSP, and incorporated into the

Comment Number	Reference	Comment	Response
			monitoring program as appropriate.
4	Appendix A, Section A.4	Evapotranspiration rate monitoring also has the benefit of assisting retail water agencies who want to pursue or adopt a rate structure that accounts for weather. This also seems to be the direction the State is moving in per Governor Brown's Executive Order released on Monday. One of the stipulations in the Executive Order is for the Department of Water Resources and the State Water Board to develop a standard for "outdoor irrigation, in a manner that incorporates landscape area, local climate, and new satellite imagery data." If you have any questions about evapotranspiration rate monitoring data please contact me and I would be happy to help.	Comment noted, and thank you.
5	Appendix A, Section A.1	The Monitoring Program, Attachment A, also discusses regional assessments using periodic mapping. SAWPA has acquired 3-inch resolution color imagery and infrared digital orthophotography through a summer 2015 flight survey (survey area attached). The Corps of Engineers is also mapping the River and major tributaries through the Coordinated Ground Truth and Airborne Hyperspectral and Topographic Lidar Survey Project through a 2015 flight survey. The flight path for that survey is attached. The SAWPA data as well as the Corps data should be available this year. Our GIS staff has been in contact with Gary Te at IEUA for the SAWPA data.	Comment noted, but no changes to the AMP text were made to address this comment. As stated in Section A.1 "…the RHMP [Riparian Habitat Monitoring Program] as described herein is conceptual, and is referred to as the 'Conceptual RHMP'.'' That said, analysis of air photos to detect changes in the extent and quality of the riparian habitat is contemplated in the AMP. The RHMP is currently being collaboratively developed by the Watermaster, IEUA, and OCWD. Data currently being collected by stakeholders will be assessed for its possible use in the PBHSP, and incorporated into the monitoring program as appropriate.