FINAL REPORT | MAY 2023

Data Collection and Evaluation Report for Fiscal Year 2021/2022

PREPARED FOR

Chino Basin Watermaster

PREPARED BY

Data Collection and Evaluation Report for Fiscal Year 2021/2022

Prepared for

Chino Basin Watermaster

Project No. 941-80-22-32

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FINAL REPORT | MAY 2023

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LIST OF ACRONYMS AND ABBREVIATIONS

2018 RMPU	2018 Recharge Master Plan Update
2020 SYR Report	*2020 Safe Yield Recalculation Report*
af	Acre-Feet
afy	Acre-Feet Per Year
Arrowhead	Arrowhead Mountain Spring Water Company
ASR	Aquifer Storage and Recovery
CBWCD	Chino Basin Water Conservation District
CC	Carbon Canyon
Chino	City of Chino
Chino Hills	City of Chino Hills
CVM	Chino Valley Model

CVWD	Cucamonga Valley Water District
DIPAW	Deep Infiltration of Precipitation and Applied Water
DWR	California Department of Water Resources
DYYP	Dry-Year Yield Program
ET	Evapotranspiration
FWC	Fontana Water Company
FY	Fiscal Year
FY 2021 Report	*Data Collection and Evaluation – Fiscal Year 2020/2021*
GSWC	Golden State Water Company
IEUA	Inland Empire Utilities Agency
JCSD	Jurupa Community Services District
MS4	Municipal Separate Storm Sewer System
MVWD	Monte Vista Water District
MZ	Management Zone
Niagara	Niagara Bottling, LLC
Norco	City of Norco
OBMP	Optimum Basin Management Program
Ontario	City of Ontario
OWDS	On-Site Waste Disposal System
Pomona	City of Pomona
SARWC	Santa Ana River Water Company
SAWCo	San Antonio Water Company
SGMA	Sustainable Groundwater Management Act
State	State of California
State Board	State Water Resources Control Board
SYR	Safe Yield Recalculation
Upland	City of Upland
WSP	Water Supply Plans
WVWD	West Valley Water District

CHAPTER 1
Background and Objectives

This second annual report on *Data Collection and Evaluation – Fiscal Year 2021/2022* describes and documents the required data collection and evaluation pursuant to the April 28, 2017 Court Order on the Safe Yield of the Chino Basin (2017 Court Order).[1] This chapter describes background information on the Court requirements to prepare this annual report, the scope of work of this effort, changes made since the *Data Collection and Evaluation – Fiscal Year 2020/2021* report (FY 2021 Report), and the organization of this report.

1.1 2017 COURT ORDER REQUIREMENTS

The 2017 Court Order ordered that the Safe Yield be set to 135,000 acre-feet per year (afy) for the period fiscal year (FY) 2011 through 2020 and included requirements to guide future model updates and Safe Yield recalculations (SYR) and resets. These requirements, which were later affirmed by the Court in March 2019,[2] are listed below verbatim from pages 15 through 17 of the 2017 Court Order:

- 4.3 – *Interim Correction*. In addition to the scheduled reset [of the Safe Yield effective July 1, 2020 that will continue until June 30, 2030], the Safe Yield may be reset in the event that, with the recommendation and advice of the Pools and Advisory Committee and in the exercise of prudent management discretion described in Paragraph 4.5(c), below, Watermaster recommends to the court that the Safe Yield must be changed by an amount greater (more or less) than 2.5 percent of the then-effective Safe Yield.
- 4.4 – *Safe Yield Reset Methodology*. The Safe Yield has been reset effective July 1, 2010 and shall be subsequently evaluated pursuant to the methodology set forth in the Reset Technical Memorandum [(WEI, 2015)[3]]. The reset will rely upon long-term hydrology and will include data from 1921 to the date of the reset evaluation. The long-term hydrology will be continuously expanded to account for new data from each year, through July 2030, as it becomes available. This methodology will thereby account for short-term climatic variations, wet and dry. Based on the best information practicably available to the Watermaster, the Reset Technical Memorandum sets forth a prudent and reasonable professional methodology to evaluate the then prevailing Safe Yield in a manner consistent with the Judgement, the Peace Agreements, and the OBMP Implementation Plan. In furtherance of the goal of maximizing the beneficial use of the waters of the Chino Basin, Watermaster, with the recommendation and advice of the Pools and Advisory Committee, may supplement the Reset Technical Memorandum's methodology to incorporate future advances in best management practices and hydrologic science as they evolve over the term of this order.

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[1] *Orders for Watermaster's Motion Regarding* the *2015 Safe Yield Reset Agreement, Amendment of Restated Judgment, Paragraph 6*, Superior Court for the County of San Bernardino (2017).

[2] *Order Regarding the Appeal Parties Motion*, Superior Court for the County of San Bernardino (2019).

[3] WEI. (2015*). Methodology to Reset Safe Yield Using Long-Term Average Hydrology and Current and Projected Future Cultural Conditions.* Prepared for the Chino Basin Watermaster, August 2015.

- 4.5 – *Annual Data Collection and Evaluation*. In support of its obligations to undertake the reset in accordance with the Reset Technical Memorandum and this order, Watermaster shall annually undertake the following actions:
  (a) Ensure that, unless a Party to the Judgment is excluded from reporting, all production by all Parties to the Judgment is metered, reported, and reflected in Watermaster's approved Assessment Packages;
  (b) Collect data concerning cultural conditions annually with cultural conditions including, but not limited to, land use, water use practices, production, and facilities for the production, generation, storage, recharge, treatment, or transmission of water;
  (c) Evaluate the potential need for prudent management discretion to avoid or mitigate undesirable results including, but not limited to, subsidence, water quality degradation, and unreasonable pump lifts. Where the evaluation of available data suggests that there has been or will be a material change from existing and projected conditions or threatened undesirable results, then a more significant evaluation, including modeling, as described in the Reset Technical Memorandum, will be undertaken; and,
  (d) As part of its regular budgeting process, develop a budget for the annual data collection, data evaluation, and any scheduled modeling efforts, including the methodology for the allocation of expenses among the Parties to the Judgment. Such budget development shall be consistent with section 5.4(a) of the Peace Agreement.
- 4.6 – *Modeling.* Watermaster shall cause the Basin Model to be updated and a model evaluation of Safe Yield, in a manner consistent with the Reset Technical Memorandum, to be initiated no later than January 1, 2024, in order to ensure that the same may be completed by June 30, 2025.
- 4.7 – *Peer Review.* The Pools shall be provided with reasonable opportunity, no less frequently than annually, for peer review of the collection of data and the application of data collected in regard to the activities described in Paragraphs 4.4, 4.5, and 4.6 above.

This report addresses the requirements in "4.5 – *Annual Data Collection and Evaluation*" for the period FY 2019 through 2030.

1.2 SCOPE OF THE ANNUAL DATA COLLECTION AND EVALUATION

The scope of work for the annual data collection and evaluation for FY 2023 is the following:

- **Data collection.** Watermaster will collect the following datasets pursuant to pages 16 and 17 of the 2017 Court Order:
  - Groundwater pumping
  - Water supply plans (from major Appropriative Pool Parties)
  - Land use
  - Data to estimate indoor and outdoor urban water use
  - Managed groundwater recharge
  - Information on regional water infrastructure (from major Appropriative Pool Parties)

For each of the above datasets, Watermaster will collect historical data since the last recalculation of the Safe Yield (2019-22 Actual Data) and the necessary information to develop an updated projection of these datasets for the remaining period of the then-current Safe Yield (2023 Projection). In this report, the 2023 Projection will span the period FY 2023-2030.

- **Data evaluation.** Watermaster will compare the 2019-22 Actual Data and the 2023 Projection to the data and assumptions that were used in the projection scenario for the 2020 Safe Yield Recalculation (2020 SYR Projection), which was documented in the *2020 Safe Yield Recalculation Report* (2020 SYR Report).[4] Specifically, the comparison includes:

  — 2020 SYR Projection for FY 2019-2022 versus 2019-22 Actual Data

  — 2020 SYR Projection versus 2023 Projection (FY 2023-2030)

  These comparisons are meant to answer the two questions pursuant to the 2017 Court Order:

  1) *Is there a potential for undesirable results that were not identified in the 2020 SYR?* Specifically, is there a **"**potential need for prudent management discretion to avoid or mitigate undesirable results including, but not limited to, subsidence, water quality degradation, and unreasonable pump lifts"? (2017 Court Order, p. 17)
  2) *Is there a reasonable likelihood that the cumulative impact of the differences between the new datasets/projections (i.e., the 2019-22 Actual Data and the 2023 Projection) and the data and assumptions in the 2020 SYR would result in the actual Safe Yield being greater than 2.5 percent (more or less) than the current Safe Yield?* (2017 Court Order, p. 15-16). This question is evaluated over the period of the current Safe Yield, which is FY 2021-30.

  Answers to these questions are qualitative and based on professional judgement, an understanding of the Chino Basin, and prior modeling investigations. An affirmative answer to either of the above questions "suggests that there has been or will be a material change from existing and projected conditions or threatened undesirable results," which would necessitate "a more significant evaluation." (2017 Court Order, p. 17). In this case, Watermaster will describe the scope of work and cost estimates of any further evaluations required because of this effort.

- **Reporting.** Watermaster will prepare an annual report to document the data collection and evaluation process and will include recommendations for improvements to subsequent annual data collection and evaluation efforts.
- **Peer review.** Watermaster will conduct multiple workshops during the execution of this work to communicate the process and findings to the Parties.

1.3 CHANGES FROM FY 2021 REPORT

The following changes have been made to this report since the FY 2021 Report:

- Omit the evaluation of land use data. A recommendation resulting from the FY 2021 Report was to reduce the frequency of the evaluation of land use data, as land use changes are generally less frequent than the other data sets evaluated in this report. Therefore, while

[4] WEI. *2020 Safe Yield Recalculation.* Prepared for the Chino Basin Watermaster. May 2020.

2022 land use data were collected for this annual data collection and evaluation process, it was not evaluated and will not be documented in this report.

- Update the methodology to estimate 2019-22 Actual urban outdoor water use and comparison to the 2020 SYR urban outdoor water use. As discussed in Chapter 3, the updated methodology incorporates recycled water used for irrigation of urban land uses.
- Incorporate the results of the request for Appropriative Pool Parties' 20-year operating plans that forecast near and long-term plans for pumping and use of Managed Storage. In February 2022, the Watermaster Board directed Watermaster staff to incorporate this request into the annual data collection and evaluation process.
- Include an appendix comparing the 2019-22 Actual pumping to the 2020 SYR groundwater pumping by Appropriative Pool well. This comparison is Appendix A.

1.4 REPORT ORGANIZATION

Chapters 2 through 5 in this report focus on each respective category of data collected and evaluated for this effort.

Chapter 2 – Groundwater Pumping. Chapter 2 describes the collection and evaluation of the data characterizing the groundwater pumping patterns and water supply plans in the Chino Basin.

Chapter 3 – Urban Outdoor Water Use. Chapter 3 describes the collection and evaluation of the data characterizing the urban outdoor water use practices in the Chino Basin.

Chapter 4 – Managed Groundwater Recharge. Chapter 4 describes the collection and evaluation of managed groundwater recharge in the Chino Basin, which includes records and projections for the recharge of stormwater, imported water, and recycled water.

Chapter 5 – Regional Water Infrastructure. Chapter 5 describes the collection and evaluation of the data characterizing the regional water infrastructure in the Chino Basin.

Chapter 6 – Conclusions and Recommendations. Chapter 6 describes the evaluation of Managed Storage, the cumulative assessment of all the data types evaluated in this report, and the main conclusions and recommendations derived from the evaluation.

Each chapter above (except Chapter 6) describes:

- A summary of the data type.
- Use of the data in the Chino Valley Model (CVM).
- A description of the data that were collected for this report and the assumptions for the development of the 2020 SYR Projection and the 2023 Projection.
- A comparison of the 2020 SYR Projection versus the 2019-22 Actual Data.
- A comparison of the 2020 SYR Projection versus an updated 2023 Projection for FY 2023-30.
- An evaluation of these comparisons to identify (i) the potential for undesirable results or (ii) the potential for a significant difference in the current expectations for net recharge during FY 2021-30 compared to the current Safe Yield for FY 2021-30.

The following appendices are also included in this report:

Appendix A – Comparison of 2019-22 Actual Data versus 2020 SYR Projections for Annual Groundwater Pumping. Appendix A includes tables and charts comparing the 2019-22 Actual Data for groundwater pumping to the 2020 SYR projected groundwater pumping data by Appropriative Pool well.

Appendix B – Water Infrastructure Maps for Major Appropriative Pool Parties. Appendix B includes maps documenting the regional water infrastructure that Watermaster received from the major Appropriative Pool Parties.

Appendix C – Metering and Reporting of Groundwater Pumping for FY 2022. Appendix C describes the wells in the Chino Basin for FY 2022, including descriptions of wells that were added or went out of service in the reporting year and information on wells that are not metered.

Appendix D – Responses to Questions and Comments on Draft Report. Appendix D documents the written questions and comments that were received on the draft report and responses to the questions and comments.

CHAPTER 2
Groundwater Pumping

Chapter 2 documents the collection and evaluation of data and information on groundwater pumping in the Chino Basin.

2.1 SUMMARY AND APPLICATION TO MODEL

Groundwater pumping is the largest discharge component of the Chino Basin water budget, comprising roughly 83 percent of the total discharge from the Chino Basin from FY 1978 through 2018. The magnitude and location of groundwater pumping can affect groundwater levels, groundwater-flow directions, and the groundwater/surface-water interactions between the Chino Basin and the Santa Ana River and Prado Basin.

Groundwater pumping data is input into the CVM through the Well Package (McDonald et al., 1988)[1] of the groundwater model code, MODFLOW-NWT. The Well Package is used to simulate the withdrawal of groundwater from aquifers using a constant flow rate for each stress period of the model, which is monthly for the CVM.

Historical groundwater pumping data is one of several datasets used to calibrate the CVM. The CVM is calibrated over the period of July 1, 1977 through June 30, 2018 by adjusting model parameters to produce the best match between simulated and observed system responses, including the historical time series of surface water discharge in Prado Basin and groundwater levels at wells.[2]

Projections of future groundwater pumping are used to develop the model projection scenarios that are then simulated with the CVM to estimate the future water budget of the Chino Basin, including net recharge. Groundwater pumping patterns (magnitude and location) are important to understand as they can affect groundwater levels, water budget components, and net recharge.

2.2 COLLECTION OF DATA AND INFORMATION

This section describes how the data and information for groundwater pumping were collected and compiled for this report.

2.2.1 2019-22 Actual Data

2019-22 Actual groundwater pumping data was developed from Watermaster's database of quarterly groundwater pumping data records and estimates. All members of the Appropriative and Overlying Non-Agricultural Pool, including the Chino Desalter Authority, meter, record, and report pumping from their own wells. Wells owned by the Overlying Agricultural Pool Parties are required to be metered if their pumping is greater than 10 afy (i.e., non-Minimal Producers), although metering is not feasible at all wells owned by non-Minimal Producers. Watermaster applies a water duty method to estimate the pumping for wells that are not metered.

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[1] McDonald, Michael G. and Harbaugh, Arlen W. 1988. MODFLOW, *A modular three-dimensional finite difference ground-water flow model*. Reston, Virginia: U. S. Geological Survey, 1988.

[2] More information on the calibration process of the CVM can be found in Section 6 of the 2020 SYR Report.

2.2.2 2020 SYR Projection

As part of the development of the Storage Framework Investigation in 2017, Watermaster submitted a comprehensive data request to each Appropriative Pool Party and some of the larger Overlying Non-Agricultural Pool pumpers, including:

- Arrowhead Mountain Spring Water Company (Arrowhead)
- City of Chino (Chino)
- City of Chino Hills (Chino Hills)
- City of Norco (Norco)
- City of Ontario (Ontario)
- City of Pomona (Pomona)
- City of Upland (Upland)
- Cucamonga Valley Water District (CVWD)
- Fontana Water Company (FWC)
- Golden State Water Company (GSWC)
- Jurupa Community Services District (JCSD)
- Marygold Mutual Water Company
- Monte Vista Irrigation Company
- Monte Vista Water District (MVWD)
- Niagara Bottling, LLC (Niagara)
- Santa Ana River Water Company (SARWC)
- San Antonio Water Company (SAWCo)
- San Bernardino County – Olympic Shooting Park
- West Valley Water District (WVWD)

The data request included future water supply plans, which represented the Parties' best estimates of monthly demands and associated water supplies for the planning period of FY 2019 through 2050, including projections of groundwater pumping. In 2019, Watermaster asked the Parties to provide updates to their projections in preparation of the 2020 SYR Projection. Three Parties (Chino Hills, Pomona, and MVWD) updated their pumping projections. The data request also included a request for an updated list of active wells, well capacities, and the priority use for each well. This information was combined with the monthly water supply plans to distribute annual projected groundwater pumping to monthly projected pumping at each of the Parties' wells to prepare the 2020 SYR Projection.

The 2020 SYR Projection of pumping for the smaller Overlying Non-Agricultural Pool Parties was estimated using historical patterns. Pumping projections for the Agricultural Pool Parties were based on a combination of historical data, projected land use changes, and projected water supply plans. The projected recharge and pumping operations for the Dry-Year Yield Program (DYYP) were uncertain and therefore not included in the 2020 SYR Projection.

2.2.3 2023 Projection

In late 2022, as part of the current data collection and evaluation effort, Watermaster submitted a request to the municipal Appropriative Pool Parties and the Chino Desalter Authority (CDA) for updated projected monthly demands and water supply plans (WSP), current and future well information, and other information described in later sections. The projected monthly demands and WSPs were provided for FY 2025 and FY 2030. Watermaster developed the 2023 Projection for each Party's WSP based on their responses to the data request, interpolating between 2022, 2025, and 2030.

The 2023 Projection for the Agricultural Pool and Overlying Non-Agricultural Pool pumping was developed based on a comparison of the 2020 SYR Projection and the 2019-22 Actual pumping to determine whether the differences suggested that the 2023 Projection should differ from the 2020 SYR Projection.

2.3 EVALUATION

This section compares the 2020 SYR Projection for groundwater pumping to 2019-22 Actual pumping and the 2023 Projection for pumping, including an evaluation of the significance of any differences.

2.3.1 2019-22 Actual Pumping versus 2020 SYR Projection

Figure 2-1 is a bar chart comparing 2019-22 Actual pumping to the 2020 SYR Projection for pumping by Pool, including the groundwater pumped for the DYYP. Figure 2-1 shows:

- On average, 2019-22 Actual pumping was greater than the 2020 SYR Projection by 10,900 afy. This was primarily due to pumping from the DYYP account in FY 2020, 2021, and 2022, which was not included in the 2020 SYR Projection.
- Not including the DYYP pumping, 2019-22 Actual pumping by the Agricultural Pool, Overlying Non-Agricultural Pool,[3] and the Appropriative Pool were less than the 2020 SYR Projection by about 1,200 afy, 1,200 afy, and 2,500 afy, respectively.

Figure 2-2 is a bar chart comparing 2019-22 Actual pumping to the 2020 SYR Projection for pumping by Management Zone (MZ). Groundwater pumping is aggregated for MZ-4 and MZ-5. Figure 2-1 shows:

- On average, 2019-22 Actual pumping in MZ-1, MZ-4 and MZ-5 was about equal to the 2020 SYR Projection.
- On average, 2019-22 Actual pumping in MZ-2 and MZ-3 was greater than the 2020 SYR Projection by about 10,900 afy. This was primarily due to pumping from the DYYP account in FY 2020, 2021, and 2022, which was not included in the 2020 SYR Projection.

[3] Annual groundwater pumping by General Electric is net zero because the agency injects the equivalent volume of groundwater pumped.

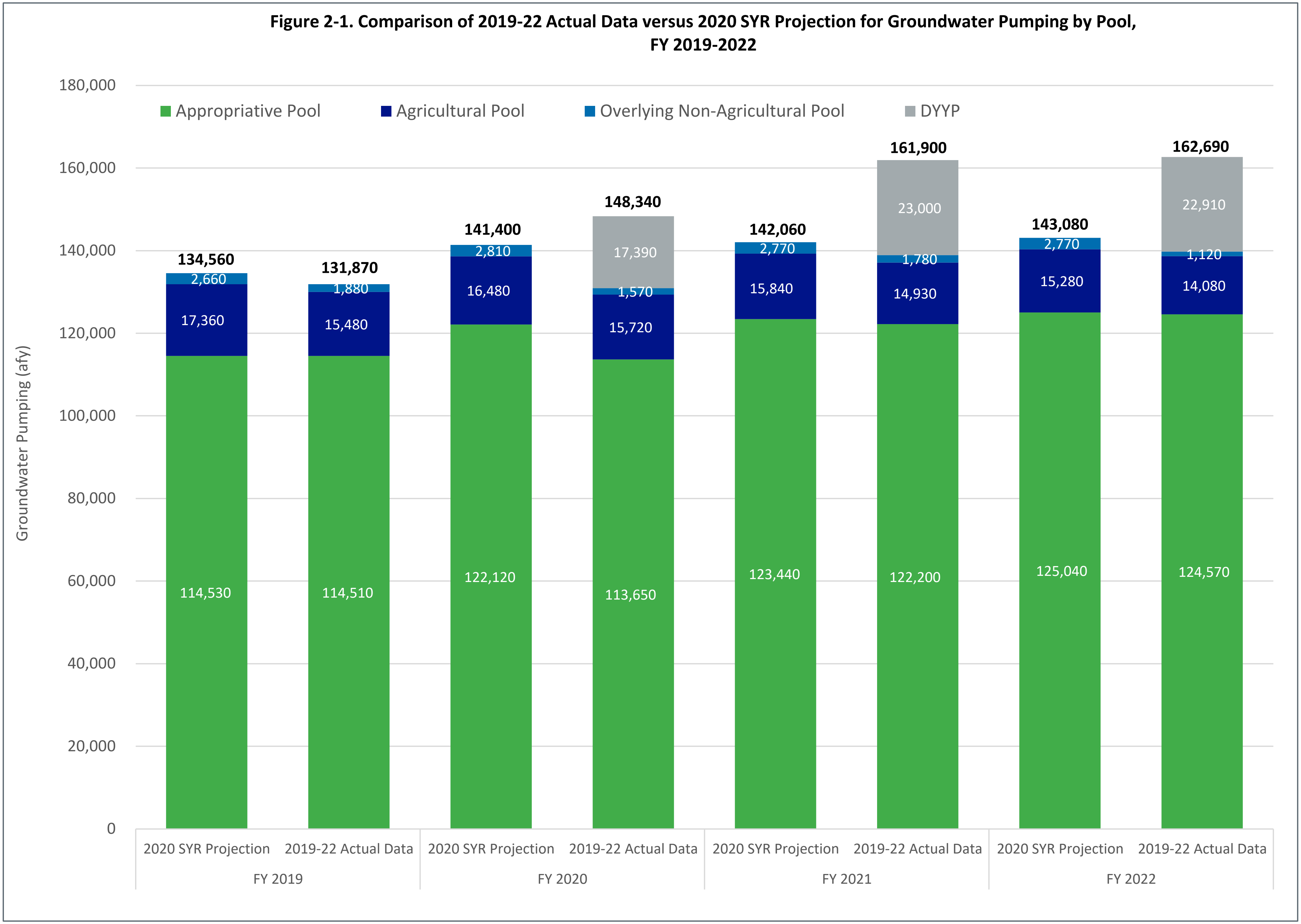
Figure 2-1. Comparison of 2019-22 Actual Data versus 2020 SYR Projection for Groundwater Pumping by Pool, FY 2019-2022
Appropriative Pool
Agricultural Pool
Overlying Non-Agricultural Pool
DYYP
Groundwater Pumping (afy)
180,000
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
134,560
2,660
17,360
114,530
131,870
1,880
15,480
114,510
141,400
2,810
16,480
122,120
148,340
17,390
1,570
15,720
113,650
142,060
2,770
15,840
123,440
161,900
23,000
1,780
14,930
122,200
143,080
2,770
15,280
125,040
162,690
22,910
1,120
14,080
124,570
2020 SYR Projection
2019-22 Actual Data
FY 2019
FY 2020
FY 2021
FY 2022

Figure 2-2. Comparison of 2019-22 Actual Data versus 2020 SYR Projection for Groundwater Pumping by Management Zone, FY 2019-2022

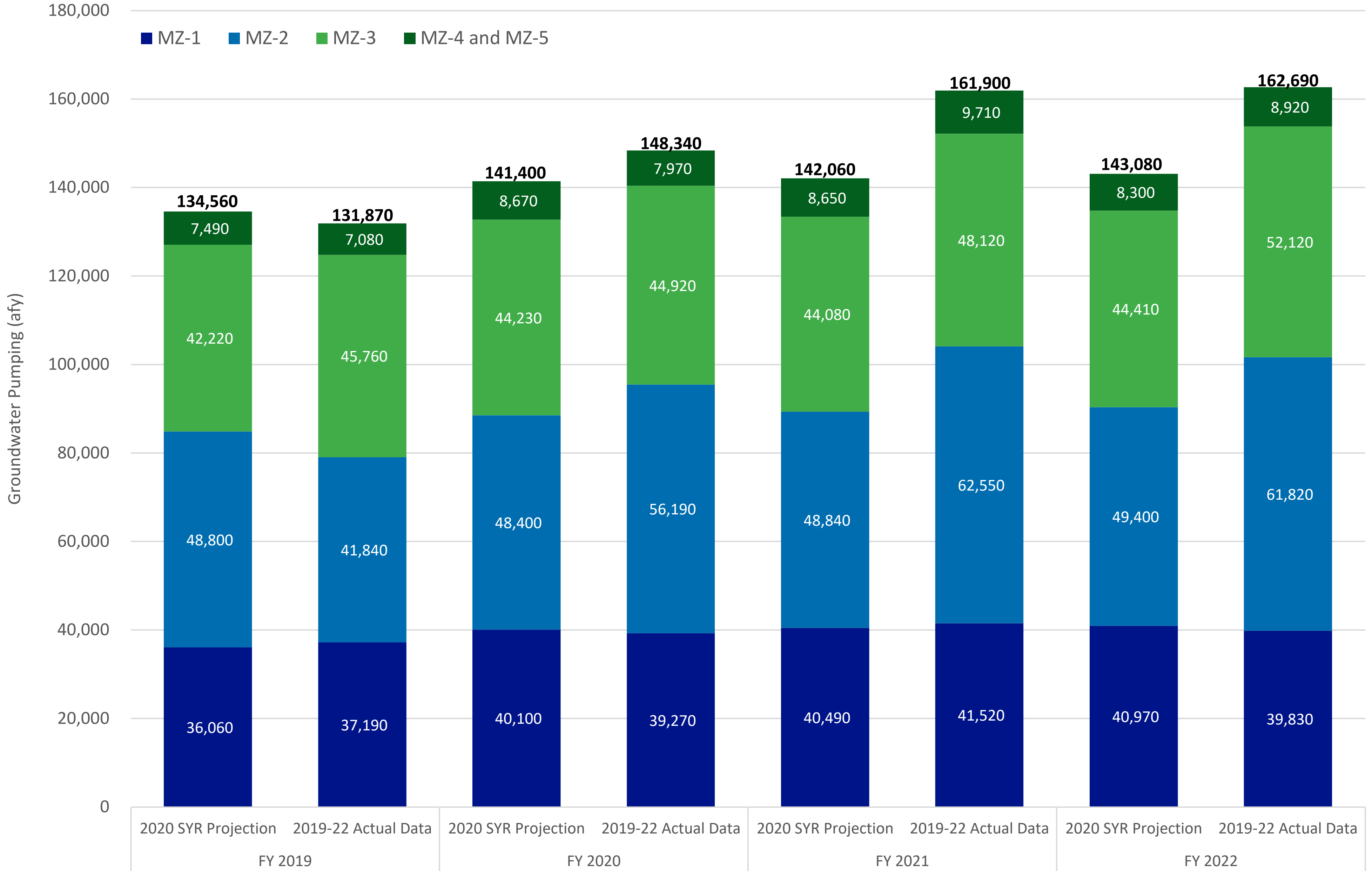

Figure 2-3 shows the spatial differences between 2019-22 Actual pumping and the 2020 SYR Projection for pumping across the Chino Basin aggregated over a grid with half-mile square cells. Areas where 2019-22 Actual pumping was greater than the 2020 SYR Projection by more than 100 afy are shown in shades of orange and red. Areas where 2019-22 Actual pumping was less than the 2020 SYR Projection by more than 100 afy are shown in shades of blue. To assess the potential for undesirable results, Figure 2-3 also shows:

- Boundaries of the Areas of Subsidence Concern.
- Locations of the areas where the 2020 SYR Projection indicated that pumping sustainability challenges would occur before FY 2050.[4]
- Locations of known groundwater contaminant plumes in the Chino Basin, based on the delineations documented in the *2020 State of the Basin Report* (WY, 2020).[5]

An examination of Figure 2-3 reveals the following:

- The areas where 2019-22 Actual pumping was greater than the 2020 SYR Projection in MZ-2 are concentrated in the north-central portion of MZ-2, where pumping for the DYYP occurred.
- 2019-22 Actual pumping was greater than the 2020 SYR Projection in much of the Northwest MZ-1 Area of Subsidence Concern.
- 2019-22 Actual pumping was greater than the 2020 SYR Projection in several areas projected to experience pumping sustainability challenges. These wells are primarily located in central MZ-3 in the JCSD well field and in the southern portions of MZ-2 and MZ-3 in the CDA well field.
- There are no significant differences between 2019-22 Actual pumping and the 2020 SYR Projection in the vicinity of groundwater contaminant plumes that would suggest these differences would change the speed and trajectory of groundwater contaminant plumes.

2.3.2 2023 Projection versus 2020 SYR Projection

Figure 2-4 is a bar chart comparing the 2020 SYR Projection to the 2023 Projection for pumping by Pool for FY 2025 and FY 2030. Figure 2-4 shows:

- The 2023 Projection for pumping is greater than the 2020 SYR Projection by 6,200 afy in FY 2025 and by 12,700 afy in FY 2030. These differences are due to higher pumping projections provided by the Appropriative Pool Parties for the 2023 Projection.
- The 2023 Projection for pumping by the Agricultural Pool is identical to the 2020 SYR Projection. This is because the projected build-out years for the Parties overlying most of the agricultural areas targeted for future development have not changed significantly from the assumptions used to develop the 2020 SYR Projection.
- The 2023 Projection for pumping by the Overlying Non-Agricultural Pool is identical to the 2020 SYR Projection. 2019-22 Actual pumping is not significantly different compared to the assumptions for Overlying Non-Agricultural Pool pumping in the 2020 SYR Projection; hence, no changes in Overlying Non-Agricultural Pool pumping are justified for the 2023 Projection.

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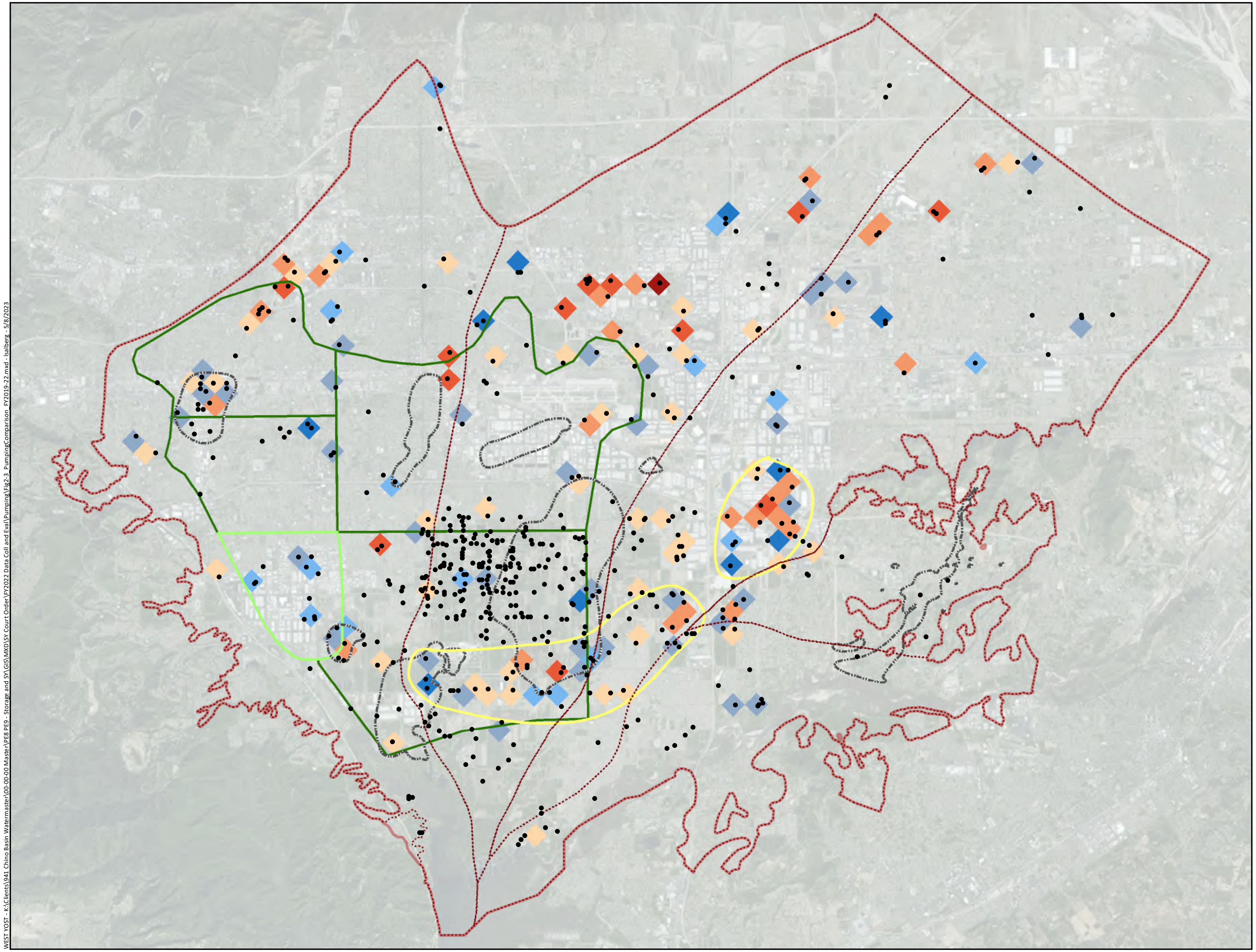
[4] See Figure 7-12 of the *2020 SYR Report.*

[5] WY. *2020 State of the Basin Report*. Prepared for the Chino Basin Watermaster, June 2021.



Active Pumping Well

Difference in Groundwater Pumping

2019-22 Actual Data minus 2020 Projection (afy)

- 3,500 - 5,000
- 1,000 - 3,500
- 500 - 1,000
- 100 - 500

2019-22 Actual Data exceeds 2020 SYR Projection

- -100 - 100
- -500 - -100
- -1,000 - -500
- -3,500 - -1,000
- -5,000 - -3,500

2019-22 Actual Data is less than 2020 SYR Projection

Known Groundwater Contaminant Plume

Managed Area

Area of Subsidence Concern

Area projected to experience pumping sustainability challenges in the 2020 SYR Projection

OBMP Management Zones

Prepared by:

WEST YOST

0 1 2 3 Miles

0 2 4 6 Km

Prepared for:

Chino Basin Watermaster
Data Collection and Evaluation
FY 2021/22

Comparison of Groundwater Pumping
2020 SYR Projection versus 2019-22 Actual Data
FY 2019-2022

Figure 2-3

Figure 2-4. Comparison of 2020 SYR Projection versus 2023 Projection for Groundwater Pumping by Pool, FY 2025-2030

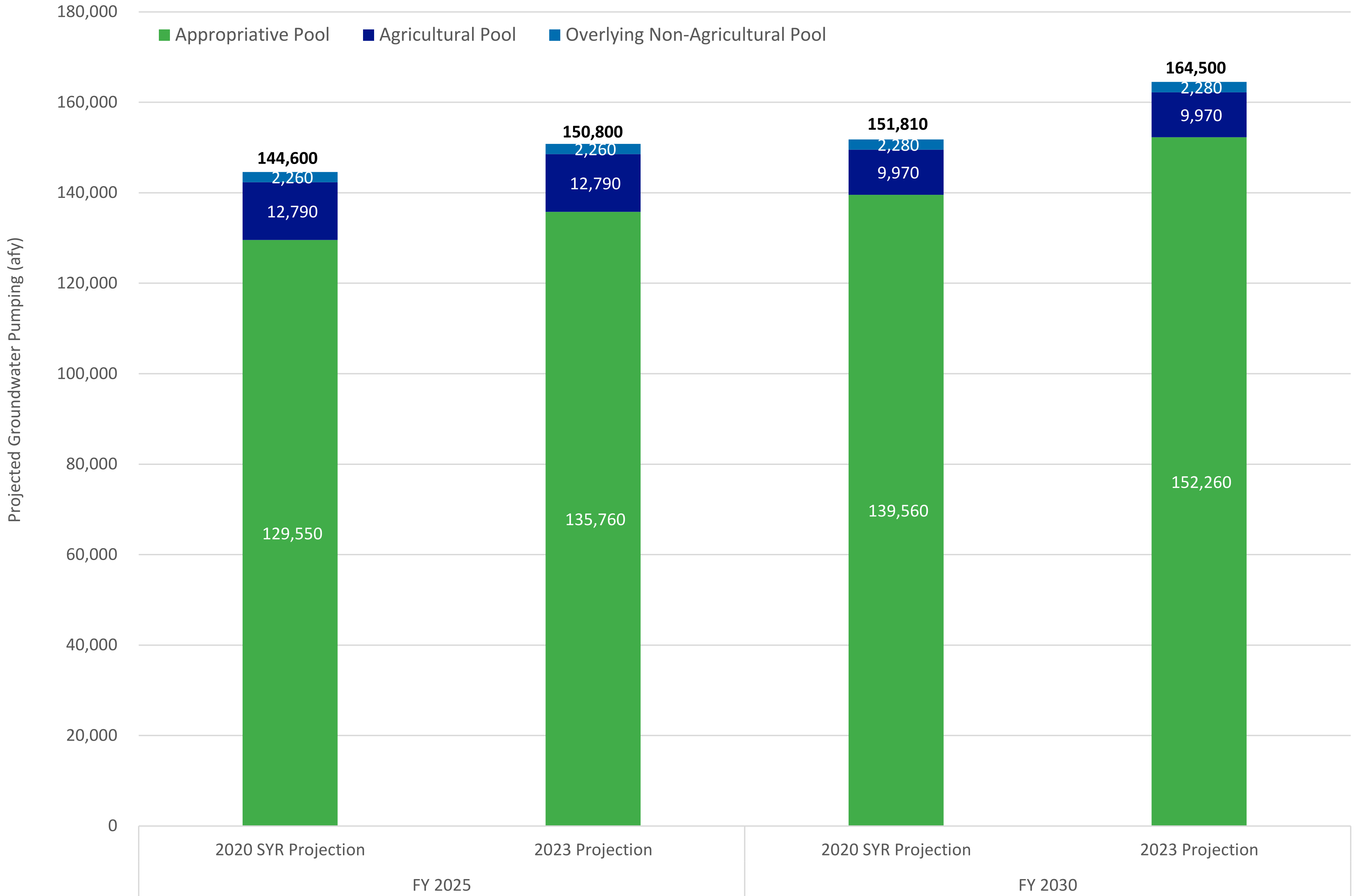


Figure 2-5 is a bar chart comparing 2020 SYR Projection to the 2023 Projection for pumping by MZ for FY 2025 and FY 2030. Figure 2-5 shows:

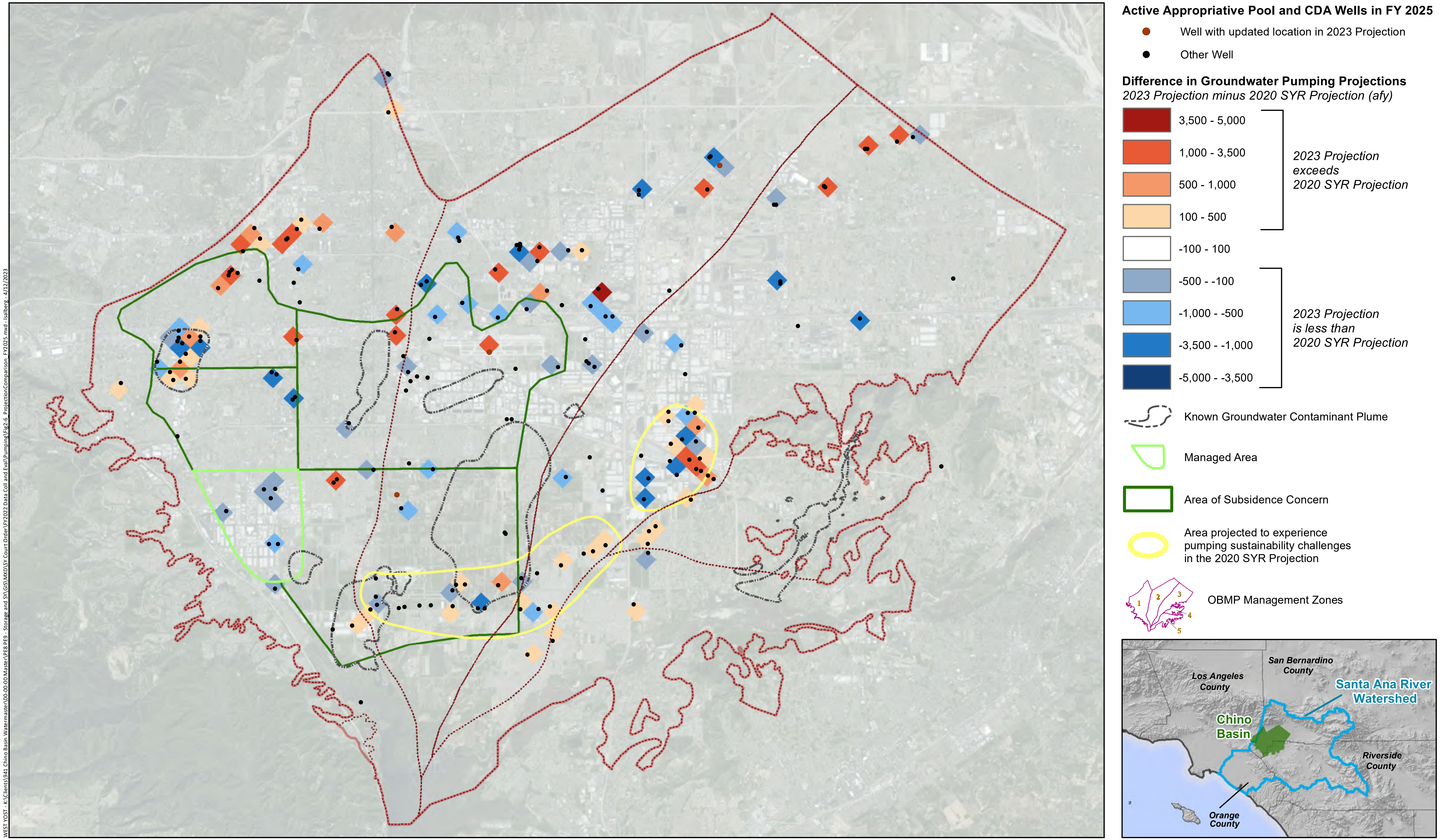
- The greatest difference between the 2023 Projection and the 2020 SYR occurs in MZ-1. The 2023 Projection for pumping is greater than the 2020 SYR Projection in MZ-1 by 10,100 afy for FY 2025 and by 11,000 afy in FY 2030. These differences are due to higher pumping projections provided by the Appropriative Pool Parties in MZ-1 for the 2023 Projection.

Figures 2-6 and 2-7 show the spatial differences between the 2020 SYR Projection and the 2023 Projection for pumping across the Chino Basin for FY 2025 and 2030, respectively, aggregated over a grid with half-mile square cells. Areas where the 2023 Projection for pumping is greater than the 2020 SYR Projection by more than 100 afy are shown in shades of orange and red. Areas where the 2023 Projection for pumping is less than the 2020 SYR Projection by more than 100 afy are shown in shades of blue. These figures include the same additional features as Figure 2-3 to assess the potential for new undesirable results.

An examination of Figures 2-6 and 2-7 reveals the following:

- The areas where the 2023 Projection for groundwater pumping is greater than the 2020 SYR Projection overlie the well fields of Parties that increased their 2023 Projection for pumping compared to their 2020 SYR Projection. The Parties for which the 2023 Projection for groundwater pumping is greater than the 2020 SYR Projection by 1,000 afy or more in FY 2025 or FY 2030 include: JCSD, Ontario, Upland, and MVWD.
- The areas where the 2023 Projection for pumping is less than the 2020 SYR Projection overlie the well fields of Parties that decreased their 2023 Projection for pumping compared to their 2020 SYR Projection. The Parties for which the 2023 Projection of pumping is less than the 2020 SYR Projection by 1,000 afy or more in FY 2025 or FY 2030 include: CVWD (FY 2025 only), Chino Hills, Chino, and FWC.
- The 2023 Projection for groundwater pumping is greater than the 2020 SYR Projection in several areas overlying the Northwest MZ-1 Area of Subsidence Concern in FY 2025 and FY 2030.
- The 2023 Projection for groundwater pumping is greater than the 2020 SYR Projection in several areas projected to experience pumping sustainability challenges in FY 2025 and FY 2030. These wells are primarily located in central MZ-3 near the JCSD well field.
- There are no significant differences between the 2023 Projection for pumping and the 2020 SYR Projection in the vicinity of groundwater contaminant plumes that would suggest these differences would change the speed and trajectory of groundwater contaminant plumes.

Figure 2-5. Comparison of 2020 SYR Projection versus 2022 Projection for Groundwater Pumping by Management Zone, FY 2025-2030



Prepared by:

WEST YOST

0 1 2 3 Miles

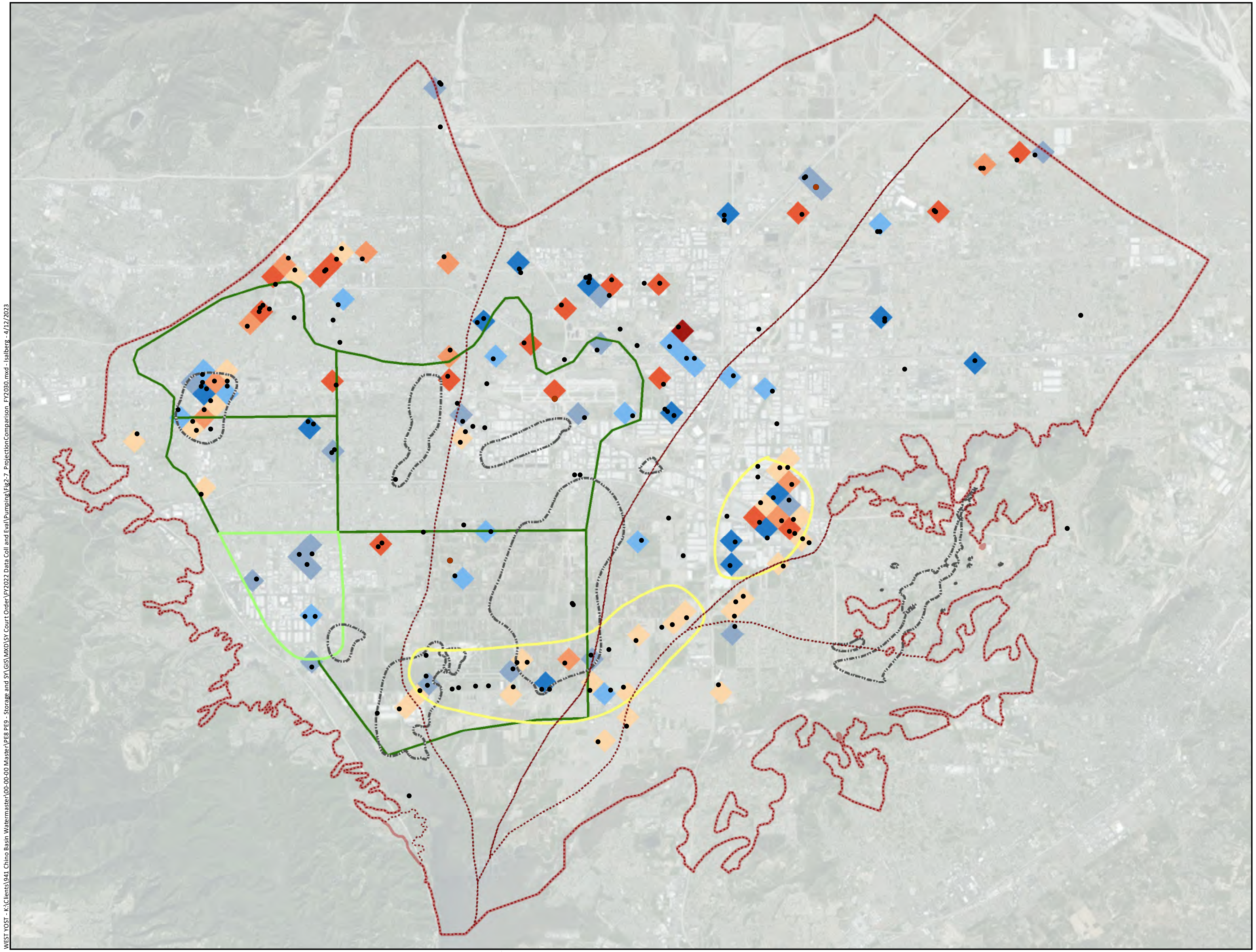
0 2 4 6 Km

Prepared for:

Chino Basin Watermaster
Data Collection and Evaluation
FY 2021/22

Comparison of Groundwater Pumping Projections
2020 SYR Projection versus 2023 Projection
FY 2025

Figure 2-6



Active Appropriative Pool and CDA Wells in FY 2030

- Well with updated location in 2023 Projection
- Other Well

Difference in Groundwater Pumping Projections
2023 Projection minus 2020 SYR Projection (afy)

3,500 - 5,000	*2023 Projection exceeds 2020 SYR Projection*
1,000 - 3,500	
500 - 1,000	
100 - 500	
-100 - 100	
-500 - -100	*2023 Projection is less than 2020 SYR Projection*
-1,000 - -500	
-3,500 - -1,000	
-5,000 - -3,500	

Known Groundwater Contaminant Plume

Managed Area

Area of Subsidence Concern

Area projected to experience pumping sustainability challenges in the 2020 SYR Projection

OBMP Management Zones

Prepared by:

WEST YOST

0 1 2 3 Miles

0 2 4 6 Km

Prepared for:

Chino Basin Watermaster
Data Collection and Evaluation
FY 2021/22

Comparison of Groundwater Pumping Projections
2020 SYR Projection versus 2023 Projection
FY 2030

Figure 2-7

2.3.3 Summary

The main observations and conclusions from this section are:

- **The 2019-22 Actual pumping was greater than assumed in the 2020 SYR Projection**. The 2019-22 Actual pumping was greater than the 2020 SYR Projection by about 10,900 afy. This difference is primarily due to the groundwater pumping for the DYYP in FY 2020, 2021, and 2022, which generally occurred in northern MZ-2. However, some of the areas where the 2019-22 Actual pumping was greater than the 2020 SYR Projection overlie the Northwest MZ-1 Area of Subsidence Concern and areas with projected pumping sustainability challenges. The greater 2019-22 Actual pumping in these areas may increase the risk for land subsidence and/or pumping sustainability challenges.
- **The 2023 Projection pumping was greater than assumed in the 2020 SYR Projection.** The 2023 Projection for pumping is greater than the 2020 SYR Projection in FY 2025 and FY 2030 by 6,200 afy and 12,700 afy, respectively. Greater pumping can result in lower groundwater levels and storage, and hence, greater net recharge by altering the groundwater/surface-water interactions in the southern Chino Basin. However, net recharge is also affected by recharge and its influence on storage. The findings and conclusions about the impact of differences in Managed Storage on net recharge are discussed in Chapter 6.
- **Differences between the 2023 Projection and the 2020 SYR Projection for pumping indicate the potential for increased risk of future undesirable results related to land subsidence and pumping sustainability.** The 2023 Projection for pumping is greater than the 2020 SYR Projection for pumping in MZ-1 by 10,100 afy in FY 2025 and by about 11,000 afy in FY 2030. Some of the areas where the 2023 Projection for groundwater pumping is greater than the 2020 SYR Projection overlie the Northwest MZ-1 Area of Subsidence Concern where Watermaster is currently developing a subsidence management plan. These differences indicate the potential for an increased risk of future land subsidence. Furthermore, some of the areas where the 2023 Projection for pumping is greater than the 2020 SYR Projection overlie areas where the 2020 SYR model results indicated the potential for pumping sustainability challenges, primarily near the JCSD well field. The differences between the 2023 Projection for pumping and the 2020 SYR Projection in this area indicate the potential increased risk of pumping sustainability challenges.

  It should be noted that Watermaster currently conducts monitoring and management to address potential land subsidence or pumping sustainability challenges through the implementation of the OBMP.

CHAPTER 3
Urban Outdoor Water Use

Chapter 3 documents the collection and evaluation of data and information on outdoor urban water use practices in the Chino Basin.

3.1 SUMMARY AND APPLICATION TO MODEL

Urban outdoor water use and the fate of these waters after use are a major driver of recharge in the Chino Basin. Typically, pervious urban landscapes are either covered with vegetation that is irrigated (e.g., lawns) or are unplanted and not irrigated. The soil underlying irrigated vegetation is usually moist, allowing some of the irrigation water and precipitation to infiltrate past the root zone to recharge the underlying groundwater basin. Changes in urban irrigation practices in response to climate, water conservation mandates, or other drivers affect the rates and volumes of infiltration of irrigation and precipitation past the root zone.

Urban outdoor water use was included in the CVM via the R4 model, which is used to calculate the deep infiltration of precipitation and applied water (DIPAW). The R4 model estimates applied water based on soil type, vegetation type, irrigation method, precipitation, and ET. The R4 model calculates the soil moisture available for use by vegetation and determines the rates/volumes of applied water needed for irrigation. The R4 model estimates the infiltration of applied water and precipitation past the root zone that constitutes DIPAW. The R4 model was calibrated to match urban outdoor water use patterns in areas where there are sufficient data to estimate urban outdoor water use; specifically, these areas are tributary to Inland Empire Utilities Agency's (IEUA) major wastewater treatment plants (sewersheds) from FY 1991 through 2018.

For the 2020 SYR, the R4 model was calibrated by comparing estimated actual potable urban outdoor water use with the model-simulated applied water on residential, commercial, and industrial land uses. Recycled water applied for irrigation was not considered in the calibration because it has historically been a small portion of the irrigation water applied to these land uses.[1] Land uses such as parks, golf courses, and schools were excluded from the calibration, as they are generally irrigated with recycled water.

Projections of future urban outdoor water use using the R4 model rely on projections of future precipitation, evapotranspiration (ET), land use, and irrigation behavior. Trends in urban outdoor water use are important to understand as they can affect DIPAW, which affects groundwater levels and the water budget, including net recharge.

3.2 COLLECTION OF DATA AND INFORMATION

This section describes how the data and information for urban outdoor water use were collected and compiled for this report.

[1] Based on the IEUA recycled water meter database, the volume of recycled water that was reused in the areas of model calibration ranged from about 3,000 to 5,000 afy since FY 2016, which is less than six percent of the annual potable urban outdoor water use estimates.

3.2.1 2019-22 Actual Data

Estimates for urban outdoor water use are derived from data collected from IEUA's two major sewersheds that cover most of the Chino Basin, which are the RP1/RP4 and Carbon Canyon (CC)/RP5 sewersheds. The methodology to derive estimates of urban outdoor water use is:

1. Obtain data from IEUA for monthly recycled water deliveries to customers in the sewershed that use recycled water for outdoor irrigation.
2. Obtain data from IEUA (and/or the Parties overlying the sewershed) for monthly potable water deliveries to the sewershed.
3. Obtain from each Party overlying the sewershed the annual estimates of the potable water delivery losses.
4. Obtain from IEUA the monthly sewage inflow to the wastewater treatment plants (i.e., estimated indoor water use).
5. Estimate the monthly dry-weather discharge using available discharge estimates from the USGS gage on Cucamonga Creek.
6. Estimate the monthly discharge from on-site waste disposal systems (OWDS) overlying the sewershed.
7. Calculate the monthly urban outdoor water use by using the formula:

   Urban Outdoor Water Use = [Water delivered to watershed] – [Water not used for irrigation]

   or

   Urban Outdoor Water Use = [(1) + (2)] – [(3) + (4) + (5) + (6)]

3.2.2 2020 SYR Projection

In the 2020 SYR, projected urban outdoor water use was estimated with the R4 model based on the calibrated parameters and the following assumptions:

- **Average expected-value hydrology adjusted for climate change.** The Safe Yield Reset methodology calls for the use of the "long-term historical record of precipitation falling on current and projected future land uses to estimate the long-term average net recharge to the Basin." Future precipitation and ET datasets used in the R4 model were based on the historical datasets for the period FY 1950 through 2011, which were adjusted for future climate conditions based on the method recommended by the California Department of Water Resources (DWR) for use in groundwater models to simulate future water budgets pursuant to the Sustainable Groundwater Management Act (SGMA) (DWR, 2018).[2,3]
- **The impact of current and future urban outdoor water use conservation legislation was not included.** On April 1, 2015, Governor Jerry Brown released Executive Order B-29-15, which mandated a statewide reduction in urban potable water usage of 25 percent through

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[2] More detail on the development of future hydrology can be found in Section 7 of the 2020 SYR Report.

[3] DWR. Resource Guide - DWR-provided Climate Change Data and Guidance for Use During Groundwater Sustainability Plan Development. 2018.

February 2016. Additionally, in 2018 the California legislature passed, and the Governor signed, two pieces of legislation (AB 1668 & SB 606) collectively known as “Making Conservation a California Way of Life” to establish new water efficiency standards for purveyors in response to the California drought. The legislation requires water suppliers to meet agency-specific urban water use objectives beginning in 2027. Details on the implementation of this legislation were insufficient at the time to include in the 2020 SYR Projection. The 2020 SYR Projection assumed that outdoor water use patterns for legacy urban areas would reflect recent historical patterns. Areas projected for future development would implement more efficient outdoor water use consistent with the guidance provided in the DWR’s 2015 Model Water Efficient Landscape Ordinance.[4]

3.2.3 2023 Projection

The 2023 Projection for urban outdoor water use was developed by reexamining the assumptions used to develop the 2020 SYR Projection, reviewing the latest information by the State Water Resources Control Board (State Board), the DWR, and wholesale agencies (e.g., the Metropolitan Water District of Southern California [MWD]) regarding targets to reduce urban outdoor water use, and obtaining input from the Parties on projected changes to urban outdoor water use.

As part of the 2022 data request, the major Appropriative Pool Parties were asked to provide information on projected changes to urban outdoor water use and any progress towards setting or complying with outdoor water use regulations. During the first workshop for this report in December 2022, Watermaster facilitated an informal discussion with the stakeholders to determine the Parties’ understanding of and potential responses to any future urban outdoor water use regulations. This discussion was used to inform the 2023 Projection.

3.3 EVALUATION

This section compares the 2020 SYR Projection to the 2019-22 Actual Data and the 2023 Projection for urban outdoor water use and evaluates the significance of the differences.

3.3.1 2019-22 Actual Data versus 2020 SYR Projection

Figure 3-1 compares the 2019-22 Actual urban outdoor water use to the 2020 SYR Projection. The 2020 SYR Projection is greater than the 2019-22 Actual urban outdoor water use by 16,100 afy. This is likely due to the reduction in urban outdoor water use effectuated by Executive Order B-29-15.

3.3.2 2023 Projection versus 2020 SYR Projection

In October 2021, after the 2020 SYR Projection was developed, the DWR proposed a provisional method to calculate agency-specific outdoor water efficiency objectives to implement the 2018 legislation. The State Board is considering DWR’s proposed rules and is expected to initiate rulemaking for outdoor water use standards following a workshop on March 22, 2023. The Association of California Water Agencies has voiced concerns on the feasibility of the DWR’s rules and has submitted additional outdoor water use policy recommendations to the State Board.

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[4] DWR. *Model Water Efficient Landscape Ordinance*. Accessed March 25, 2022.

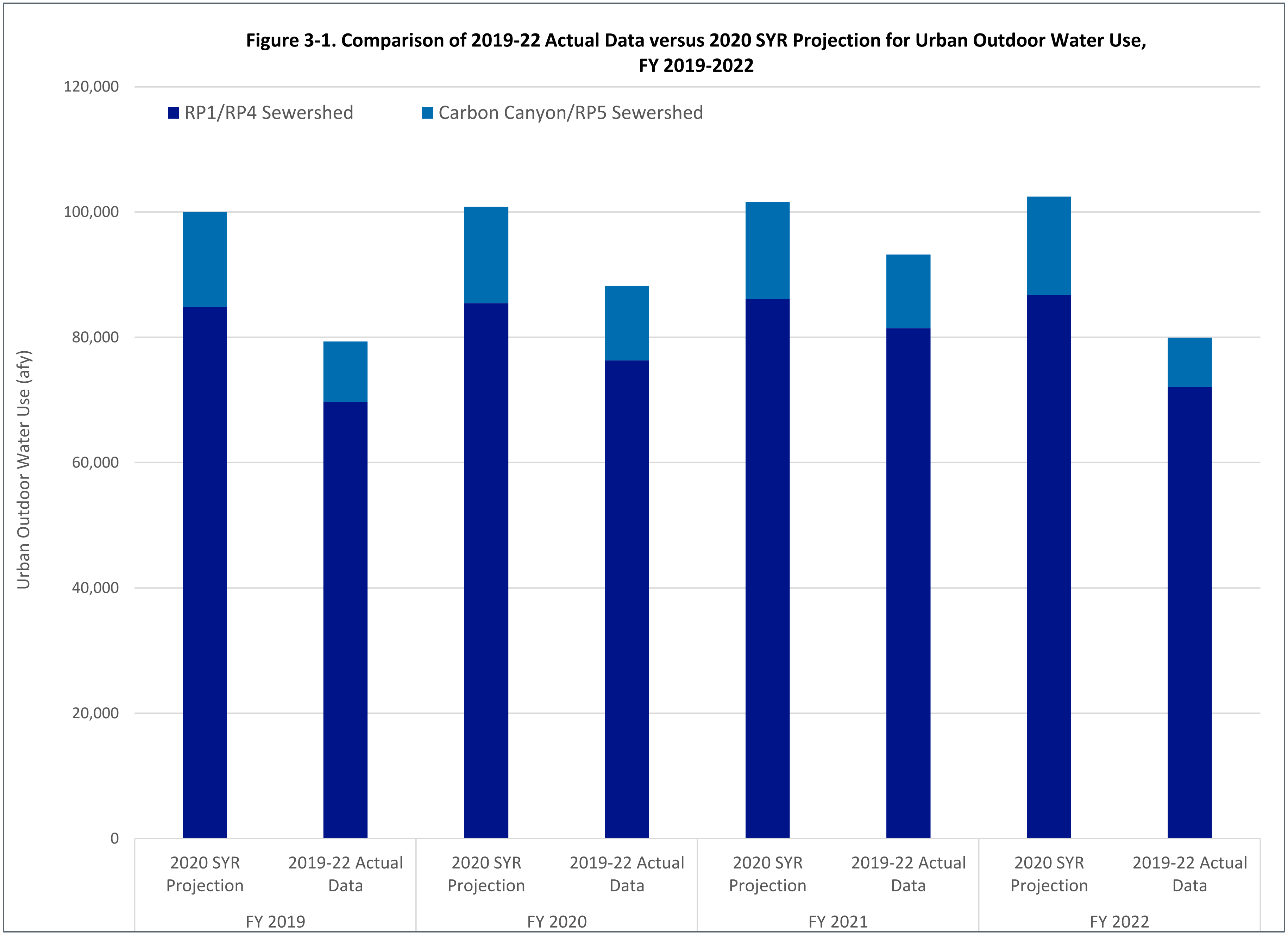


Figure 3-1. Comparison of 2019-22 Actual Data versus 2020 SYR Projection for Urban Outdoor Water Use, FY 2019-2022
RP1/RP4 Sewershed
Carbon Canyon/RP5 Sewershed
Urban Outdoor Water Use (afy)
120,000
100,000
80,000
60,000
40,000
20,000
0
2020 SYR Projection
2019-22 Actual Data
FY 2019
FY 2020
FY 2021
FY 2022

Input from the Parties from the data request and the December 2022 workshop indicated a general expectation for greater reductions in future urban outdoor water use. In response to current conservation regulations, many of the Parties have been successful in reducing urban outdoor water use. During the workshop, Parties discussed the uncertainty in the future regulations regarding urban outdoor water use, the availability and efficacy of enforcement tools, and challenges in collecting reliable data on outdoor water use.

Based on current regulatory activity and discussions with the Parties, there is not sufficient information to develop a precise 2023 Projection for urban outdoor water use. However, available information indicates that future outdoor water use will continue to follow similar patterns that are reflected in the 2019-22 Actual urban outdoor water use, which is less than the 2020 SYR Projection.

3.3.3 Summary

The main observations and conclusions from this section are:

- **The 2019-22 Actual urban outdoor water use was less than assumed in the 2020 SYR Projection.** The 2020 SYR Projection urban outdoor water use was greater than the 2019-22 Actual urban outdoor water use by 16,100 afy. This observation suggests that less DIPAW from the root zone occurred during 2019-22 compared to the 2020 SYR Projection. The effect of this reduction in urban outdoor water use on DIPAW and net recharge to the saturated zone depends on the location of the applied water and the travel time between the root zone and the saturated zone, which ranges from less than one year to over 30 years in the Chino Basin. Therefore, these effects would take several years to significantly affect DIPAW to the saturated zone and the net recharge of the Basin.[5]
- **Future outdoor urban water use is likely to be less than the 2020 SYR Projection.** The current information regarding the implementation of water conservation legislation and practices in California is insufficient to develop a 2023 Projection for urban outdoor water use. However, based on the available information and the 2019-22 Actual Data, it is likely that future patterns of urban outdoor water use will be less than the 2020 SYR Projection, which would result in less DIPAW compared to the 2020 SYR Projection. The effect of less urban outdoor water use would likely take several years to measurably affect DIPAW to the saturated zone and the net recharge to the Basin.

[5] See Section 7 and Figure 7-4 of the 2020 SYR Report. The 2020 SYR Projection for the discharge of DIPAW to the vadose zone (dashed green line in Figure 7-4) is greater than the estimated discharge from the vadose zone to the saturated zone at the beginning of the 2020 SYR projection (beginning of the dotted blue line in Figure 7-4). The estimated discharge from the vadose zone to the saturated zone (dotted blue line in Figure 7-4) increases gradually throughout the 2020 SYR Projection period, asymptotically reaching the discharge of DIPAW to the vadose zone. This demonstrates the lag between changes of DIPAW at the surface and changes in discharge to the saturated zone that affect net recharge.

CHAPTER 4
Managed Groundwater Recharge

Chapter 4 documents the collection and evaluation of data and information on managed groundwater recharge in the Chino Basin.

4.1 SUMMARY AND APPLICATION TO MODEL

Managed groundwater recharge (also known as managed aquifer recharge or managed recharge) is the deliberate recharge of water into an aquifer. Watermaster has collaborated with the Parties and local agencies to enhance managed recharge in the Chino Basin through the implementation of Program Element 2 of the Optimum Basin Management Program (OBMP), which is to develop and implement a comprehensive recharge program.

The types of water recharged in the Chino Basin include stormwater and supplemental water. Stormwater is the runoff generated from rainfall within the Chino Basin watershed, some of which can be routed to recharge facilities within the Chino Basin. Stormwater recharge varies from year to year, and the volume of recharge is dependent on precipitation, which is highly variable, and the capacity and operation of the recharge facilities. Supplemental water includes recycled water and water that originates from outside the Chino Basin (i.e., imported water from the State Water Project). Supplemental water recharge is also highly variable and is dependent on the water-supply plans of the Parties, actions and coordination with outside agencies recharging in the Chino Basin (e.g., MWD's DYYP), and the capacity and operation of the recharge facilities.

Managed recharge occurs in the Chino Basin via spreading of surface water at recharge basins, injection at aquifer storage and recovery (ASR) facilities, infiltration at Municipal Separate Storm Sewer System (MS4) facilities, and in-lieu recharge, which are all documented in detail in the 2018 Recharge Master Plan Update (2018 RMPU).[1] Each method for managed recharge is listed below, including a description of how each of these recharge terms are input into the CVM:

- **Recharge Basins.** Recharge basins are the flood control and conservation basins that the IEUA, Chino Basin Water Conservation District (CBWCD), and the San Bernardino County Flood Control District own and operate. Recharge at these basins is input to the CVM as a specified inflow at the model cells corresponding to the recharge basins. Figure 4-1 shows the locations of the recharge basins in the Chino Basin where managed recharge occurs.
- **Aquifer Storage and Recovery Facilities.** ASR facilities are wells that are equipped for the injection of surface water and extraction of groundwater. Data for the injection and extraction of water from the ASR facilities is input into the CVM as a specified inflow at the location of the ASR well. Figure 4-1 shows the locations of the current and future known ASR facilities in the Chino Basin.
- **MS4 Facilities.** MS4 facilities include facilities to capture stormwater runoff in an urban area. Los Angeles, San Bernardino, and Riverside Counties, and/or the cities within these counties, have MS4 facilities in the Chino Basin. A reconnaissance-level study completed during the development of the 2018 RMPU estimated that there were 114 known MS4 facilities that have been constructed in the Chino Basin through FY 2016 that included infiltration features that would contribute to new stormwater recharge in the Chino Basin. The data that has been collected on the performance and maintenance of the MS4 facilities has been insufficient to

[1] WEI. 2018 Recharge Master Plan Update. Prepared for the Chino Basin Watermaster. September 2018.

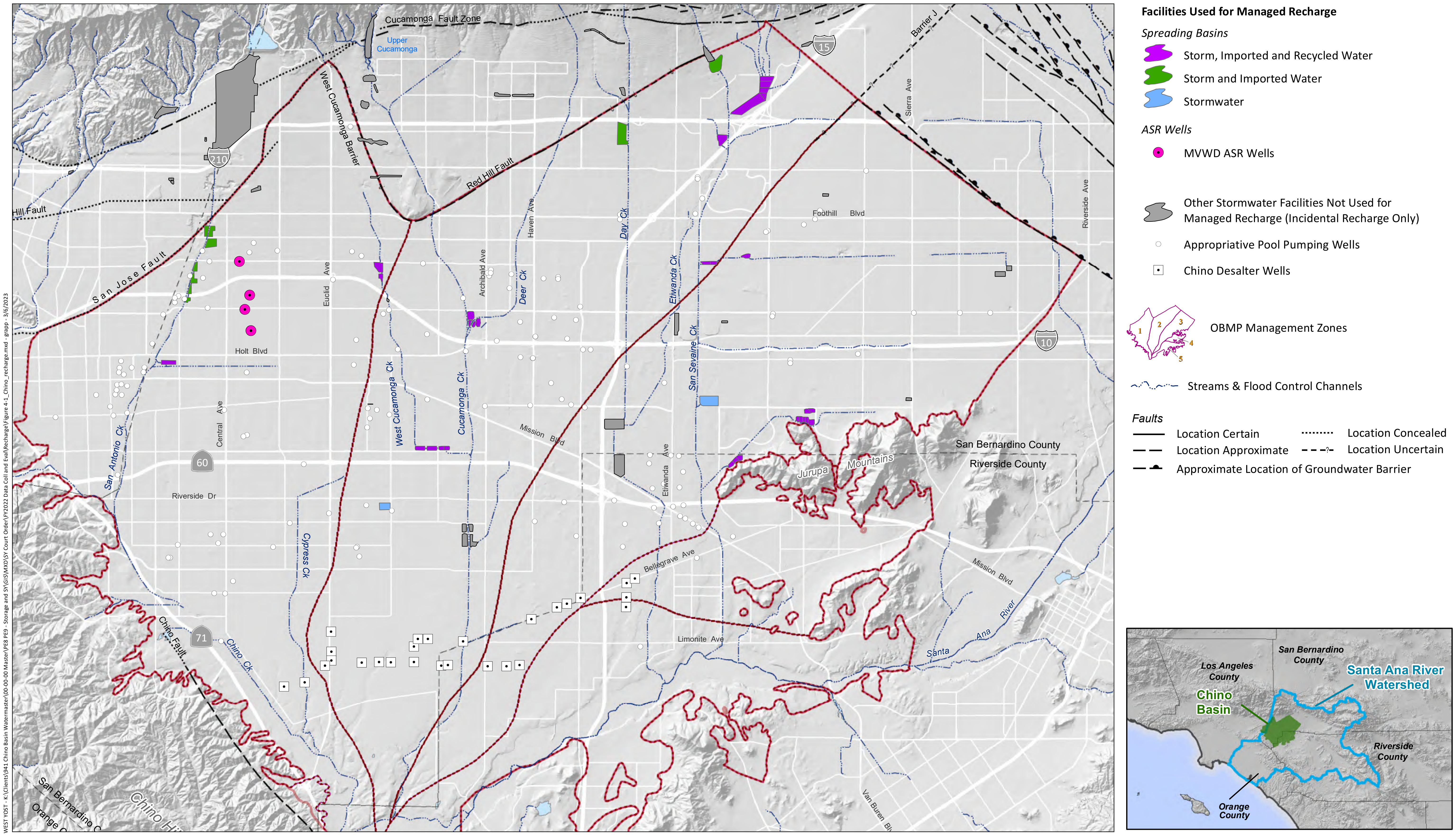
quantify the historical or projected contribution of these facilities to new recharge in the Chino Basin. The CVM does not explicitly account for recharge at these facilities.

- **In-lieu Recharge.** In-lieu recharge can occur when a Party with pumping rights in the Chino Basin uses supplemental water for direct use in lieu of pumping Chino Basin groundwater. The ability of a Party to conduct in-lieu recharge depends on the extent of a Party's access to treatment and conveyance facilities for imported water. In-lieu recharge is reflected in a Party's water supply plan and is not a direct input into the CVM.

Historical data on managed recharge is one of several input datasets in the CVM calibration scenario. The CVM's R4 surface water model is calibrated to match the IEUA's estimates of stormwater recharge at recharge basins. The CVM groundwater model was calibrated over the period of July 1, 1977 through June 30, 2018 by adjusting model parameters to produce the best match between simulated and observed system responses, including the time series of surface water discharge into the Prado Dam reservoir and groundwater levels at wells.[2]

Projections of future managed recharge are used to develop the model projection scenarios, that are then simulated with the CVM to estimate the future water budget of the Chino Basin, including net recharge. Managed recharge patterns (magnitude and location) are important as they affect groundwater levels, water budget components, and net recharge in the Chino Basin.

[2] More information on the calibration process of the CVM can be found in Section 6 of the 2020 SYR Report.



Prepared by:

WEST YOST

Prepared for:

Chino Basin Watermaster
Data Collection and Evaluation
FY 2021/22

Managed Recharge in the Chino Basin

Figure 4-1

4.2 COLLECTION OF DATA AND INFORMATION

This section describes how the data and information for managed recharge were collected and compiled for this report.

4.2.1 Stormwater Recharge

4.2.1.1 2019-22 Actual Data

Stormwater recharge is metered at each recharge basin by the IEUA. The IEUA provides Watermaster the daily and monthly measurements of stormwater diverted to each recharge basin. Watermaster maintains these data in a database.

4.2.1.2 2020 SYR Projection

For the 2020 SYR, projections of stormwater recharge at recharge basins were estimated with the R4 model based on the following assumptions:

- **Average expected-value hydrology adjusted for climate change.** The Safe Yield Reset methodology employed for the 2020 SYR calls for the use of the "long-term historical record of precipitation falling on current and projected future land uses to estimate the long-term average net recharge to the Basin." Future precipitation and ET datasets used in the R4 model are based the historical datasets for the period of FY 1950 through 2011, which were adjusted for future climate conditions based on the method recommended by the DWR for model simulations of future water budgets pursuant to the SGMA (DWR, 2018).[3]
- **2013 RMPU projects would be fully operational by FY 2023.** During the development of the 2020 SYR Projection, the design and construction of the approved recharge enhancement projects in the 2013 RMPU were underway. The assumptions in the 2020 SYR Projection were that all approved 2013 RMPU projects would be completed by FY 2023, at which point the expected stormwater recharge increases by the R4-estimated volumes for each project.

4.2.1.3 2023 Projection

The 2023 Projection was developed by reexamining the assumptions used to develop the 2020 SYR Projection. Since the development of the 2020 SYR Projection, there is no updated information that would necessitate a change in the data or methods used to develop the long-term hydrology used in the 2020 SYR Projection. All 2013 RMPU projects are expected to be completed by FY 2023 except for the Montclair Basin improvements, which are expected to be completed in FY 2024. The Montclair Basin improvements are expected to result in an increase in stormwater recharge of about 96 afy. There are no expected additional stormwater recharge projects planned for construction through FY 2030.

[3] More detail on the development of future hydrology can be found in Section 7 of the 2020 SYR Report.

4.2.2 Recycled Water Recharge

4.2.2.1 2019-22 Actual Data

Recycled water recharge is metered at each recharge basin by the IEUA. The IEUA provides Watermaster the daily and monthly measurements of recycled water delivered to each recharge basin, adjusted for evaporative losses. Watermaster maintains these data in a database.

4.2.2.2 2020 SYR Projection

The IEUA provided projections of future annual recycled water recharge at each recharge basin. The Watermaster Engineer reduced the IEUA projections for the 2020 SYR Projection to be more consistent with the then-recent history of recycled water recharge that occurred prior to FY 2019.

4.2.2.3 2023 Projection

The IEUA provided updated recycled water recharge projections in 2023.

4.2.3 Imported Water Recharge

4.2.3.1 2019-22 Actual Data

Imported water recharge is metered at each recharge basin by the IEUA. The IEUA provides Watermaster the daily and monthly measurements of imported water delivered to each recharge basin, adjusted for evaporative losses. Volumes of imported water injected into ASR wells in the Chino Basin are reported to Watermaster quarterly by the well owners. Watermaster maintains these data in a database.

4.2.3.2 2020 SYR Projection

For the 2020 SYR Projection, estimates of future imported water recharge were based on the following:

- **Storage and Recovery Programs.** The only active Storage and Recovery Program in the Chino Basin is the DYYP. This program involves the recharge of imported water in the Chino Basin for later extraction via Chino Basin wells. At the end of the calibration period (June 30, 2018), the DYYP had a balance of about 41,380 af. The future operations of the DYYP were uncertain beyond the calibration period, so no recharge for the DYYP was included in the 2020 SYR Projection.
- **Peace II Agreement requirements.** Pursuant to the Peace II Agreement, 6,500 afy of supplemental water must be recharged in MZ-1 through 2030. The 2020 SYR Projection assumed that “this obligation will be satisfied through the recharge of imported water for the [DYYP] that has already occurred and recycled water recharge planned to occur in MZ1 through 2030.” (2020 SYR Report).

- **Replenishment obligations.** Imported water was assumed to be recharged in the future to satisfy the replenishment obligations of the Parties. To estimate the volume of replenishment obligations and Managed Storage,[4] Watermaster compared estimates of future pumping to future pumping rights, as summarized below.[5]
  - Projections of future pumping rights were based on the Safe Yield (through FY 2020), projected average net recharge (for each decade after FY 2020), Reoperation water, and projected recycled water recharge.
  - If projected pumping was greater than projected pumping rights, the difference was the replenishment obligation. It was assumed that the replenishment obligation would be satisfied 80 percent by debits from Managed Storage accounts and the remaining 20 percent by wet-water (imported water) recharge.
- **Projected imported water recharge at ASR wells.** No imported water was assumed to be recharged via ASR wells in the 2020 SYR.

The projected imported water recharge was allocated to specific recharge basins based on the recommendation in the 2018 RMPU (WEI, 2018), which stated the following:

> *"WEI's recommendation to Watermaster regarding the location and magnitude of supplemental water recharge for replenishment has been to maximize recharge to MZ1 up to its spreading capacity, then to maximize recharge in MZ3 up to its recharge capacity, and then to recharge in MZ2. This strategy was developed during the [2013] safe yield recalculation and subsequently reevaluated in the Storage Framework investigation. Given that the long-term land subsidence management plan for Northwest MZ1 has not yet been completed and there are no projected recharge-related pumping substantiality challenges that can be practically mitigated through recharge, the existing strategy and the facilities on which it relies are sufficient at least until the next RMPU occurs in 2023. This includes continuing the recharge of 6,500 afy of supplemental water in MZ1 until the next RMPU occurs in 2023."*

4.2.3.3 2023 Projection

For the 2023 Projection, estimates of future imported water recharge were based on the following:

- **Storage and Recovery Programs.** The only active Storage and Recovery Program remains the DYYP, which had a zero balance at the end of FY 2022. No recharge for the DYYP was included in the 2023 Projection.
- **Peace II Agreement requirements.** There have been no changes to the Peace II Agreement requirements, thus 6,500 afy of supplemental water must continue to be recharged in MZ-1 through 2030. It is still assumed that "this obligation will be satisfied through the recharge of imported water for the [DYYP] that has already occurred and recycled water recharge planned to occur in MZ1 through 2030."

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[4] Managed Storage, as used herein, refers to water stored by the Parties and other entities, and includes Carryover, Local Storage, and Supplemental Water held in storage accounts by the Parties, and Storage and Recovery Programs.

[5] More detail on the methods to calculate the replenishment obligation can be found in Section 7.3.1.2 of the 2020 SYR Report.

- **Replenishment obligations.** The 2023 Projection for Managed Storage and the replenishment obligations were developed using the same methodology as for the 2020 SYR Projection but updated with the 2023 Projection for groundwater pumping and recycled water recharge. In 2022, as part of Watermaster's data request to the Appropriative Pool Parties, Watermaster requested 20-year operating plans for groundwater pumping, transfers, and the use of Managed Storage to meet any future replenishment obligations. Based on the Parties' responses, the average percentage[6] of future replenishment obligations that the Parties expected to meet through debits from Managed Storage accounts was about 90 percent, with the other 10 percent expected to be met with imported water recharge. Most of the Parties expressed some uncertainty in these estimates, noting that future availability and cost of imported water has been more volatile in recent years.
- **Projected imported water recharge at ASR wells.** The Parties indicated that no imported water should be assumed to be recharged via ASR wells in the 2023 Projection.

4.3 EVALUATION

This section compares the 2020 SYR Projection to the 2019-22 Actual Data and the 2023 Projection for managed recharge and evaluates the significance of the differences. Figure 4-2 is a chart that compares the 2019-22 Actual Data, 2020 SYR Projection, and the 2023 Projection for managed recharge for FY 2019-2030.

4.3.1 Stormwater Recharge

4.3.1.1 2019-22 Actual Data versus 2020 SYR Projection

Year-to-year, the 2019-22 Actual stormwater recharge was sometimes greater and sometimes less than stormwater recharge in the 2020 SYR Projection, which is to be expected given the interannual variability in precipitation. On average, the 2019-22 Actual stormwater recharge was less than the 2020 SYR Projection by 1,500 afy.

4.3.1.2 2023 Projection versus 2020 SYR Projection

The 2023 Projection of stormwater recharge is about the same as the 2020 SYR Projection (14,300 afy).

4.3.2 Recycled Water Recharge

4.3.2.1 2020 SYR Projection versus 2019-22 Actual Data

On average, the 2019-22 Actual recycled water recharge was about the same as the 2020 SYR Projection (13,700 afy).

4.3.2.2 2020 SYR Projection versus 2023 Projection

The 2023 Projection for recycled water recharge is greater than the 2020 SYR Projection by an average of 1,020 afy from FY 2023 through FY 2030.

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[6] A volume-weighted average percentage was calculated based on each Party's respective Managed Storage account balance at the end of FY 2022.

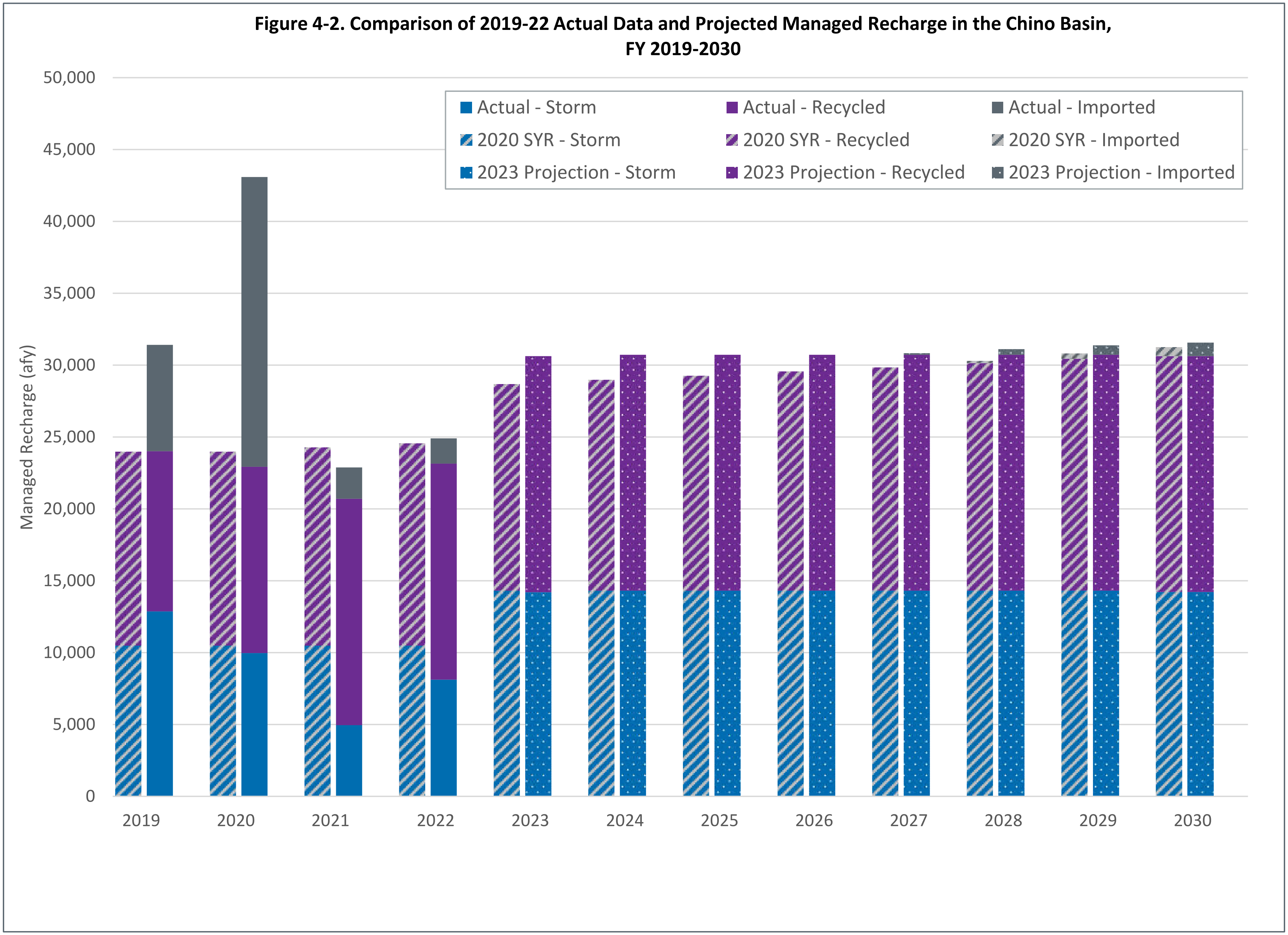


Figure 4-2. Comparison of 2019-22 Actual Data and Projected Managed Recharge in the Chino Basin, FY 2019-2030
Managed Recharge (afy)
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
Actual - Storm
Actual - Recycled
Actual - Imported
2020 SYR - Storm
2020 SYR - Recycled
2020 SYR - Imported
2023 Projection - Storm
2023 Projection - Recycled
2023 Projection - Imported
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
2029
2030

4.3.3 Imported Water Recharge

4.3.3.1 2020 SYR Projection versus 2019-22 Actual Data

On average, the 2019-22 Actual imported water recharge was greater than the 2020 SYR Projection by 7,870 afy. This is almost entirely due to imported water recharge for the DYYP during FY 2019 and 2020.

4.3.3.2 2020 SYR Projection versus 2023 Projection

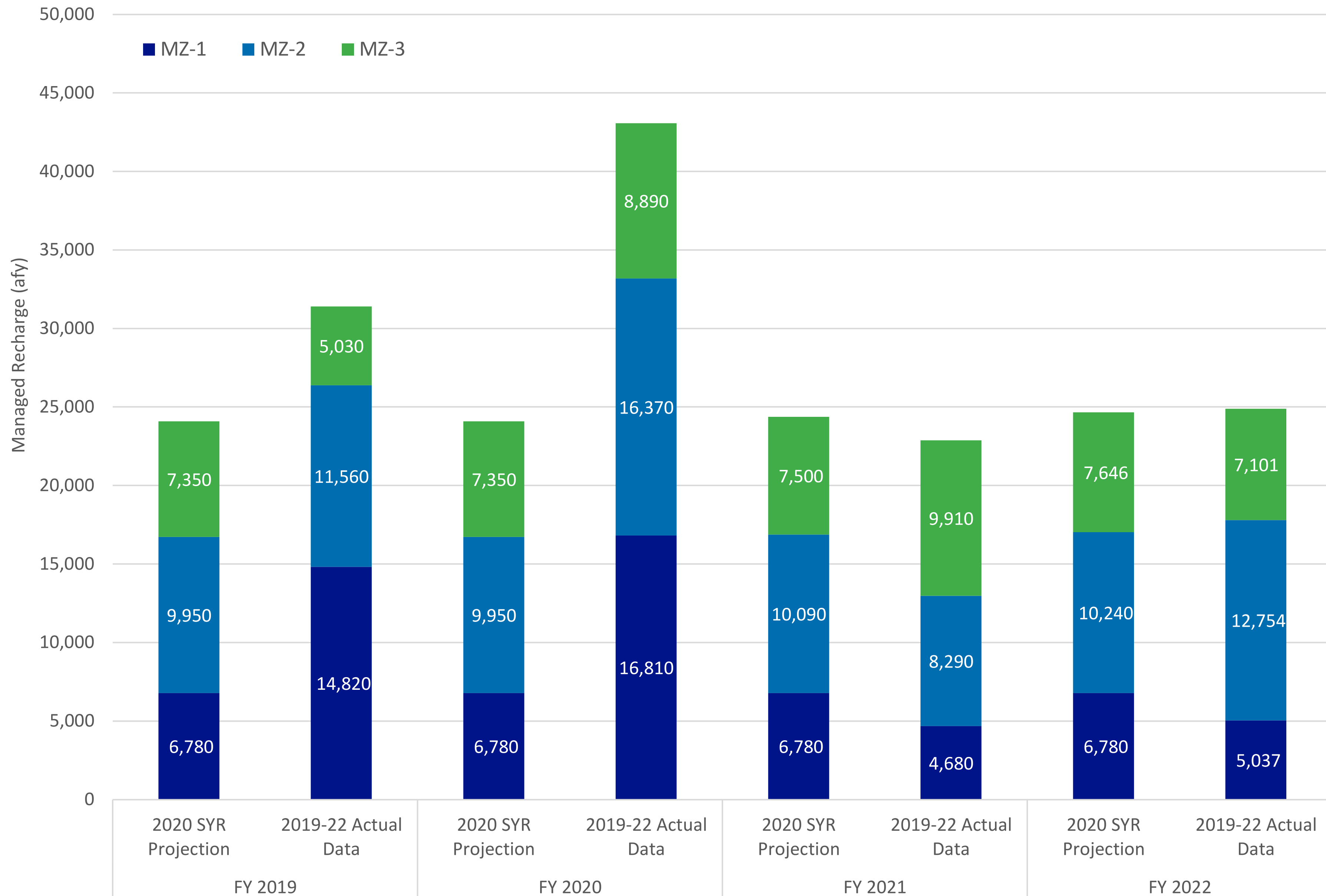
The 2023 Projection for imported water recharge during FY 2027 through 2030 is greater than the 2020 SYR Projection by an average of 230 afy. This is due to the higher pumping projections in the 2023 Projection that result in a replenishment obligation that is partially satisfied with imported water recharge.

4.3.4 Summary

The main observations and conclusions from this section are:

- **The 2019-22 Actual managed recharge in MZ-1 was greater than assumed in the 2020 SYR Projection.** Figure 4-3 compares the 2019-22 Actual managed recharge to the 2020 SYR Projection by MZ. The 2019-22 Actual managed recharge was greater than the 2020 SYR Projection by an average of about 6,300 afy, including 3,600 afy in MZ-1. This was largely due to the imported water recharged for the DYYP. The facilities for managed recharge in MZ-1 are all located in the northwest portion of MZ-1, where persistent land subsidence has been occurring for decades and the Watermaster is currently developing a subsidence management plan. The greater volumes of managed recharge in MZ-1 can help support groundwater levels in this area and help mitigate the occurrence of land subsidence.
- **The 2019-22 Actual stormwater recharge was less than assumed in the 2020 SYR Projection.** The 2019-22 Actual stormwater recharge in the Chino Basin was less than the 2020 SYR Projection by about 1,500 afy. Differences between actual and projected stormwater recharge are to be expected because (i) precipitation and runoff are highly variable and (ii) the projections are based on long-term expected average hydrology adjusted for climate change. Over longer time periods, Actual stormwater recharge should become approximately equal to the projections assuming stationary climate conditions.

Figure 4-3. Comparison of 2019-22 Actual Data versus 2020 SYR Projection for Managed Recharge by Management Zone, FY 2019-2022



CHAPTER 5
Regional Water Infrastructure

Chapter 5 documents the collection and evaluation of data and information on regional water infrastructure in the Chino Basin.

5.1 SUMMARY AND APPLICATION TO MODEL

As the overlying land uses and water use practices in the Chino Basin have converted from mainly agricultural to mainly urban since the Judgment, the water-supply agencies have constructed a complex network of infrastructure to utilize a diverse set of water supplies to meet demands. In addition to pumping from the Chino Basin, the Watermaster Parties (generally in the Appropriative Pool) develop and use: groundwater from surrounding basins, local surface water, imported water from MWD or other entities, and recycled water. As the availability, cost, and quality of these supplies fluctuate, each agency decides how to serve their dynamic demands. The patterns in groundwater pumping that result from these decisions can affect the hydraulic interactions between the Chino Basin, adjacent groundwater basins, and the Santa Ana River.

In addition to the urbanization of lands in the Chino Basin, infrastructure was built to convey stormwater runoff rapidly, safely, and efficiently away from agricultural and urban areas. This further reduced the areal recharge in the Chino Basin. Since the late 1990s, efforts of the Watermaster and Chino Basin stakeholders to develop and implement Recharge Master Plans have helped offset the reduced recharge in the Chino Basin while maintaining flood-control capacity.

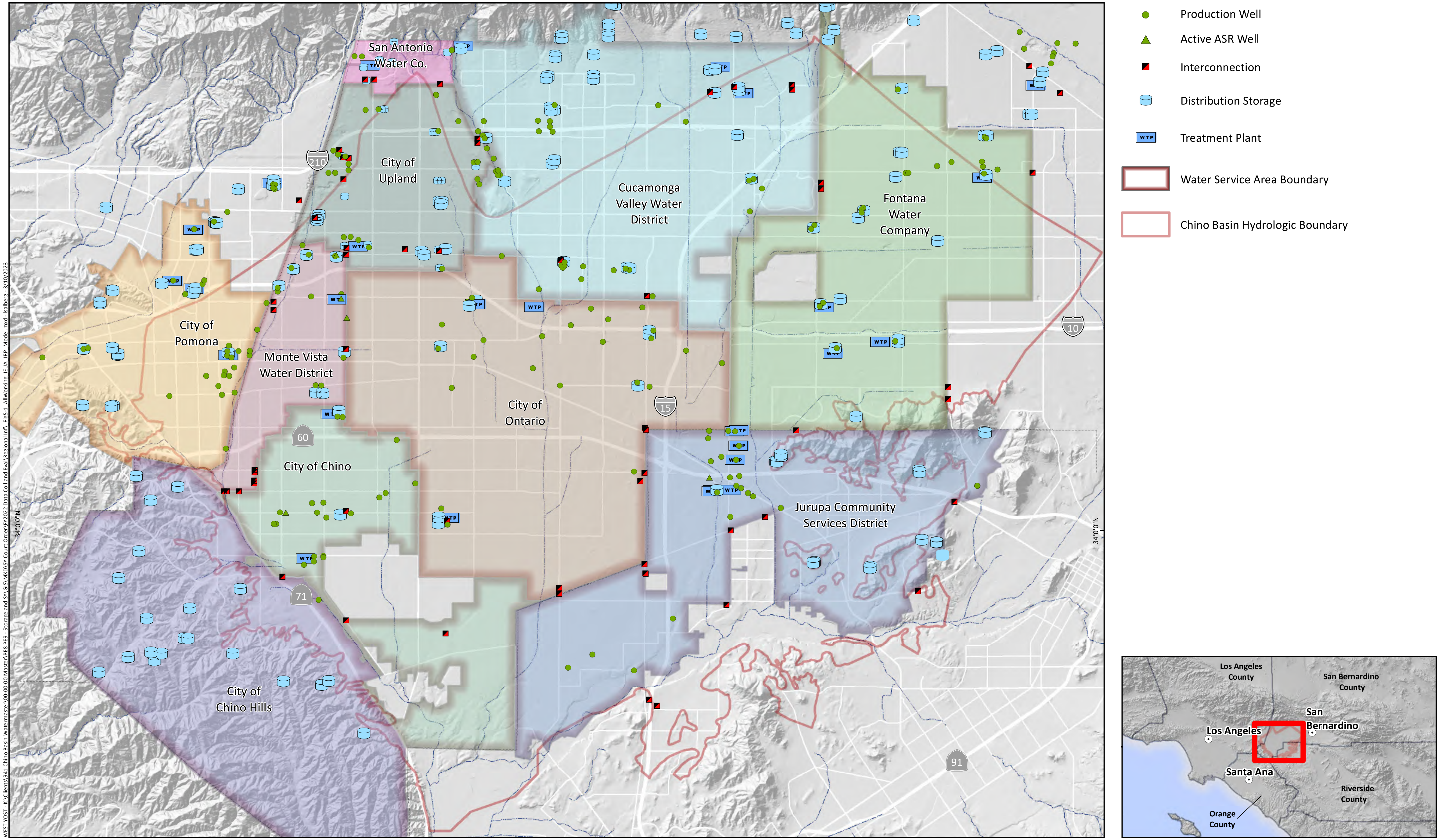
Regional infrastructure is not directly used in the groundwater model. The impacts on net recharge and Safe Yield from regional water infrastructure is mostly captured in groundwater pumping and urban outdoor water use (Chapters 2 and 3, respectively). However, an understanding of the existing and planned regional infrastructure can further provide context on behavioral changes related to water use that could impact the water use assumptions for future projections.

5.2 COLLECTION OF DATA AND INFORMATION

This section describes how the data and information for regional water infrastructure were collected and compiled for this report.

5.2.1 2019-22 Actual Data

As part of Watermaster's comprehensive data request to the Parties for this report, Watermaster requested updated information on current water infrastructure from the major Appropriative Pool Parties. This data request included existing well information and information regarding current treatment, storage, production, and conveyance facilities in the Chino Basin. Figure 5-1 shows the current water infrastructure for the major Appropriative Pool Parties in the Chino Basin. More detailed maps of current water infrastructure for 10 of the major Appropriative Pool Parties are included in Appendix B.



Prepared by:

WEST YOST

0 2 4 Miles

0 4 8 Km

Prepared for:

Chino Basin Watermaster
Data Collection and Evaluation
FY 2021/22

Major Water Supply Infrastructure
Major Appropriative Pool Parties

Figure 5-1

5.2.2 2020 SYR Projection

The development of the 2020 SYR Projection included a data request to the Appropriative Pool Parties for projected water supply plans, current and planned well information, and information regarding future treatment and conveyance facilities.

5.2.3 2023 Projection

As part of the data request to the Appropriative Pool Parties for this report, Watermaster requested updated information regarding future treatment and conveyance facilities.

5.3 EVALUATION

This section compares the 2020 SYR Projection to the 2019-22 Actual Data and the 2023 Projection for regional water infrastructure and evaluates the significance of the differences.

5.3.1 2019-22 Actual Data versus 2020 SYR Projection

There were no major differences between the regional water infrastructure information used in the 2020 SYR Projection and the 2019-22 Actual regional water infrastructure.

5.3.2 2023 Projection versus 2020 SYR Projection

The information collected for the 2020 SYR Projection and the 2023 Projection both include plans for future facilities to increase the capacity for treatment and conveyance of groundwater and supplemental water in the Chino Basin, consistent with the projected increases in pumping and water supplies in the Chino Basin.

5.3.3 Summary

The main observation and conclusion from this section is:

- **Differences in regional infrastructure are not expected to have a significant effect on net recharge or increase the risk of new undesirable results.** Comparing the 2020 SYR Projection of regional water infrastructure to the 2019-22 Actual Data and the 2023 Projection for regional water infrastructure, there were no significant differences in assumptions that would suggest the potential for behavioral changes related to water use that are not already reflected in the data and information provided in prior chapters. Therefore, the 2019-22 Actual Data and 2023 Projection for regional water infrastructure are not expected to result in a significantly different net recharge or threaten new undesirable results compared to the 2020 SYR Projection.

CHAPTER 6
Conclusions and Recommendations

Chapter 6 documents conclusions of the cumulative evaluation of the data collected for this report and recommendations for further evaluation and future years.

6.1 CONCLUSIONS

This section discusses the cumulative evaluation of the differences between the 2020 SYR Projection versus the 2019-22 Actual Data and the 2023 Projection. The evaluation considers the cumulative impacts on net recharge and the potential for Material Physical Injury. Table 6-1 summarizes the findings and conclusions described in prior chapters and this evaluation of cumulative impacts.

6.1.1 Managed Storage

Groundwater pumping (Chapter 2) and managed recharge (Chapter 4) are components of the calculation of Managed Storage. Managed Storage can affect groundwater levels and the net recharge in the Chino Basin. For example, higher Managed Storage can result in higher groundwater levels and storage, and hence, lower net recharge because of the groundwater/surface-water interactions in the southern Chino Basin.

Table 6-2 shows the 2019-22 Actual Data and 2023 Projection for Managed Storage and its components, including groundwater pumping, pumping rights, and the proportion of replenishment that comes from storage versus wet-water recharge, based on the assumptions described in Chapters 2 and 4. Figure 6-1 compares the 2020 SYR Projection for Managed Storage to the 2019-22 Actual and 2023 Projection for Managed Storage through FY 2030. The 2019-22 Actual Managed Storage was derived from Watermaster Assessment Packages. By the end of FY 2030, the 2023 Projection for Managed Storage is about 594,000 af, which is 63,000 af less than the 2020 SYR Projected Managed Storage. This difference could result in lower groundwater levels and a greater net recharge by FY 2030 compared to the 2020 SYR.

Based on the current understanding of the relationship between Managed Storage and basin conditions, a difference of 63,000 af in Managed Storage is unlikely to have a significant effect on net recharge or groundwater levels by FY 2030. The evaluation of the Local Storage Limitation Solution (WY, 2021)[1] evaluated the basin response to the assumed operations of the Dry-Year Yield Program (DYYP) that resulted in a net reduction of 41,000 af of storage compared to the baseline condition (i.e., the 2020 SYR Projection),[2] which was simulated from FY 2018 through FY 2050. By FY 2040, the net recharge increased by about 500 afy compared to the baseline condition.[3] Assuming an approximately linear relationship between Managed Storage and net recharge, a 63,000 af difference in Managed Storage at the end of FY 2030 may result in net recharge increasing by about 800 afy, which is less than one percent of the current Safe Yield.

6.1.2 Potential Deviation from Current Safe Yield

The 2019-22 Actual Data and 2023 Projection for Managed Storage indicate the potential for net recharge to be greater than the current Safe Yield by less than one percent. Conversely, the 2019-22 Actual Data

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[1] WY. *Evaluation of the Local Storage Limitation Solution*. Prepared for the Chino Basin Watermaster, February 2021.

[2] The storage balance in the DYYP account was 41,000 af at the beginning of the projection period (July 2018), and no takes had occurred; therefore, the net reduction in storage was 41,000 af compared to the baseline condition over the projection period due to the completion of the DYYP.

[3] See Figure 3-1 in the *Evaluation of the Local Storage Limitation Solution* report.

and 2023 Projection for urban outdoor water use indicate the potential for less DIPAW compared to the 2020 SYR Projection, and hence, less net recharge. The effects of these two factors on net recharge will offset each other, likely resulting in a deviation of net recharge of less than 2.5 percent compared to the current Safe Yield.

6.1.3 Potential Material Physical Injury

The 2019-22 Actual Data and 2023 Projection for groundwater pumping indicate the potential for undesirable results related to increased risk of new land subsidence in Northwest MZ-1 and pumping sustainability challenges near the JCSD well field that were not identified in the 2020 SYR.

6.2 RECOMMENDATIONS

The recommendations resulting from this FY 2021/22 Annual Report are:

- **Through Watermaster's existing programs, address the potential for new undesirable results resulting from the 2019-22 Actual Data and 2023 Projection for groundwater pumping exceeding the 2020 SYR Projection.** The comparison of the 2020 SYR Projection to the 2019-22 Actual Data and the 2023 Projection for groundwater pumping indicated the increased risk for new land subsidence and pumping sustainability. We recommend the following actions to address this:
  - Complete and implement a subsidence management plan for MZ-1. This process is already underway as part of Watermaster's Ground-Level Monitoring Program. The continued development of a subsidence management plan should include a more precise evaluation of the potential impacts of future pumping to inform mitigation measures that allow continued pumping from MZ-1 without increasing the risk of land subsidence.
  - Collaborate with the JCSD and the other Parties with pumping wells in areas where the evaluation of the 2023 Projection indicated an increased risk for pumping sustainability challenges. Watermaster currently develops and implements a comprehensive recharge program, a goal of which is to enhance the yield of the Basin and address pumping sustainability challenges. The current update of the Recharge Master Plan will be completed by October 2023 and will be used to further examine the extent of increased risk of pumping sustainability challenges and develop a plan to address the risk if necessary.
- **Develop multiple projection scenarios for the 2025 Safe Yield Reevaluation that represent the maximum range in future cultural conditions.** As part of the 2025 Safe Yield Reevaluation, multiple projection scenarios will be designed to simulate a variety of cultural conditions, including pumping, recharge, and outdoor water use. The year-to-year changes in groundwater pumping projections and Parties' uncertainty in the use of Managed Storage and urban outdoor water use indicates that there is uncertainty in future cultural conditions. It is recommended that the scenarios developed for the 2025 Safe Yield Reevaluation include the maximum range in future cultural conditions to allow for a complete understanding of the predictive uncertainty in the Basin response to possible futures. Simulating a wide range of impacts will allow for understanding thresholds of significance in a more quantifiable manner.

Table 6-1. Summary of Observations and Conclusions		
Cultural Condition (Chapter)	**Main Findings**	**Main Conclusions**
Groundwater Pumping (2)	The 2019-22 Actual Data was greater than the 2020 SYR Projection of groundwater pumping for FY 2019 through FY 2022 by about 10,900 afy. Some of the areas where 2019-22 Actual Data were greater than the 2020 SYR Projection overlie the Northwest MZ-1 Area of Subsidence Concern and areas with projected pumping sustainability challenges.	The greater groundwater pumping in the 2019-22 Actual Data compared to the 2020 SYR Projection in the Northwest MZ-1 Area of Subsidence Concern and the JCSD well field may increase the risk for land subsidence or pumping sustainability challenges.
	The 2023 Projection for groundwater pumping is greater than the 2020 SYR Projection in FY 2025 and FY 2030 by 6,200 afy and 12,700 afy, respectively.	The greater pumping in the 2023 Projection is not expected to result in a significantly different net recharge compared to the 2020 SYR Projection.
	Some of the areas where the 2023 Projection for groundwater pumping is greater than the 2020 SYR Projection overlie the Northwest MZ-1 Area of Subsidence Concern where Watermaster is currently developing a subsidence management plan. Furthermore, some of the areas where the 2023 Projection for groundwater pumping is greater than the 2020 SYR Projection overlie areas of projected pumping sustainability challenges, primarily near the JCSD well field.	The differences between the 2023 Projection for groundwater pumping and the 2020 SYR Projection in the Northwest MZ-1 Area of Subsidence Concern and the JCSD well field indicate the potential for an increased risk of future land subsidence and pumping sustainability challenges.
Urban Outdoor Water Use (3)	The 2020 SYR Projection exceeds the 2019-22 Actual Data for urban outdoor water use by 16,100 afy.	The lower urban outdoor water use in the 2019-22 Actual Data compared to the 2020 SYR Projection would likely result in less net recharge compared to the 2020 SYR Projection. This difference would take several years to significantly affect the net recharge of the Basin.
	Based on the available information on future patterns of urban outdoor water use and the 2019-22 Actual Data, it is likely that future patterns of urban outdoor water use will be less than the 2020 SYR Projection.	The 2023 Projections for future patterns of urban outdoor water use are likely to result in less net recharge than the 2020 SYR Projection. This difference would take several years to significantly affect the net recharge of the Basin.
Managed Recharge (4)	2019-22 Actual Data was greater than the 2020 SYR Projection for managed recharge in MZ-1 by about 3,600 afy.	The greater volumes of managed recharge in the 2019-22 Actual Data compared to the 2020 SYR Projection in MZ-1 can help support groundwater levels in this area and help mitigate the occurrence of land subsidence.
	2019-22 Actual Data was less than the 2020 SYR Projection for stormwater recharge in the Chino Basin by about 1,500 afy.	Differences in stormwater recharge between the 2019-22 Actual Data and the 2020 SYR Projection are to be expected because (i) precipitation and runoff are highly variable and (ii) the projections are based on long-term expected average hydrology adjusted for climate change. Over longer time periods, actual stormwater recharge should become approximately equal to the projections.
Regional Water Infrastructure (5)	By comparing the 2020 SYR Projection of regional water infrastructure to the 2019-22 Actual Data and the 2023 Projection for regional water infrastructure, there were no significant differences in assumptions that would suggest the potential for behavioral changes related to water use that are not already reflected in other data (e.g., groundwater pumping projections).	Differences in regional infrastructure between the 2019-22 Actual Data, the 2020 SYR Projection, and the 2023 Projection are not expected to have a significant effect on net recharge or increase the risk of new undesirable results.
Cumulative Impact	**Based on 2019-22 Actual Data and the 2023 Projection for groundwater pumping and managed recharge, the 2023 Projection for Managed Storage is 63,000 af less than the 2020 SYR Projection for Managed Storage at the end of FY 2030.**	**The 2019-22 Actual Data and 2023 Projection for Managed Storage indicate the potential for net recharge to be greater than the current Safe Yield by less than one percent. However, the 2019-22 Actual Data and 2023 Projection for urban outdoor water use indicate the potential for less DIPAW compared to the 2020 SYR Projection, and hence, less net recharge. The effect of these two factors on net recharge will offset each other, likely resulting in a deviation of net recharge of less than 2.5 percent compared to the current Safe Yield.**
		The 2019-22 Actual Data and 2023 Projection for groundwater pumping indicate the potential for undesirable results related to increased risk of new land subsidence in Northwest MZ-1 and pumping sustainability challenges near the JCSD well field that were not identified in the 2020 SYR.

Table 6-2. Projected Groundwater Pumping, Pumping Rights, Replenishment and End-of-Year Volume in Managed Storage – 2019-22 Actual Data and 2023 Projection

FY	2023 Projection Groundwater Pumping	Pumping Rights				Net Replenishment Obligation[b]	Replenishment from Storage[c]	Replenishment with Wet-Water Recharge	Net Change in DYYP Storage Account Balance	End-of-Year Managed Storage[d]
		Safe Yield[a]	Reoperation Water Use to Offset the Desalter Replenishment Obligation	Recycled Water Recharge	Total					
(1)	(2)	(3)	(4)	(5)	(6) = (3)+(4)+(5)	(7) = (2)-(6)	(8)	(9)	(10)	$(11)_t = (11)_{t-1} - (7)_t + (9)_t + (10)_t$
2019									-	549,243
2020									(8)	587,806
2021									(23,032)	589,875
2022									(22,929)	586,310
2023	143,875	131,000	12,500	16,420	159,920	(16,045)	0	0	0	602,356
2024	147,342	131,000	12,500	16,420	159,920	(12,578)	0	0	0	614,934
2025	150,810	131,000	12,500	16,420	159,920	(9,110)	0	0	0	624,044
2026	153,549	131,000	5,000	16,420	152,420	1,129	1,017	113	0	623,027
2027	156,289	131,000	5,000	16,420	152,420	3,869	3,482	387	0	619,545
2028	159,028	131,000	5,000	16,420	152,420	6,608	5,948	661	0	613,597
2029	161,768	131,000	5,000	16,420	152,420	9,348	8,413	935	0	605,184
2030	164,508	131,000	5,000	16,420	152,420	12,088	10,879	1,209	0	594,305

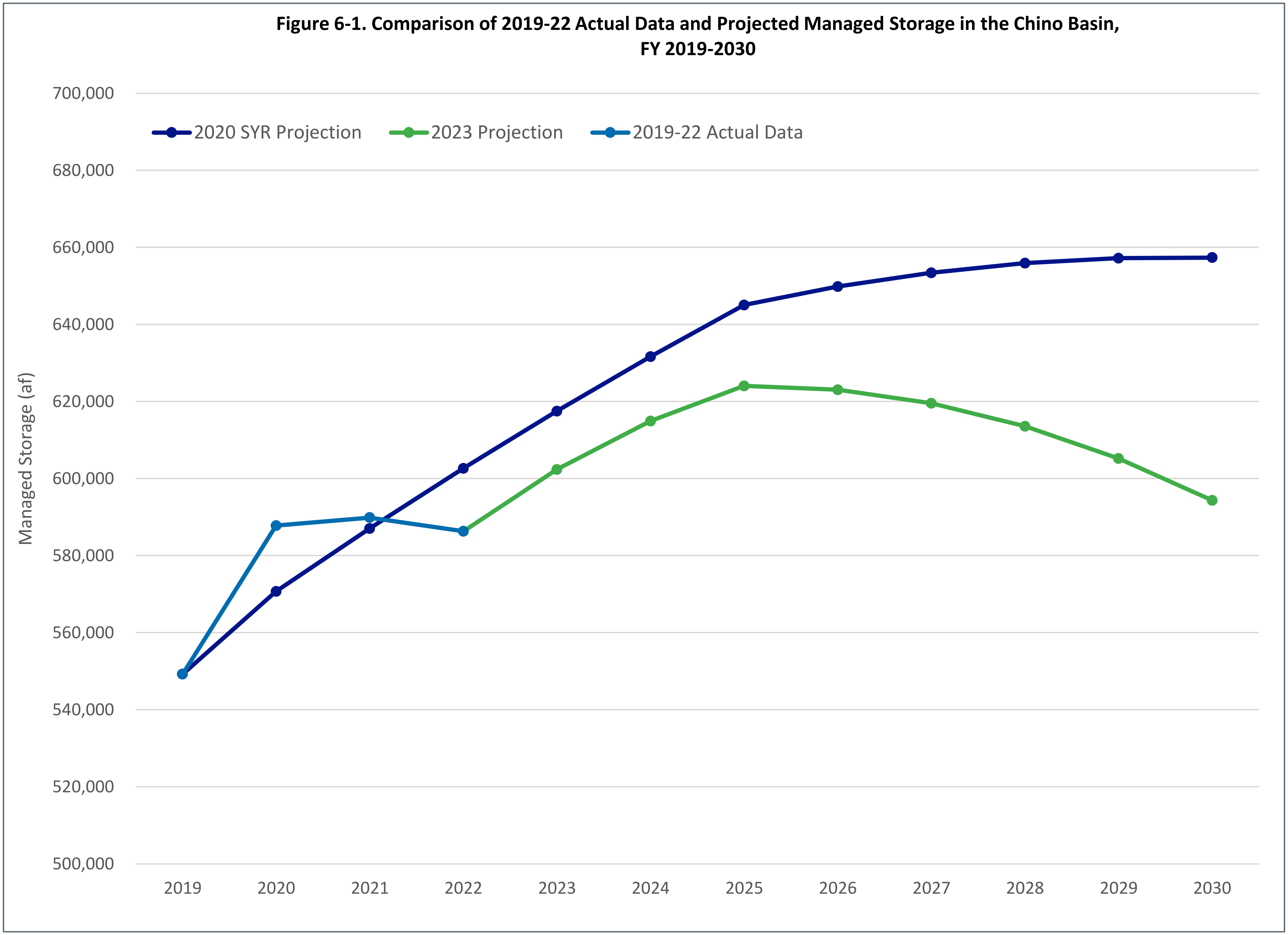


Figure 6-1. Comparison of 2019-22 Actual Data and Projected Managed Storage in the Chino Basin, FY 2019-2030
2020 SYR Projection
2023 Projection
2019-22 Actual Data
Managed Storage (af)
700,000
680,000
660,000
640,000
620,000
600,000
580,000
560,000
540,000
520,000
500,000
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
2029
2030

Appendix A

Comparison of 2019-22 Actual Pumping to the 2020 SYR Groundwater Pumping by Appropriative Pool Wells

Appendix A. Comparison of Modeled vs. Actual Pumping by Well - Appropriative Pool (af)

FY 2019 through 2022

Agency	Well Name	2019			2020			2021			2022		
		Modeled	Actual[b]	Modeled minus Actual Pumping	Modeled	Actual[b]	Modeled minus Actual Pumping	Modeled	Actual[b]	Modeled minus Actual Pumping	Modeled	Actual[b]	Modeled minus Actual Pumping
BlueTriton Brands[a]	Arrow-2	389	285	103	401	279	122	400	271	128	400	252	148
Chino Basin Desalter Authority	I-1	407	271	136	514	0	514	513	0	513	513	0	513
	I-2	159	0	159	200	0	200	200	0	200	200	0	200
	I-3	1,004	0	1,004	1,268	0	1,268	1,265	0	1,265	1,265	0	1,265
	I-4	354	41	313	447	0	447	446	0	446	446	0	446
	I-5	929	816	113	1,174	1,855	-681	1,171	1,879	-708	1,171	1,710	-539
	I-6	732	286	446	924	303	621	922	288	633	922	417	504
	I-7	922	200	721	1,165	348	816	1,161	206	955	1,161	317	845
	I-8	825	904	-78	1,043	1,199	-157	1,040	1,240	-200	1,040	1,042	-2
	I-9	872	1,105	-233	1,101	1,354	-253	1,098	1,752	-654	1,098	1,685	-587
	I-10	984	1,315	-330	1,244	1,756	-512	1,240	1,278	-37	1,240	1,645	-405
	I-11	387	1,502	-1,115	489	1,830	-1,341	487	1,614	-1,126	487	1,692	-1,204
	I-13	951	1,298	-348	1,201	1,440	-239	1,198	882	316	1,198	1,312	-115
	I-14	1,687	2,443	-756	2,132	2,391	-259	2,126	2,717	-591	2,126	1,251	875
	I-15	1,732	2,452	-720	2,188	1,161	1,027	2,182	3,006	-824	2,182	3,259	-1,077
	I-16	167	289	-121	211	273	-61	211	264	-54	211	206	5
	I-17	NM	ND	0	NM	ND	0	NM	ND	0	NM	0	0
	I-20	359	603	-245	453	423	30	452	599	-147	452	567	-116
	I-21	266	450	-184	336	605	-268	335	339	-4	335	360	-24
	II-1	1,441	1,515	-73	1,821	1,977	-155	1,816	2,464	-648	1,816	2,495	-679
	II-2	1,441	1,521	-80	1,821	758	1,063	1,816	1,995	-178	1,816	2,489	-673
	II-3	1,441	2,652	-1,210	1,821	2,749	-928	1,816	2,671	-854	1,816	1,052	764
	II-4	1,514	2,528	-1,014	1,912	2,689	-777	1,907	2,653	-746	1,907	1,869	38
	II-6	1,425	2,335	-910	1,800	2,273	-474	1,795	1,646	148	1,795	2,196	-401
	II-7	721	1,140	-419	911	1,417	-506	908	1,485	-577	908	1,350	-442
	II-8	881	1,201	-320	1,113	1,710	-597	1,110	1,676	-566	1,110	688	422
	II-9A	1,441	14	1,428	1,821	416	1,406	1,816	2,535	-719	1,816	2,249	-433
	II-10	3,082	2,139	943	3,893	4,291	-397	3,883	2,975	907	3,883	4,597	-714
	II-11	3,362	2,216	1,146	4,247	2,413	1,835	4,236	3,992	244	4,236	4,323	-88
	II-12	2,241	ND	2,241	2,832	ND	2,832	2,824	ND	2,824	2,824	1,794	1,030
City of Chino	10	752	0	752	1,507	0	1,507	1,515	45	1,470	1,527	139	1,388
	11	1,059	0	1,059	275	0	275	322	0	322	368	0	368
	12	408	0	408	754	0	754	758	0	758	763	0	763
	13	1,636	1,346	290	242	2,005	-1,763	283	2,071	-1,788	324	1,950	-1,626
	14	0	0	0	306	0	306	357	0	357	409	0	409
	16	0	3	-3	754	0	754	758	0	758	763	0	763
	4	0	0	0	107	0	107	125	0	125	143	0	143
	5	0	35	-35	1,507	591	916	1,515	750	765	1,527	816	711
	6	0	0	0	153	0	153	179	0	179	205	0	205
	9	980	2,359	-1,379	2,386	1,955	431	2,399	2,557	-158	2,418	2,063	355
	18	51	14	38	211	114	97	247	37	210	283	118	165
	19	0	559	-559	81	507	-425	95	672	-576	109	496	-387

Appendix A. Comparison of Modeled vs. Actual Pumping by Well - Appropriative Pool (af)

FY 2019 through 2022

Agency	Well Name	2019			2020			2021			2022		
		Modeled	Actual[b]	Modeled minus Actual Pumping	Modeled	Actual[b]	Modeled minus Actual Pumping	Modeled	Actual[b]	Modeled minus Actual Pumping	Modeled	Actual[b]	Modeled minus Actual Pumping
City of Chino Hills	01A	372	0	372	651	0	651	684	0	684	718	0	718
	01B	NM	0	0	NM	0	0	NM	0	0	NM	0	0
	5	0	0	0	31	0	31	55	0	55	80	0	80
	07A	0	0	0	325	0	325	342	0	342	359	0	359
	07B	352	0	352	447	0	447	470	0	470	493	0	493
	15B	0	0	0	66	0	66	119	0	119	172	0	172
	16	NM	0	0	NM	0	0	NM	0	0	NM	0	0
	17	575	0	575	1,058	0	1,058	1,111	0	1,111	1,166	0	1,166
	19	NM	0	0	NM	0	0	NM	0	0	NM	0	0
City of Ontario	09	NM	0	0	NM	0	0	NM	0	0	NM	0	0
	11	NM	0	0	NM	0	0	NM	0	0	NM	0	0
	15	NM	0	0	NM	0	0	NM	0	0	NM	0	0
	17	NM	0	0	NM	0	0	NM	0	0	NM	0	0
	20	NM	0	0	NM	0	0	NM	1,228	-1,228	NM	0	0
	25	387	105	281	290	0	290	299	0	299	310	0	310
	26	NM	0	0	NM	0	0	NM	0	0	NM	0	0
	27	NM	0	0	NM	0	0	NM	0	0	NM	0	0
	29	834	492	342	0	679	-679	5	996	-990	61	503	-442
	30	509	603	-94	381	212	169	394	496	-103	407	696	-289
	31	809	0	809	607	3	604	627	1	626	648	0	647
	34	432	0	432	324	0	324	335	0	335	346	0	346
	35	745	1,338	-593	558	3,117	-2,559	577	2,261	-1,684	596	2,764	-2,168
	36	458	955	-497	343	1,001	-658	355	830	-476	367	1,088	-721
	37	804	2,238	-1,434	603	1,118	-515	623	339	284	644	0	644
	38	653	1,413	-760	490	857	-367	506	1,568	-1,062	523	1,604	-1,081
	39	603	0	603	452	0	452	467	0	467	483	0	483
	40	904	1,261	-357	678	1,188	-510	700	1,340	-640	723	721	3
	41	736	1,221	-486	552	2,329	-1,777	570	3,601	-3,031	589	2,674	-2,085
	42	PW	0	0	PW	0	0	PW	0	0	PW	0	0
	43	0	0	0	371	0	371	383	0	383	396	0	396
	44	2,237	1,739	499	1,776	1	1,775	1,832	815	1,017	1,874	687	1,187
	45	687	3,358	-2,671	515	2,348	-1,833	532	3,089	-2,556	550	2,850	-2,300
	46	2,237	221	2,016	1,776	934	842	1,832	164	1,668	1,874	32	1,841
	47	687	4,046	-3,358	515	3,301	-2,785	532	4,156	-3,624	550	3,982	-3,432
	48	495	0	495	371	0	371	383	0	383	396	0	396
	49	495	681	-186	371	458	-87	383	445	-62	396	574	-178
	50	28	0	28	0	0	0	0	0	0	0	980	-980
	51	0	0	0	0	0	0	0	0	0	0	0	0
	24	NM	287	-287	NM	100	-100	NM	86	-86	NM	215	-215
	Elec/Irr	NM	87	-87	NM	0	0	NM	0	0	NM	0	0
	52	1,790	679	1,111	1,421	750	670	1,466	338	1,128	1,499	300	1,200

Appendix A. Comparison of Modeled vs. Actual Pumping by Well - Appropriative Pool (af)

FY 2019 through 2022

Agency	Well Name	2019			2020			2021			2022		
		Modeled	Actual(b)	Modeled minus Actual Pumping	Modeled	Actual(b)	Modeled minus Actual Pumping	Modeled	Actual(b)	Modeled minus Actual Pumping	Modeled	Actual(b)	Modeled minus Actual Pumping
City of Pomona	10	1,131	592	539	995	1,096	-101	994	1,174	-180	996	1,499	-503
	14	NM	0	0	NM	0	0	NM	0	0	NM	0	0
	15	NM	0	0	NM	0	0	NM	0	0	NM	153	-153
	16	554	56	498	846	1,074	-228	845	893	-48	846	560	286
	17	419	794	-375	0	531	-531	0	735	-735	0	488	-488
	18	NM	0	0	NM	0	0	NM	0	0	NM	0	0
	21	339	617	-279	796	381	415	795	6	789	797	246	651
	23	411	1,225	-815	896	714	182	895	480	415	896	724	371
	25	1,539	1,482	57	1,095	904	190	1,094	644	450	1,095	1,418	-920
	26	273	421	-148	498	298	199	497	245	252	498	706	91
	27	1,249	1,264	-16	796	1,232	-436	795	1,217	-421	797	1,199	-1,199
	29	NM	0	0	NM	0	0	NM	0	0	NM	0	0
	2	0	0	0	1,194	1,280	-86	1,193	1,957	-764	1,195	1,462	-267
	30	NM	0	0	NM	0	0	NM	0	0	NM	0	0
	34	1,486	1,524	-38	1,194	836	358	1,193	361	832	1,195	523	672
	35	0	0	0	498	0	498	497	0	497	498	0	498
	36	727	707	20	796	338	458	795	256	539	797	33	763
	5B	496	980	-483	846	1,118	-272	845	809	36	846	593	254
	6	637	1,177	-540	896	751	145	895	414	480	896	579	317
City of Upland	20	323	315	8	372	442	-70	371	439	-68	371	343	28
	21A	0	0	0	27	0	27	27	0	27	27	0	27
	3	871	252	620	1,005	138	867	1,003	0	1,003	1,003	0	1,003
	7A	1,037	1,505	-468	1,196	1,499	-303	1,193	1,372	-178	1,193	759	434
	8	57	309	-251	209	371	-162	209	366	-157	209	371	-163
Cucamonga Valley Water District	CB-1	1,246	2	1,243	1,187	1,057	130	1,197	1,159	38	1,209	1,183	26
	CB-30	0	1,010	-1,010	0	2,103	-2,103	0	2,741	-2,741	0	2,761	-2,761
	CB-38	2,097	16	2,082	1,999	1,501	498	2,016	1,800	216	2,036	2,277	-241
	CB-39	2,440	898	1,542	2,326	2,588	-262	2,345	2,868	-523	2,369	3,672	-1,303
	CB-3	276	889	-612	210	1,133	-924	68	764	-696	74	0	74
	CB-40	489	334	155	371	1,215	-844	120	1,004	-883	131	1,077	-946
	CB-43	683	982	-299	518	1,637	-1,119	168	3,726	-3,558	182	3,655	-3,473
	CB-46	2,335	2,057	278	2,226	3,567	-1,341	2,244	3,591	-1,347	2,267	2,393	-126
	CB-50	2,885	PW	2,885	2,750	PW	2,750	2,772	PW	2,772	2,800	PW	2,800
	CB-49	0	PW	0	0	PW	0	1,631	PW	1,631	1,647	PW	1,647
	CB-4	387	4	383	294	86	208	95	182	-87	103	810	-707
	CB-48	526	PW	526	399	PW	399	129	PW	129	140	PW	140
	CB-41	NM	326	-326	NM	2,558	-2,558	NM	3,040	-3,040	NM	3,171	-3,171
	CB-42	NM	1,697	-1,697	NM	3,039	-3,039	NM	2,364	-2,364	NM	3,695	-3,695
	CB-5	669	1,409	-740	508	2,835	-2,327	165	2,988	-2,823	179	2,588	-2,409

Appendix A. Comparison of Modeled vs. Actual Pumping by Well - Appropriative Pool (af)
FY 2019 through 2022

Agency	Well Name	2019			2020			2021			2022		
		Modeled	Actual[b]	Modeled minus Actual Pumping	Modeled	Actual[b]	Modeled minus Actual Pumping	Modeled	Actual[b]	Modeled minus Actual Pumping	Modeled	Actual[b]	Modeled minus Actual Pumping
Fontana Water Company	F03A	NM	0	0	NM	0	0	NM	0	0	NM	0	0
	F04A	NM	0	0	NM	0	0	NM	0	0	NM	0	0
	F7A	1,269	1,109	160	1,143	2,241	-1,098	1,153	1,608	-455	1,164	2,584	-1,420
	F7B	1,181	1,333	-152	1,064	1,804	-741	1,073	959	114	1,084	2,781	-1,698
	F17B	1,078	562	515	971	612	358	979	368	611	989	532	457
	F17C	1,344	318	1,026	1,210	1,056	154	1,221	338	883	1,233	400	832
	F18A	NM	0	0	NM	0	0	NM	0	0	NM	0	0
	F21B	NM	99	-99	NM	1,008	-1,008	NM	964	-964	0	597	-597
	F23A	1,761	1,229	531	1,585	0	1,585	1,599	1,067	533	1,615	948	667
	F24A	0	54	-54	0	660	-660	0	174	-174	0	369	-369
	F26A	1,248	3	1,245	1,123	132	992	1,133	2,684	-1,550	1,145	835	309
	F31A	831	1,446	-615	748	1,852	-1,104	755	641	114	762	2,123	-1,361
	F31B	NM	ND	0	NM	ND	0	NM	ND	0	NM	350	-350
	F44A	1,189	2,681	-1,492	1,071	655	416	1,080	2,665	-1,584	1,091	2,488	-1,397
	F44B	0	0	0	0	0	0	0	0	0	0	258	-258
	F44C	1,157	1,125	32	1,042	405	636	1,051	2,098	-1,047	1,061	2,121	-1,060
Golden State Water Company	Margarita #2	NM	0	0	NM	640	-640	NM	1,074	-1,074	NM	1,066	-1,066
	Margarita #1	532	0	532	375	0	375	374	0	374	374	0	374
Jurupa Community Services District	11	0	0	0	0	0	0	0	3	-3	0	0	0
	12	0	0	0	0	0	0	0	296	-296	0	79	-79
	13	1,580	1,455	125	1,584	786	798	1,580	0	1,580	1,580	2,220	-640
	14	103	327	-225	0	1,274	-1,274	0	1,688	-1,688	0	565	-565
	15	0	100	-100	0	135	-135	0	225	-225	0	295	-295
	16	0	3	-3	0	177	-177	0	811	-811	0	1,535	-1,535
	17	676	1,815	-1,139	216	1,953	-1,738	346	0	346	476	1,116	-640
	18	295	0	295	162	1	161	223	0	223	284	0	284
	19	320	906	-586	320	808	-489	320	693	-374	320	863	-543
	20	239	0	239	131	0	131	181	0	181	230	0	230
	22	1,434	1,885	-451	1,002	1,769	-767	1,088	3,180	-2,091	1,174	1,597	-423
	23	1,975	19	1,956	1,942	0	1,942	1,975	0	1,975	1,975	0	1,975
	25	1,946	3,137	-1,191	1,952	2,657	-706	1,946	3,004	-1,058	1,946	2,994	-1,047
	6	1,015	27	988	765	84	681	800	731	69	873	0	873
	8	0	68	-68	0	113	-113	0	178	-178	0	644	-644
	IDI-1	1,128	ND	1,128	1,131	ND	1,131	1,128	ND	1,128	1,128	ND	1,128
	IDI-2	0	ND	0	1,131	ND	1,131	1,128	ND	1,128	1,128	ND	1,128
	High School	NM	108	-108	NM	106	-106	NM	128	-128	NM	121	-121
	40	NM	65	-65	NM	65	-65	NM	72	-72	NM	57	-57
	41	NM	44	-44	NM	44	-44	NM	15	-15	NM	0	0
	42	NM	16	-16	NM	19	-19	NM	20	-20	NM	11	-11
	27	NM	2,198	-2,198	NM	1,350	-1,350	NM	116	-116	NM	0	0
	28	NM	1,722	-1,722	NM	1,419	-1,419	NM	0	0	NM	0	0

Appendix A. Comparison of Modeled vs. Actual Pumping by Well - Appropriative Pool (af)
FY 2019 through 2022

Agency	Well Name	2019			2020			2021			2022		
		Modeled	Actual(b)	Modeled minus Actual Pumping	Modeled	Actual(b)	Modeled minus Actual Pumping	Modeled	Actual(b)	Modeled minus Actual Pumping	Modeled	Actual(b)	Modeled minus Actual Pumping
Marygold Mutual Water Company	MMWC 06	689	939	-251	829	849	-20	838	829	8	848	931	-82
	MMWC 07	344	11	334	414	11	403	419	12	407	424	13	411
Monte Vista Water District	10	0	0	0	0	0	0	0	0	0	0	0	0
	19	2,484	2,709	-225	796	2,453	-1,657	790	1,510	-719	786	169	617
	26 (MVWD/CH)(c)	1,325	1,073	253	890	1,467	-577	883	2,682	-1,798	879	3,008	-2,130
	27 (MVWD/CH)(c)	367	446	-79	104	-4	108	99	936	-837	94	1,591	-1,497
	28 (MVWD/CH)(c)	1,536	693	843	866	1,405	-539	860	1,982	-1,122	856	1,890	-1,035
	30 (MVWD/CH)(c)	331	428	-97	104	306	-201	99	70	29	94	59	34
	31	374	1,102	-728	937	1,615	-679	930	1,506	-576	925	1,769	-844
	32 (MVWD/CH)(c)	312	0	312	104	0	104	99	1	98	94	4	89
	33 (MVWD/CH)(c)	0	21	-21	937	0	936	930	0	930	925	0	925
	34 (MVWD/CH)(c)	0	72	-72	937	0	937	930	0	930	925	4	921
	04 (MVWD/CH)(c)	288	389	-100	187	2	186	186	72	114	185	388	-203
	5	1,024	1,306	-282	656	939	-283	651	1,445	-795	647	996	-349
	06	NM	0	0	NM	0	0	NM	0	0	NM	0	0
	09	NM	0	0	NM	0	0	NM	0	0	NM	0	0
Niagara Water Company	Philadelphia #1	504	447	57	513	606	-92	512	332	180	512	242	270
	Philadelphia #2	504	705	-201	513	514	0	512	763	-251	512	755	-243
	Concours #2 (Nia)	504	531	-28	513	641	-127	512	657	-144	512	686	-174
San Antonio Water Company	15	546	1	546	639	1	638	638	1	637	638	1	637
	16	676	376	300	817	614	203	816	675	141	816	402	414
San Bernadino Shooting Park	SS2	12	11	1	12	8	4	12	17	-5	12	20	-8
	SS1	0	0	0	0	0	0	0	0	0	0	0	0
	Total	**114,533**	**114,513**	**20**	**122,116**	**131,048**	**-8,932**	**123,443**	**145,195**	**-21,753**	**125,037**	**147,483**	**-23,243**

Notes:

(a) BlueTriton Brands was formerly known as Arrowhead Mountain Springs Water Company

(b) Total Actual Pumping includes pumping for the Dry Year Yield Program

(c) MVWD/CH denotes wells that are used to supply MVWD and Chino Hills

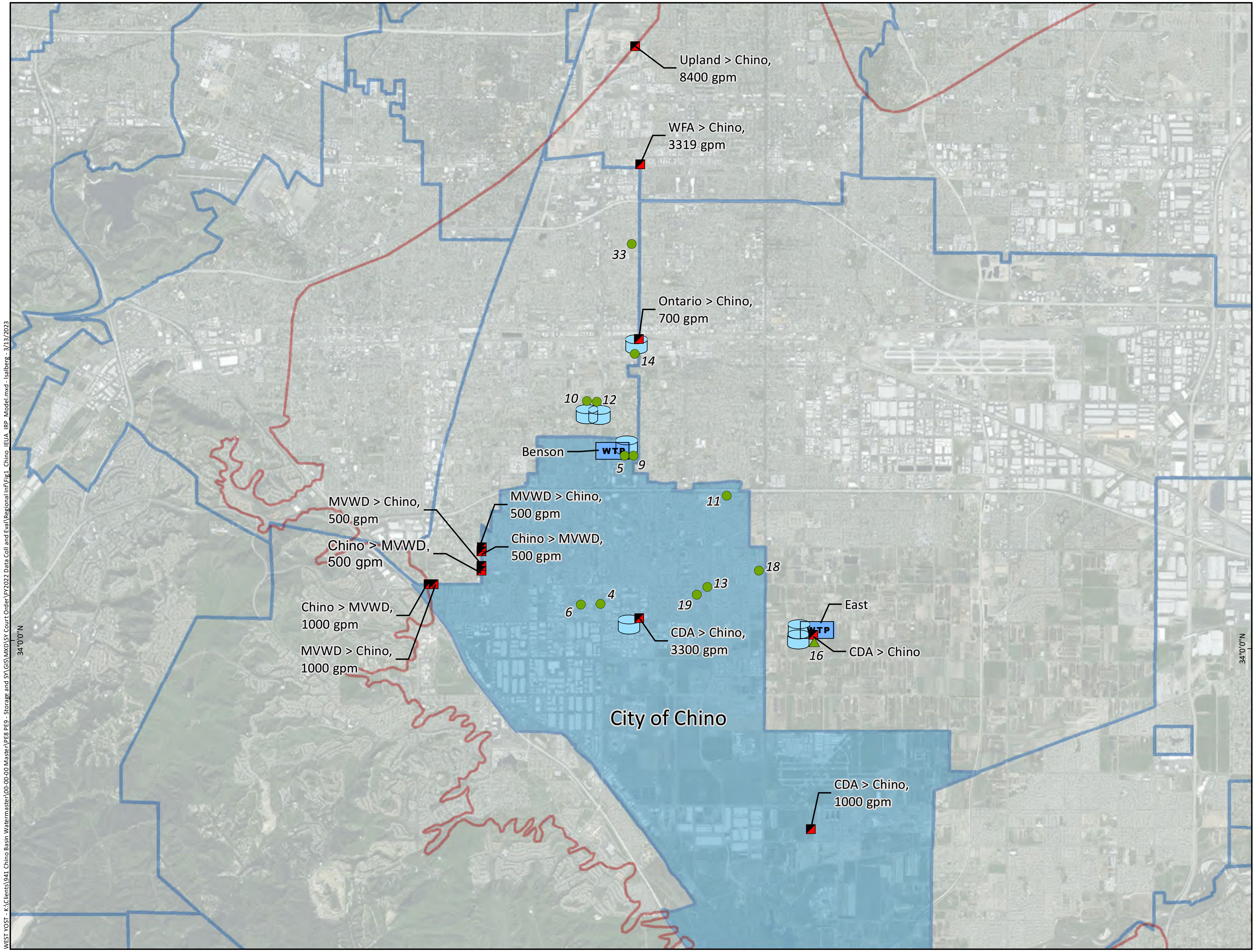
NM = "Not modeled". Well is not modeled by the Chino Valley Model (CVM)

ND = "No data". No data is reported for this well in the Chino Basin Watermaster (CBWM) Database

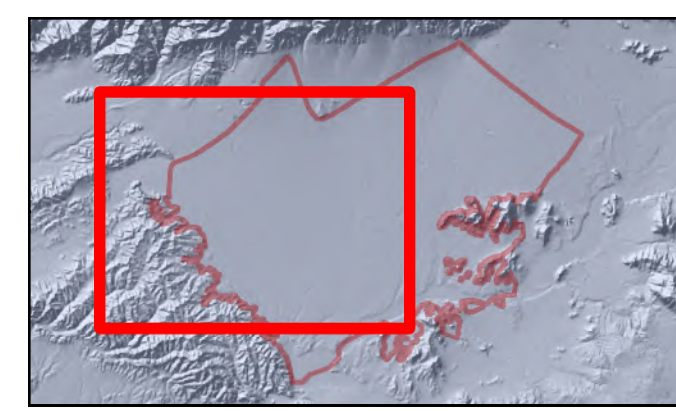
PW = "Projected Well". Well is modeled in the CVM, but pumping is modeled after the time period presented (e.g. , pumping begins after FY 2022).

Appendix B

Water Infrastructure Maps for Major Appropriative Pool Parties, FY 2022



Active Production Well
Active ASR Well
Interconnection
Delivering Agency > Receiving Agency, Flow Capacity (gpm)
Distribution Storage
Treatment Plant
City of Chino Water Service Area
Other Agencies
Chino Basin Hydrologic Boundary



Prepared by:

WEST YOST

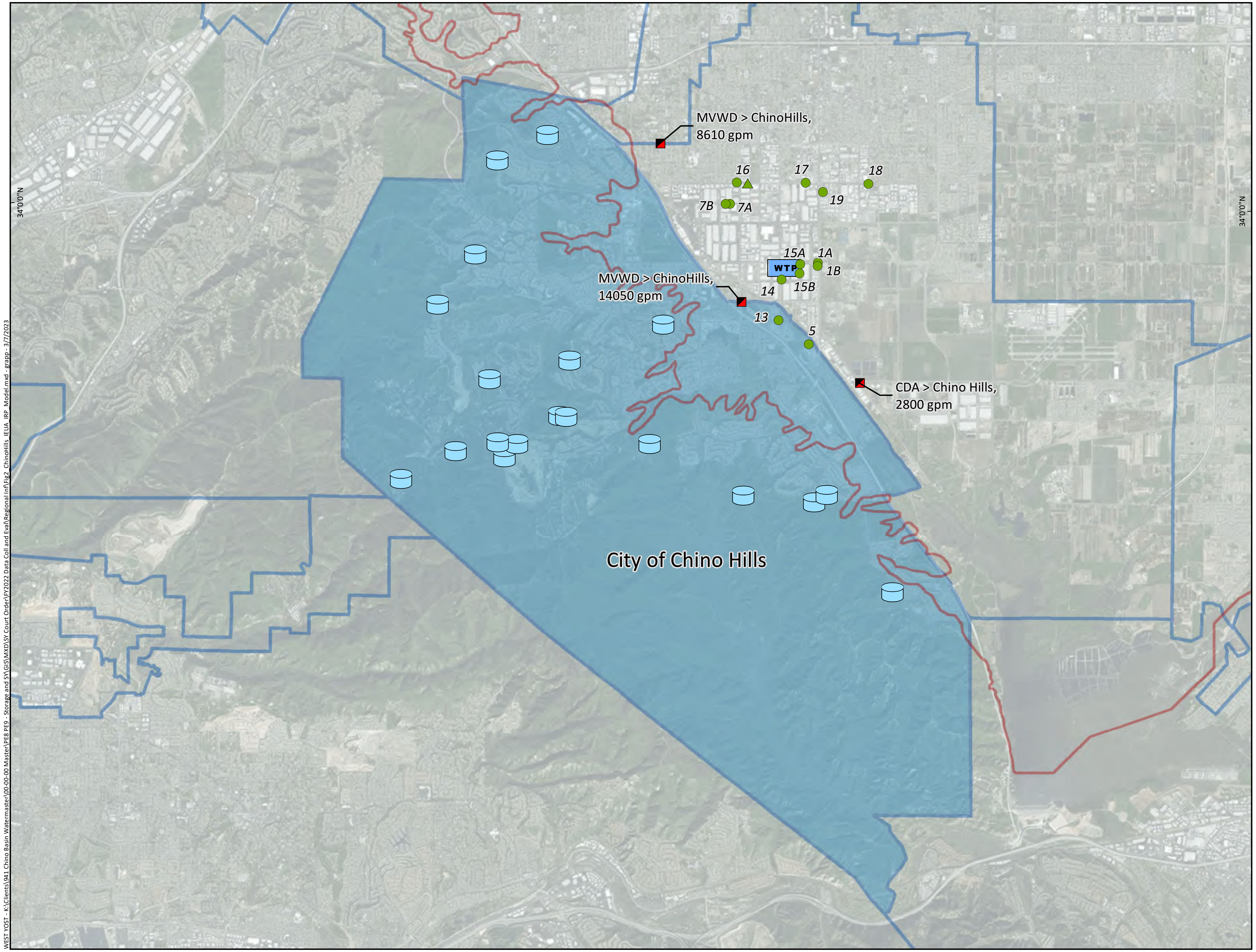
0 0.5 1 Miles
0 1 2 Km

Prepared for:

Chino Basin Watermaster
Data Collection and Evaluation
FY 2021/22

Major Water Supply Infrastructure
City of Chino

Figure B-1



Active Production Well

Active ASR Well

Interconnection

Delivering Agency > Receiving Agency,
Flow Capacity (gpm)

Distribution Storage

Treatment Plant

City of Chino Hills Water Service Area

Other Agencies

Chino Basin Hydrologic Boundary

WEST YOST - K:\Clients\941 Chino Basin Watermaster\00-00-00 Master\PE8 PE9 - Storage and SY\GIS\MXD\SY Court Order\FY2022 Data Coll and Eval\Regional Inf\Fig2_ChinoHills_IEUA_IRP_Model.mxd - grapp - 3/7/2023

Prepared by:

WEST YOST

0 0.5 1 Miles

0 1 2 Km

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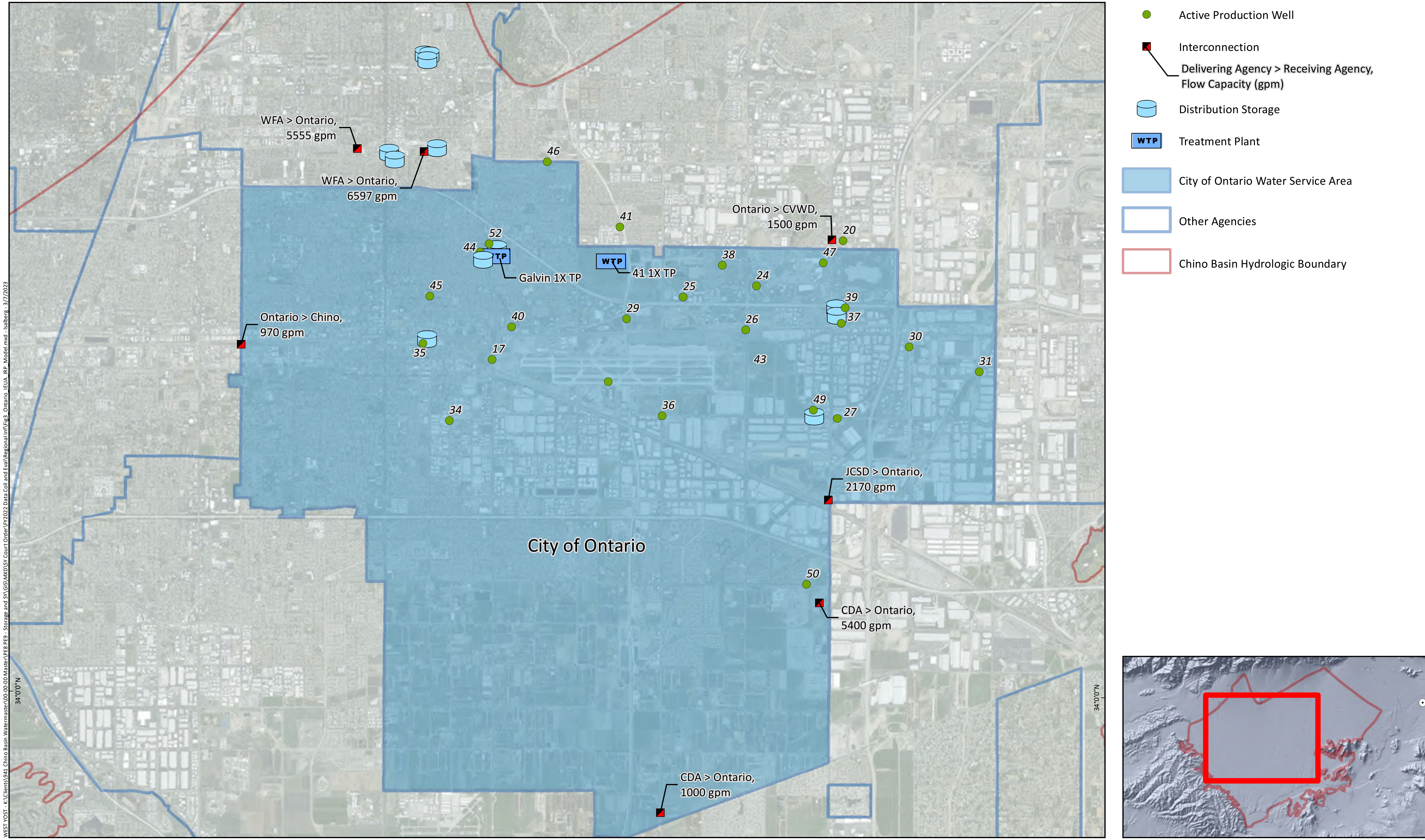
Prepared for:

Chino Basin Watermaster
Data Collection and Evaluation
FY 2021/22

Major Water Supply Infrastructure
City of Chino Hills

Figure B-2



Prepared by:

WEST YOST

0 0.5 1 Miles

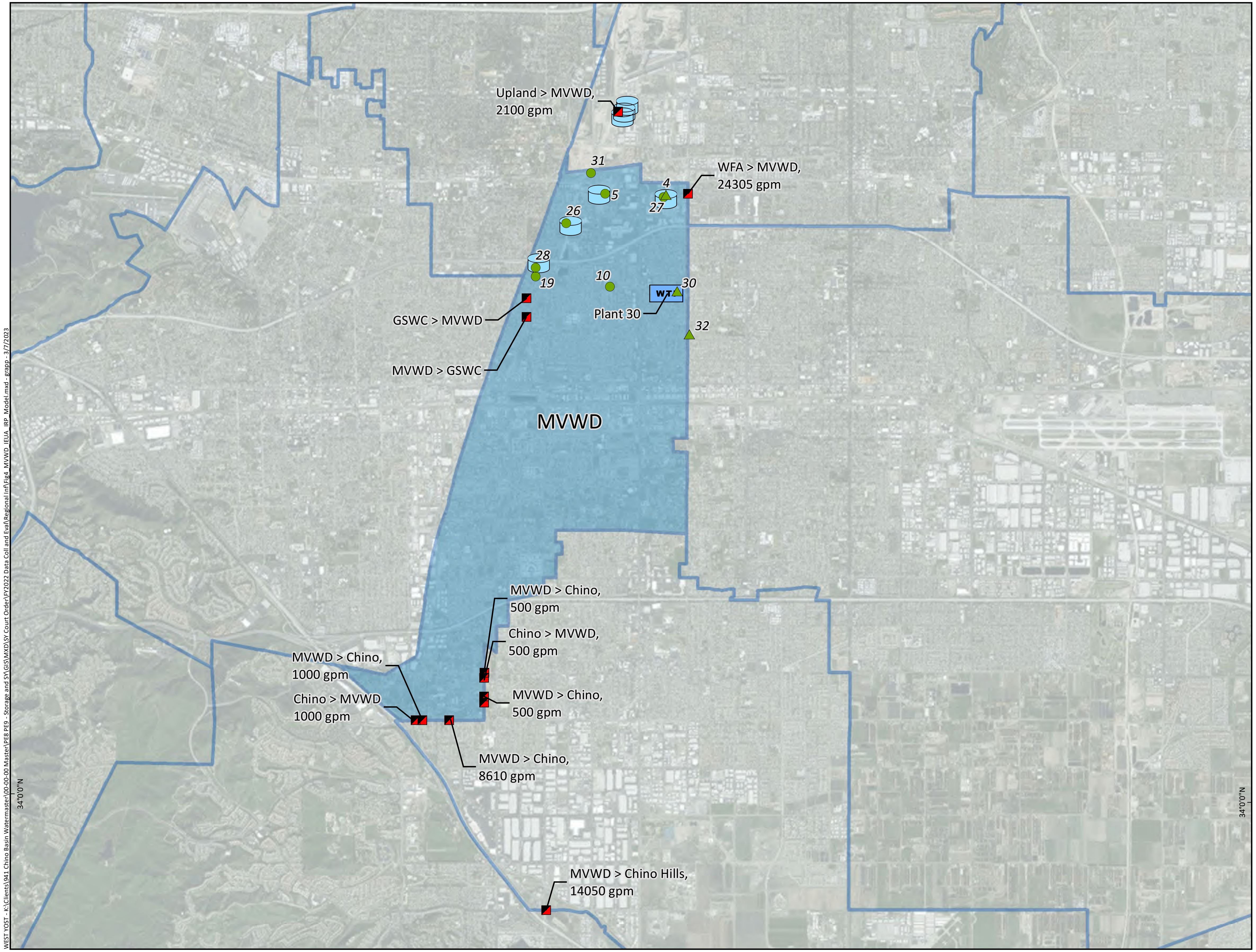
0 1 2 Km

Prepared for:

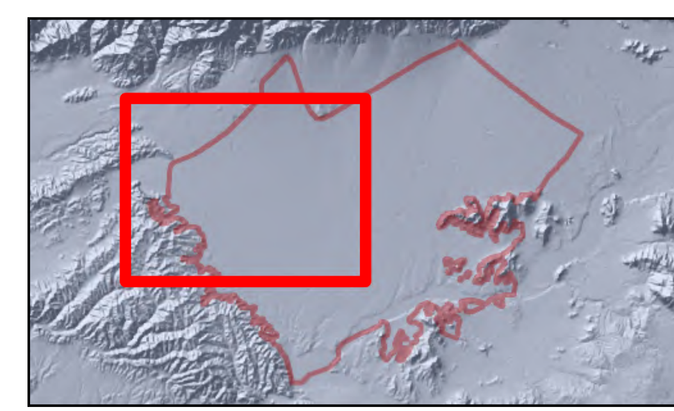
Chino Basin Watermaster
Data Collection and Evaluation
FY 2021/22

Major Water Infrastructure
City of Ontario

Figure B-3



Active Production Well
Active ASR Well
Interconnection
Delivering Agency > Receiving Agency,
Flow Capacity (gpm)
Distribution Storage
WTP Treatment Plant
MVWD Water Service Area
Other Agencies
Chino Basin Hydrologic Boundary



Prepared by:

WEST YOST

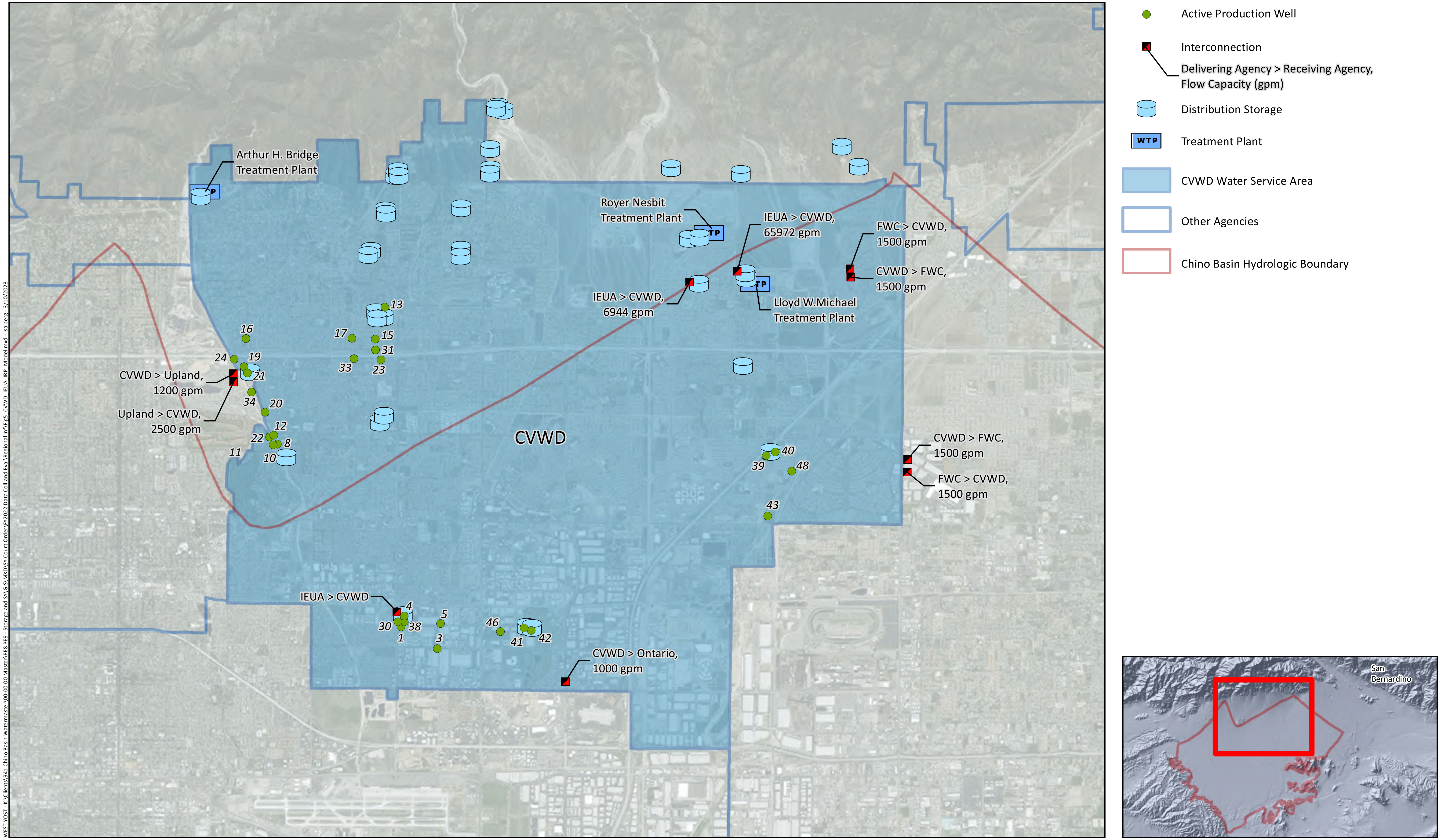
0 0.5 1 Miles
0 1 2 Km

Prepared for:

Chino Basin Watermaster
Data Collection and Evaluation
FY 2021/22

Major Water Supply Infrastructure
Monte Vista Water District (MVWD)

Figure B-4



Prepared by:

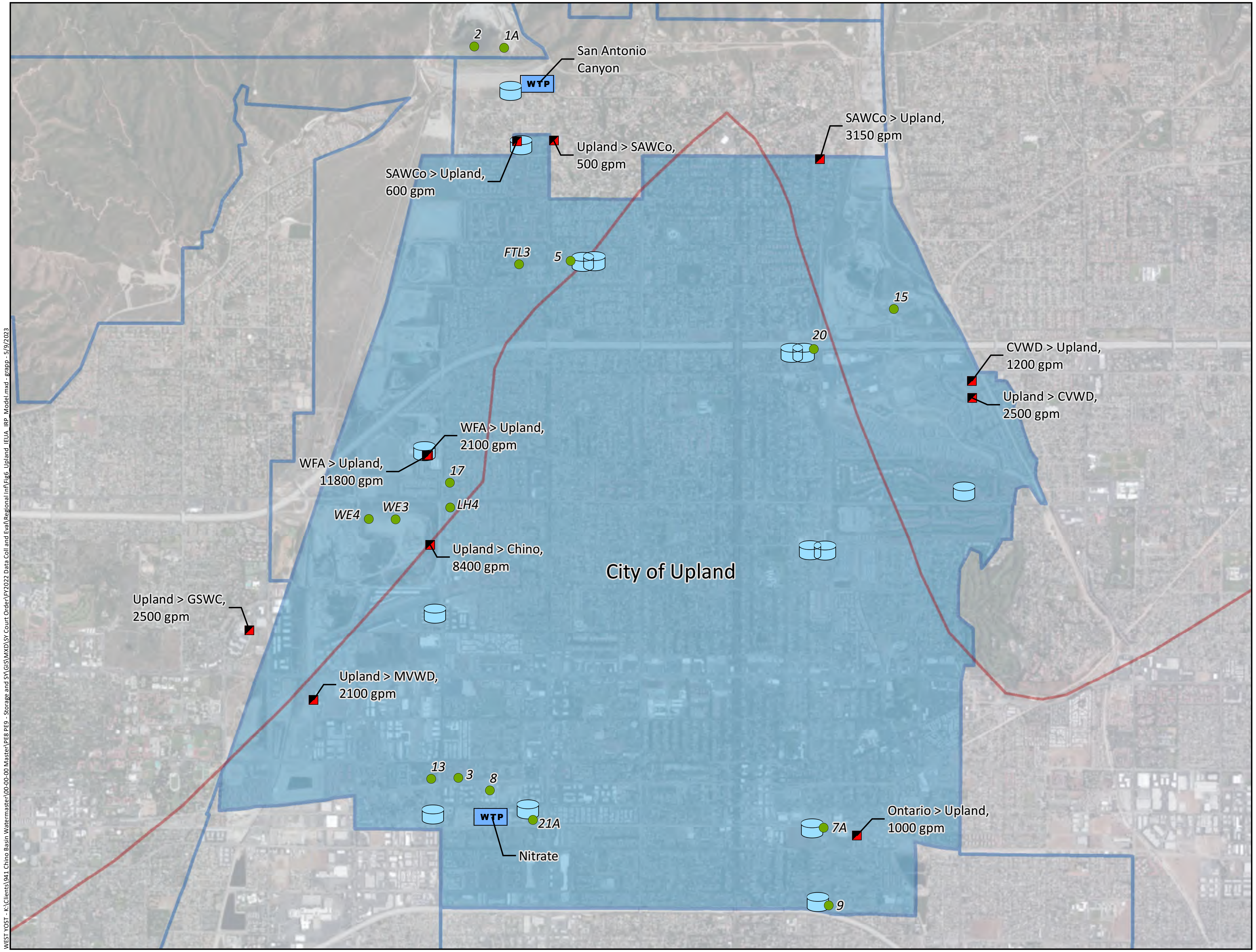
WEST YOST

Prepared for:

Chino Basin Watermaster
Data Collection and Evaluation
FY 2021/22

Major Water Supply Infrastructure
Cucamonga Valley Water District (CVWD)

Figure B-5



Active Production Well

Interconnection

Delivering Agency > Receiving Agency, Flow Capacity (gpm)

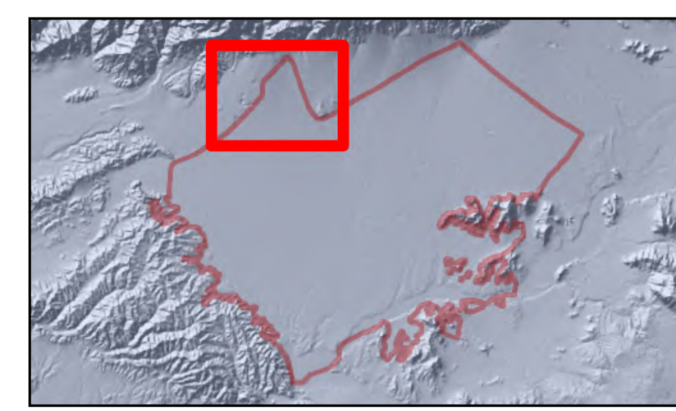
Distribution Storage

Treatment Plant

City of Upland Water Service Area

Other Agencies

Chino Basin Hydrologic Boundary



Prepared by:

WEST YOST

0 0.25 0.5 Miles

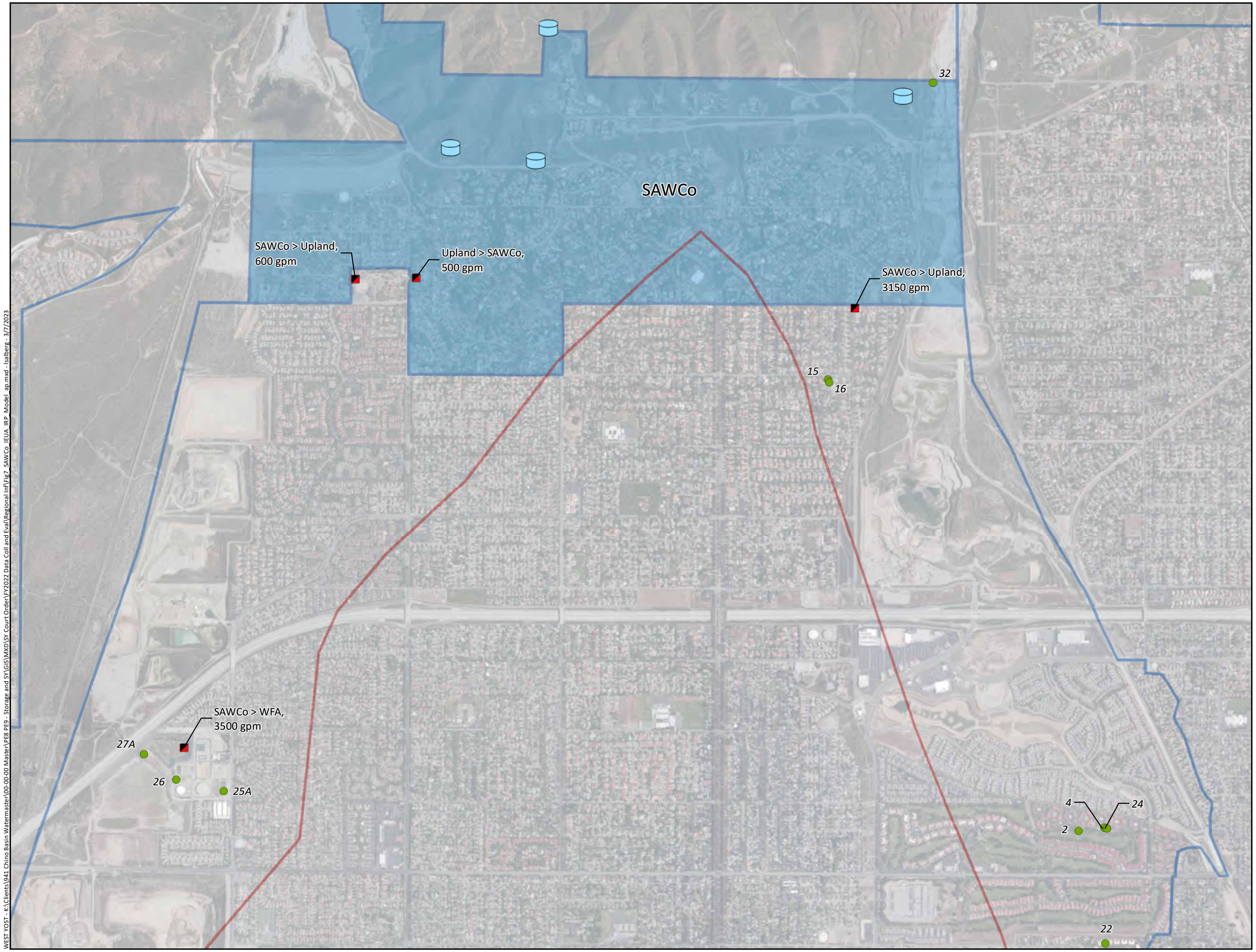
0 0.5 1 Km

Prepared for:

Chino Basin Watermaster
Data Collection and Evaluation
FY 2021/22

Major Water Supply Infrastructure
City of Upland

Figure B-6



Active Production Well

Interconnection
Delivering Agency > Receiving Agency, Flow Capacity (gpm)

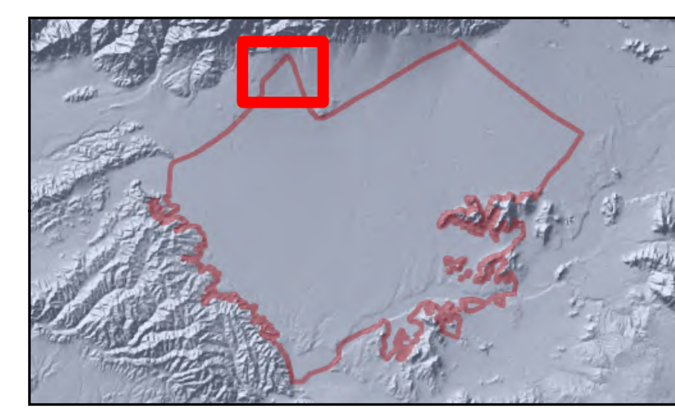
Distribution Storage

WTP Treatment Plant

SAWCo Water Service Area

Other Agencies

Chino Basin Hydrologic Boundary



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WEST YOST

N

0 0.125 0.25 Miles

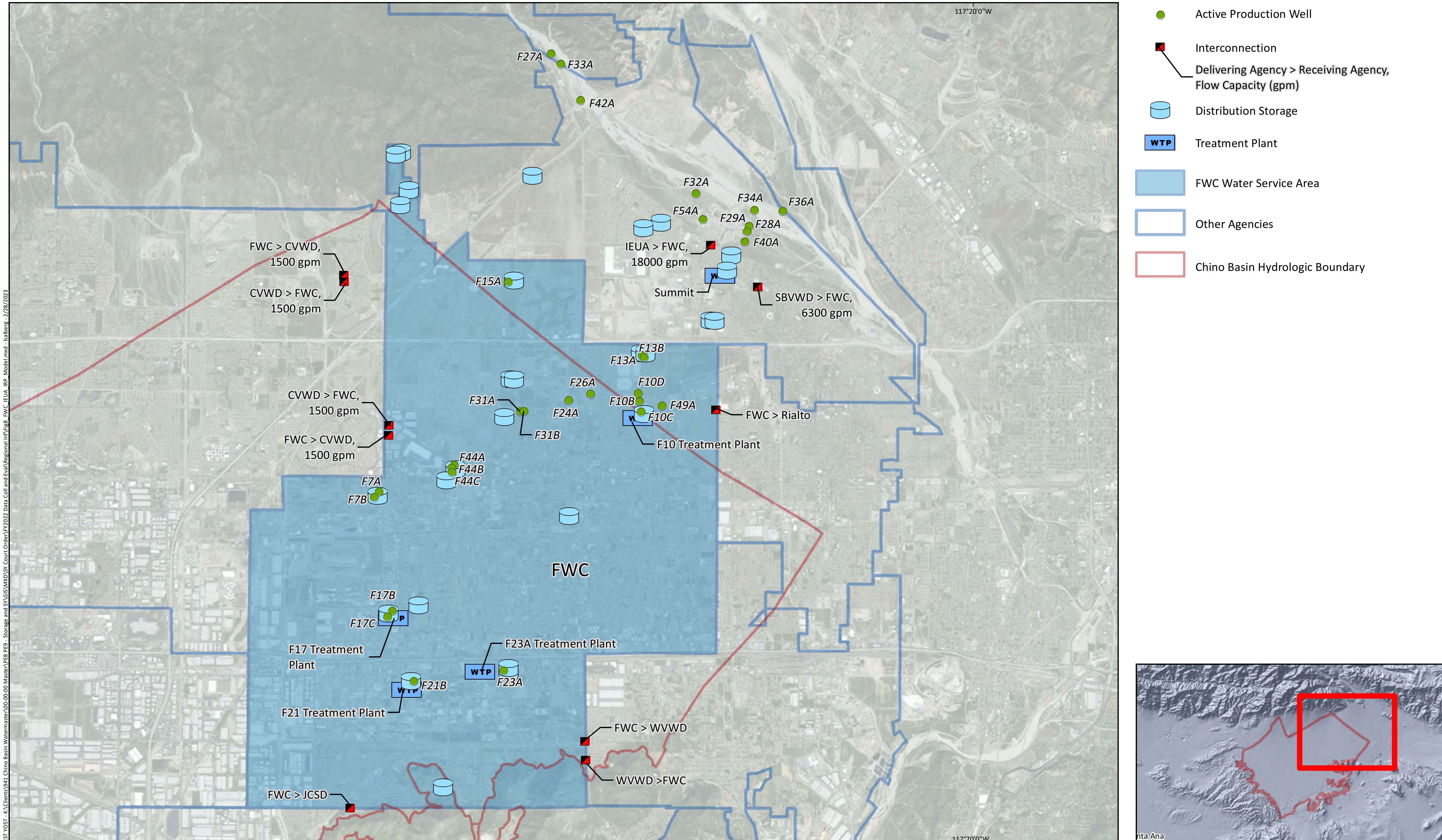
0 0.25 0.5 Km

Prepared for:

Chino Basin Watermaster
Data Collection and Evaluation
FY 2021/22

Major Water Supply Infrastructure
San Antonio Water Company (SAWCo)

Figure B-7



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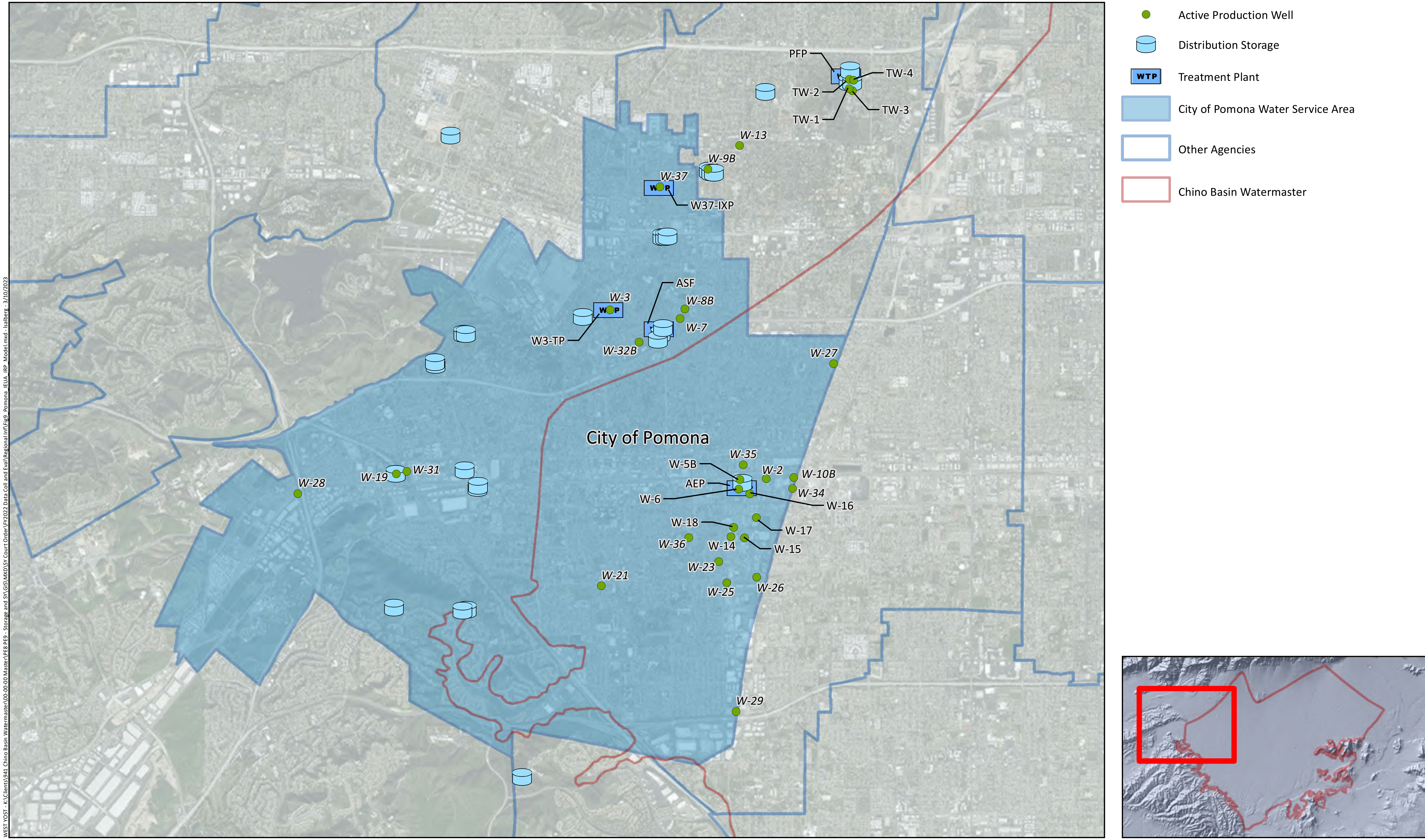
WEST YOST

Prepared for:

Chino Basin Watermaster
Data Collection and Evaluation
FY 2021/22

Major Water Supply Infrastructure
Fontana Water Company (FWC)

Figure B-8



Prepared by:

WEST YOST

0 0.25 0.5 Miles

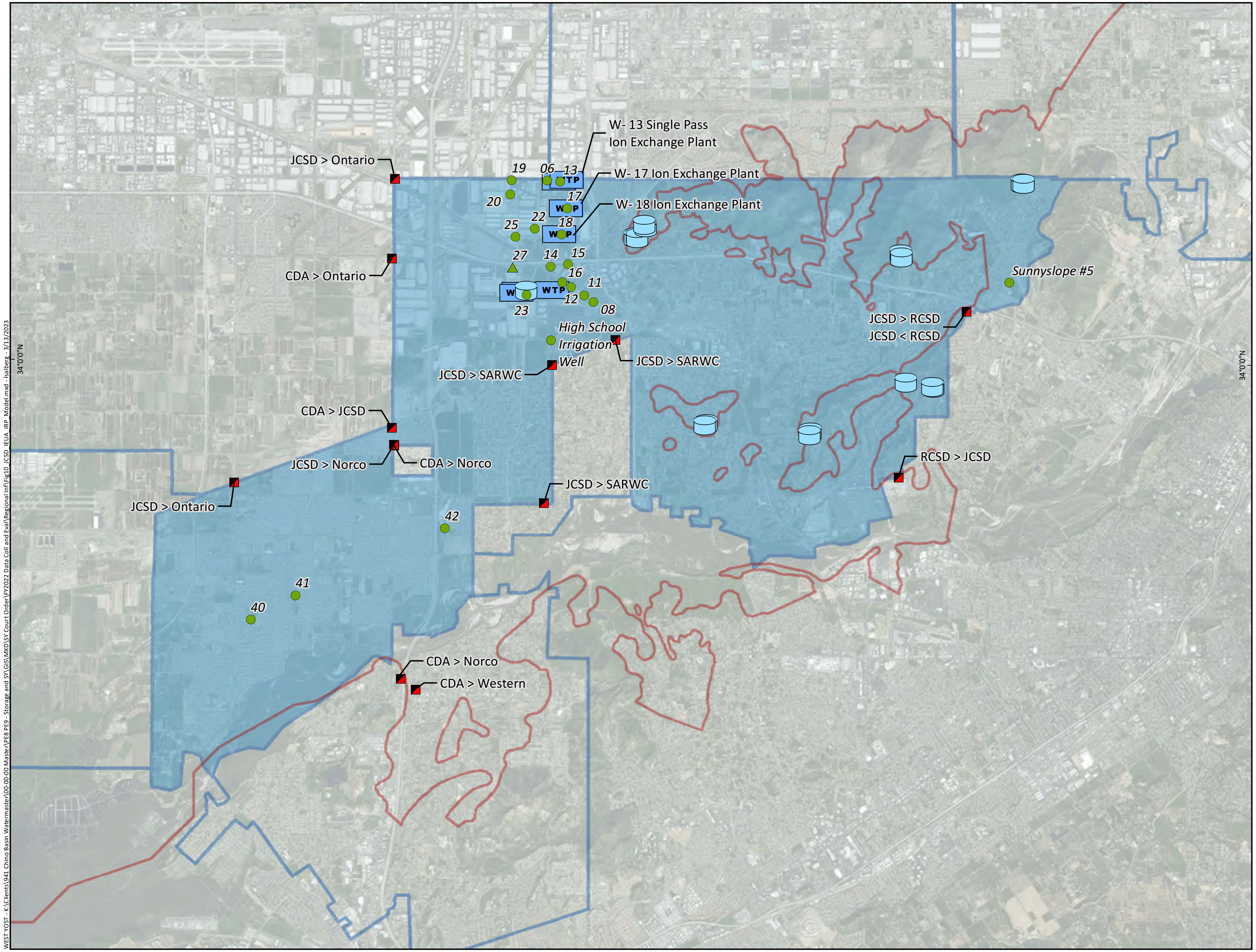
0 0.5 1 Km

Prepared for:

Chino Basin Watermaster
Data Collection and Evaluation
FY 2021/22

Major Water Supply Infrastructure
City of Pomona

Figure B-9



Active Production Well

Active ASR Well

Interconnection

Delivering Agency > Receiving Agency

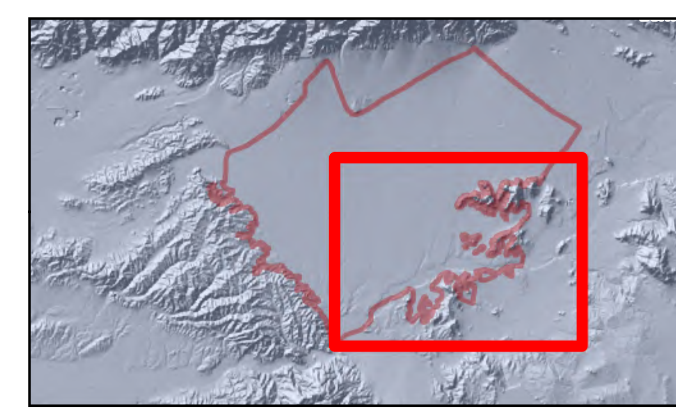
Distribution Storage

WTP Treatment Plant

JCSD Water Service Area

Other Agencies

Chino Basin Hydrologic Boundary



Prepared by:

WEST YOST

Prepared for:

Chino Basin Watermaster
Data Collection and Evaluation
FY 2021/22

Major Water Supply Infrastructure
Jurupa Community Service Water District (JCSD)

Figure B-10

Appendix C

Metering and Reporting of Groundwater Pumping for FY 2022

Appendix C responds to the requirement of the 2017 Court Order that Watermaster must "[e]nsure that, unless a Party to the Judgment is excluded from reporting, all production by all Parties to the Judgment is metered, reported, and reflected in Watermaster's approved Assessment Packages." (2017 Court Order, p. 16). This chapter characterizes the wells in the Chino Basin for FY 2022, including descriptions of wells that were added or went out of service in the reporting year and information on wells that are not metered.

Chino Basin Production Wells in FY 2022

Watermaster staff maintains a database of wells and groundwater pumping data, which is updated on a quarterly basis. Metered pumping data are collected from all Chino Basin Parties who pump more than 10 afy (a Minimal Producer as defined in the Judgment pumps less than 10 afy[1]). In some cases, metered pumping data are unavailable due to lack of access to the meter, a broken meter, or for other reasons. For wells where no metered data are available, Watermaster staff applies a water duty method to estimate the quarterly pumping. The water duty method is based on such factors as: irrigated area; crop type; irrigation efficiency; livestock populations; number of domestic users; or other factors. The water duty method is currently being refined and documented and will be included in a future report.

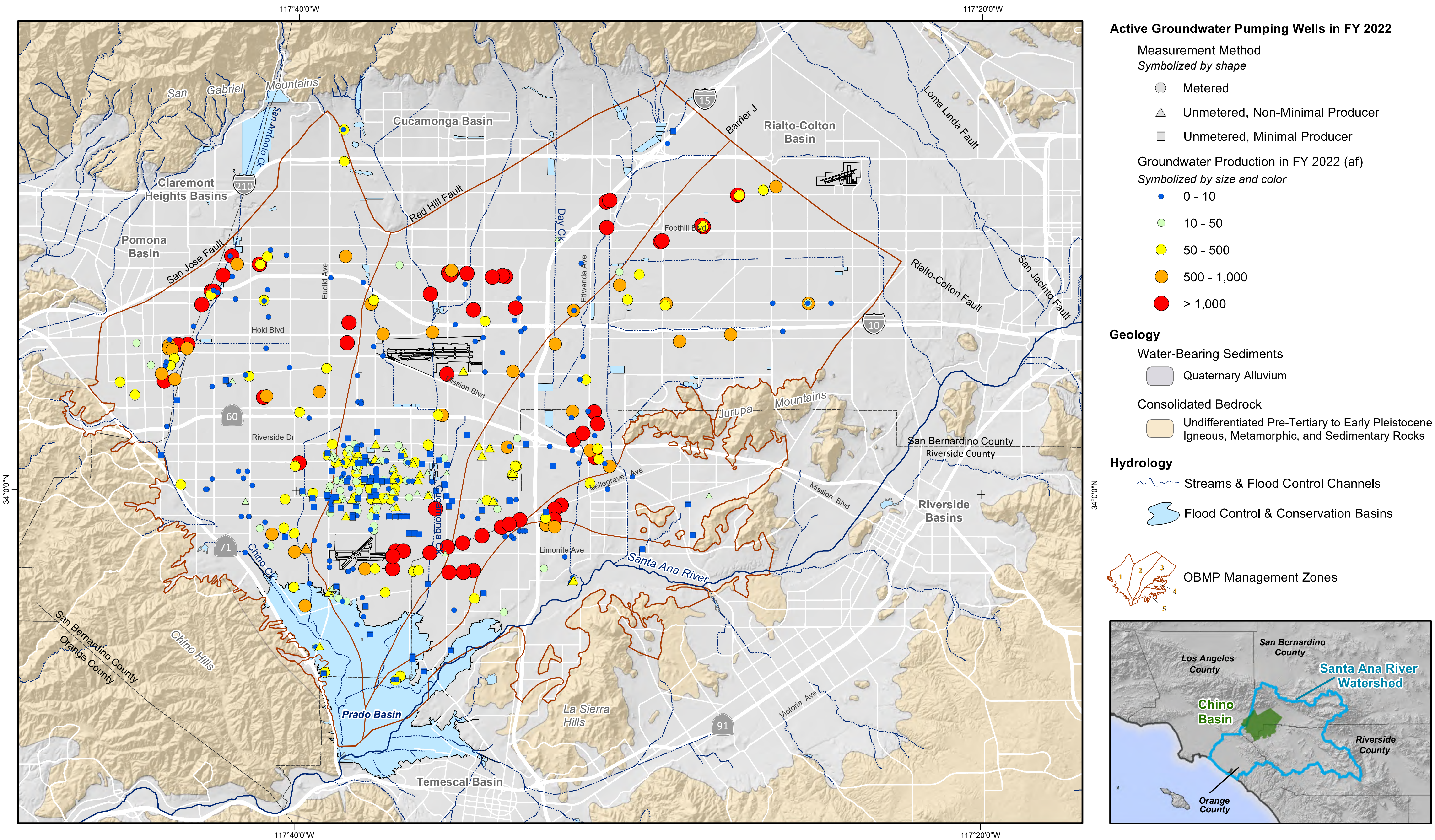
Figure C-1 shows all active pumping wells in the Chino Basin during FY 2022. These wells are symbolized by meter status, wells owned Minimal Producers, and whether the well was brought online or decommissioned in FY 2022. There were 475 wells that were active during FY 2022, as summarized below in Table C-1.

Table C-1. Summary of Pumping Wells in the Chino Basin in FY 2022

Well Category	Number of Wells Meeting Criteria in FY 2022	Total FY 2022 Production
Well Status		
Active for entire year	455	161,681
Brought online in FY 2022	3	2,148
Decommissioned in FY 2022	17	63
Meter Status		
Metered	332	158,637
Unmetered, Non-Minimal Producer	93	4,919
Minimal Producer	50	335
Total	**475**	**163,891**

Table C-2 includes a comprehensive list of the active wells in Watermaster's database for FY 2022.

[1] Chino Basin Judgment Section I.4.j



Prepared by:

WEST YOST
Water. Engineered.

Author: LS

Date: 3/7/2023

File Name: Appendix_B_GWPumpingWells.mxd

Prepared for:

Chino Basin Watermaster
Data Collection and Evaluation
FY 2021/22

Active Pumping Wells in the Chino Basin by Measurement Method
FY 2022

Figure C-1

Table C-2. Pumping Wells in the Chino Basin in FY 2022

CBWM Well ID	Name	Owner[a]	Pool	Latitude	Longitude	New in FY 2022	Abandoned/ Destroyed in FY 2022	Metered/ Estimated	Minimal Producer	FY 2022 Production
0600496	Well 1	BlueTriton Brands, Inc.	3	34.04610	-117.52873	N	N	Metered	N	0.0
0600923	Well 2	BlueTriton Brands, Inc.	3	34.04583	-117.52581	N	N	Metered	N	251.6
0600487	01B	Chino Hills, City Of	3	33.98964	-117.68942	N	N	Metered	N	0.0
0600488	15B	Chino Hills, City Of	3	33.98977	-117.69319	N	N	Metered	N	0.0
0600489	16	Chino Hills, City Of	3	34.00489	-117.70742	N	N	Metered	N	0.0
0600499	17	Chino Hills, City Of	3	34.00528	-117.69218	N	N	Metered	N	0.0
0600500	19	Chino Hills, City Of	3	34.00249	-117.68788	N	N	Metered	N	0.0
0600689	05	Chino Hills, City Of	3	33.97513	-117.69114	N	N	Metered	N	0.0
3601911	01A	Chino Hills, City Of	3	33.98984	-117.68945	N	N	Metered	N	0.0
3601916	07A	Chino Hills, City Of	3	34.00071	-117.70984	N	N	Metered	N	0.0
3601917	07B	Chino Hills, City Of	3	34.00075	-117.71050	N	N	Metered	N	0.0
0600417	11	Chino, City Of	3	34.02990	-117.66045	N	N	Metered	N	0.0
0600467	12	Chino, City Of	3	34.04712	-117.69159	N	N	Metered	N	0.0
0600478	13	Chino, City Of	3	34.01168	-117.66540	N	N	Metered	N	1949.8
0600482	14	Chino, City Of	3	34.05802	-117.68165	N	N	Metered	N	0.0
0601026	16	Chino, City Of	3	34.00153	-117.64018	N	N	Metered	N	0.0
0601183	18	Chino, City Of	3	34.01473	-117.65118	N	N	Metered	N	117.7
0601194	19	Chino, City Of	3	34.01027	-117.66711	N	N	Metered	N	495.7
3601618	04	Chino, City Of	3	34.00815	-117.69029	N	N	Metered	N	0.0
3601752	05	Chino, City Of	3	34.03868	-117.68144	N	N	Metered	N	815.6
3602105	06	Chino, City Of	3	34.00812	-117.69461	N	N	Metered	N	0.0
3602666	09	Chino, City Of	3	34.03823	-117.68287	N	N	Metered	N	2675.4
3602680	10	Chino, City Of	3	34.04650	-117.68991	N	N	Metered	N	138.7
0600598	07A	City Of Upland-Public Wks Dir	3	34.09555	-117.64335	N	N	Metered	N	759.1
0600659	20	City Of Upland-Public Wks Dir	3	34.13393	-117.64412	N	N	Metered	N	343.1
0601070	21A	City Of Upland-Public Wks Dir	3	34.09586	-117.67202	N	N	Metered	N	0.0
3600180	03	City Of Upland-Public Wks Dir	3	34.09789	-117.67977	N	N	Metered	N	0.0
3600359	08	City Of Upland-Public Wks Dir	3	34.09501	-117.68130	N	N	Metered	N	371.3
0600479	30	Cucamonga Valley Water District	3	34.08913	-117.59315	N	N	Metered	N	2760.9
0600680	38	Cucamonga Valley Water District	3	34.08908	-117.59183	N	N	Metered	N	2276.7
0600905	39	Cucamonga Valley Water District	3	34.11819	-117.51669	N	N	Metered	N	3671.8
0600906	40	Cucamonga Valley Water District	3	34.11882	-117.51485	N	N	Metered	N	1076.8
0600907	41	Cucamonga Valley Water District	3	34.08814	-117.56687	N	N	Metered	N	3170.6
0600908	42	Cucamonga Valley Water District	3	34.08775	-117.56541	N	N	Metered	N	3694.7
0601033	43	Cucamonga Valley Water District	3	34.10775	-117.51630	N	N	Metered	N	3655.3
0601143	46	Cucamonga Valley Water District	3	34.08749	-117.57181	N	N	Metered	N	2392.6
3600475	04	Cucamonga Valley Water District	3	34.09005	-117.59178	N	N	Metered	N	810.3
3601174	01	Cucamonga Valley Water District	3	34.08816	-117.59241	N	N	Metered	N	1183.5
3601373	03	Cucamonga Valley Water District	3	34.08448	-117.58492	N	N	Metered	N	0.0
3602000	05	Cucamonga Valley Water District	3	34.08881	-117.58426	N	N	Metered	N	2588.0
0300258	Chino I #06	Desalter Authority	3	33.96790	-117.60924	N	N	Metered	N	417.5
0300259	Chino I #07	Desalter Authority	3	33.96823	-117.60689	N	N	Metered	N	316.7
0300454	Chino I #13	Desalter Authority	3	33.96769	-117.59213	N	N	Metered	N	1312.2
0300455	Chino I #14	Desalter Authority	3	33.96773	-117.58522	N	N	Metered	N	1251.4
0300456	Chino I #15	Desalter Authority	3	33.96839	-117.58024	N	N	Metered	N	3258.8
0300457	Chino II #01	Desalter Authority	3	33.98256	-117.57614	N	N	Metered	N	2494.9
0300458	Chino II #04	Desalter Authority	3	33.98917	-117.55785	N	N	Metered	N	1869.1
0300460	Chino II #06	Desalter Authority	3	33.99355	-117.54086	N	N	Metered	N	2196.2
0300461	Chino II #07	Desalter Authority	3	33.98931	-117.54111	N	N	Metered	N	1350.1
0300462	Chino II #08	Desalter Authority	3	33.98639	-117.54091	N	N	Metered	N	688.2
0300463	Chino II #09A	Desalter Authority	3	33.99515	-117.53782	N	N	Metered	N	2248.9
0300590	Chino II #10	Desalter Authority	3	33.97958	-117.58559	N	N	Metered	N	4596.9
0600648	Chino I #01	Desalter Authority	3	33.97821	-117.65016	N	N	Metered	N	0.0
0600649	Chino I #02	Desalter Authority	3	33.97209	-117.65005	N	N	Metered	N	0.0
0600650	Chino I #03	Desalter Authority	3	33.96940	-117.65003	N	N	Metered	N	0.0
0600651	Chino I #04	Desalter Authority	3	33.96877	-117.63872	N	N	Metered	N	0.0
0600652	Chino I #05	Desalter Authority	3	33.96894	-117.61948	N	N	Metered	N	1709.7

Table C-2. Pumping Wells in the Chino Basin in FY 2022

CBWM Well ID	Name	Owner[a]	Pool	Latitude	Longitude	New in FY 2022	Abandoned/ Destroyed in FY 2022	Metered/ Estimated	Minimal Producer	FY 2022 Production
0600653	Chino I #08	Desalter Authority	3	33.97392	-117.61962	N	N	Metered	N	1041.6
0600654	Chino I #09	Desalter Authority	3	33.97621	-117.61804	N	N	Metered	N	1685.5
0600655	Chino I #10	Desalter Authority	3	33.97624	-117.61441	N	N	Metered	N	1645.4
0600656	Chino I #11	Desalter Authority	3	33.97557	-117.60145	N	N	Metered	N	1691.7
0600925	Chino II #02	Desalter Authority	3	33.98616	-117.56675	N	N	Metered	N	2489.2
0600926	Chino II #03	Desalter Authority	3	33.98738	-117.56299	N	N	Metered	N	1052.2
0601108	Chino I #16	Desalter Authority	3	33.96121	-117.66746	N	N	Metered	N	206.1
0601121	Chino I #17	Desalter Authority	3	33.96285	-117.65982	N	N	Metered	N	0.0
0601145	Chino I #20	Desalter Authority	3	33.96889	-117.63306	N	N	Metered	N	567.3
0601146	Chino I #21	Desalter Authority	3	33.96889	-117.62806	N	N	Metered	N	359.6
0601197	Chino II #11	Desalter Authority	3	33.97792	-117.59291	N	N	Metered	N	4323.3
0601202	Chino II #12	Desalter Authority	3	33.99344	-117.59881	Y	N	Metered	N	1794.2
0600486	F17B	Fontana Water Company	3	34.07699	-117.48725	N	N	Metered	N	531.8
0600490	F07A	Fontana Water Company	3	34.10260	-117.48924	N	N	Metered	N	2583.8
0600492	F23A	Fontana Water Company	3	34.06468	-117.45567	N	N	Metered	N	948.3
0600502	F24A	Fontana Water Company	3	34.12319	-117.43991	N	N	Metered	N	369.4
0600504	F26A	Fontana Water Company	3	34.12465	-117.43399	N	N	Metered	N	835.4
0600562	F17C	Fontana Water Company	3	34.07616	-117.48746	N	N	Metered	N	400.3
0600696	F44A	Fontana Water Company	3	34.10828	-117.46915	N	N	Metered	N	2487.6
0600697	F44B	Fontana Water Company	3	34.10816	-117.46922	N	N	Metered	N	257.8
0600698	F44C	Fontana Water Company	3	34.10883	-117.46989	N	N	Metered	N	2121.5
0601035	F07B	Fontana Water Company	3	34.10219	-117.48997	N	N	Metered	N	2781.5
0601181	F21B	Fontana Water Company	3	34.06179	-117.48052	N	N	Metered	N	597.0
0601203	F31B	Fontana Water Company	3	34.12095	-117.45166	Y	N	Metered	N	349.6
3600584	F31A	Fontana Water Company	3	34.12111	-117.45265	N	N	Metered	N	2123.3
0601182	2	Golden State Water Company	3	34.08100	-117.70764	N	N	Metered	N	1066.1
3601764	1	Golden State Water Company	3	34.08138	-117.70753	N	N	Metered	N	0.0
0300114	HighSchool	Jurupa Community Services District	3	34.00392	-117.52367	N	N	Metered	N	121.3
0300188	W11	Jurupa Community Services District	3	34.01214	-117.51647	N	N	Metered	N	0.0
0300190	W12	Jurupa Community Services District	3	34.01372	-117.51934	N	N	Metered	N	78.7
0300200	W13	Jurupa Community Services District	3	34.03299	-117.52184	N	N	Metered	N	2220.1
0300202	W15	Jurupa Community Services District	3	34.01785	-117.52005	N	N	Metered	N	294.9
0300204	W14	Jurupa Community Services District	3	34.01740	-117.52386	N	N	Metered	N	564.7
0300205	W16	Jurupa Community Services District	3	34.01454	-117.52128	N	N	Metered	N	1534.5
0300206	W24 (GA 6)	Jurupa Community Services District	3	34.00682	-117.50299	N	N	Metered	N	0.0
0300207	W17	Jurupa Community Services District	3	34.02814	-117.52025	N	N	Metered	N	1115.7
0300208	W18	Jurupa Community Services District	3	34.02334	-117.52146	N	N	Metered	N	0.0
0300262	W40	Jurupa Community Services District	3	33.95696	-117.57962	N	N	Metered	N	56.6
0300263	W41	Jurupa Community Services District	3	33.95245	-117.58939	N	N	Metered	N	0.0
0300264	W22	Jurupa Community Services District	3	34.02435	-117.52742	N	N	Metered	N	1597.2
0300267	W23	Jurupa Community Services District	3	34.01221	-117.52910	N	N	Metered	N	0.0
0300268	W25	Jurupa Community Services District	3	34.02153	-117.53196	N	N	Metered	N	2993.6
0300269	W42	Jurupa Community Services District	3	33.96936	-117.54593	N	N	Metered	N	10.6
0300582	W27	Jurupa Community Services District	3	34.01725	-117.53225	N	N	Metered	N	0.0
0300583	W28	Jurupa Community Services District	3	34.01898	-117.54329	N	N	Metered	N	0.0
3301743	W06	Jurupa Community Services District	3	34.03321	-117.52472	N	N	Metered	N	0.0
3301895	W08	Jurupa Community Services District	3	34.01097	-117.51439	N	N	Metered	N	643.9
3302030	W19	Jurupa Community Services District	3	34.03322	-117.53251	N	N	Metered	N	862.7
3302031	W20	Jurupa Community Services District	3	34.03060	-117.53283	N	N	Metered	N	0.0
0601091	6	Marygold Mutual Water Company	3	34.07743	-117.41788	N	N	Metered	N	930.8
0601092	7	Marygold Mutual Water Company	3	34.07734	-117.41792	N	N	Metered	N	13.4
3600194	3	Marygold Mutual Water Company	3	34.07748	-117.41796	N	N	Metered	N	0.0
3600195	2	Marygold Mutual Water Company	3	34.07746	-117.43509	N	N	Metered	N	0.0
3600196	4	Marygold Mutual Water Company	3	34.07754	-117.40667	N	N	Metered	N	0.0
0600415	19	Monte Vista Water District	3	34.07947	-117.70883	N	N	Metered	N	168.8
0600674	27 (MVWD/CH)	Monte Vista Water District	3	34.09203	-117.68536	N	N	Metered	N	1590.5
0600675	26 (MVWD/CH)	Monte Vista Water District	3	34.08751	-117.70307	N	N	Metered	N	3008.2

Table C-2. Pumping Wells in the Chino Basin in FY 2022

CBWM Well ID	Name	Owner[a]	Pool	Latitude	Longitude	New in FY 2022	Abandoned/ Destroyed in FY 2022	Metered/ Estimated	Minimal Producer	FY 2022 Production
0600684	28 (MVWD/CH)	Monte Vista Water District	3	34.08101	-117.70866	N	N	Metered	N	1890.2
0601029	30 (MVWD/CH)	Monte Vista Water District	3	34.07740	-117.68286	N	N	Metered	N	59.2
0601068	32 (MVWD/CH)	Monte Vista Water District	3	34.07082	-117.68053	N	N	Metered	N	4.2
0601071	31	Monte Vista Water District	3	34.09534	-117.69883	N	N	Metered	N	1769.2
0601072	33 (MVWD/CH)	Monte Vista Water District	3	34.08178	-117.68112	N	N	Metered	N	0.0
0601104	34 (MVWD/CH)	Monte Vista Water District	3	34.08047	-117.70530	N	N	Metered	N	3.7
3601357	04 (MVWD/CH)	Monte Vista Water District	3	34.09192	-117.68471	N	N	Metered	N	388.4
3601358	05	Monte Vista Water District	3	34.09214	-117.69618	N	N	Metered	N	996.1
3601359	06	Monte Vista Water District	3	34.08698	-117.69828	N	N	Metered	N	0.0
3601362	09	Monte Vista Water District	3	34.07719	-117.68274	N	N	Metered	N	0.0
3601363	10	Monte Vista Water District	3	34.07781	-117.69670	N	N	Metered	N	0.0
0600683	Concours #1	Niagara Bottling, LLC	3	34.07409	-117.53185	N	N	Metered	N	0.0
0600909	Concours #2	Niagara Bottling, LLC	3	34.07410	-117.53225	N	N	Metered	N	686.2
0600910	Philadelphia #1	Niagara Bottling, LLC	3	34.03126	-117.59779	N	N	Metered	N	242.4
0601034	Philadelphia #2	Niagara Bottling, LLC	3	34.03132	-117.59588	N	N	Metered	N	755.4
0600420	ELEC/IRR	No Longer Ag Owner	3	34.01880	-117.56272	N	N	Metered	N	0.0
0300172	09 W	Norco, City Of	3	33.98458	-117.55773	N	N	Metered	N	0.0
0300173	10 E	Norco, City Of	3	33.98460	-117.55490	N	N	Metered	N	0.0
0300199	11 M	Norco, City Of	3	33.98459	-117.55629	N	N	Metered	N	0.0
0600453	29	Ontario, City Of	3	34.06498	-117.60088	N	N	Metered	N	503.0
0600454	30	Ontario, City Of	3	34.06047	-117.54113	N	N	Metered	N	696.2
0600455	31	Ontario, City Of	3	34.05553	-117.52732	N	N	Metered	N	0.3
0600476	34	Ontario, City Of	3	34.04714	-117.63707	N	N	Metered	N	0.0
0600493	35	Ontario, City Of	3	34.06049	-117.64231	N	N	Metered	N	2764.0
0600494	36	Ontario, City Of	3	34.04808	-117.59369	N	N	Metered	N	1087.8
0600551	37	Ontario, City Of	3	34.06563	-117.55756	N	N	Metered	N	0.0
0600585	38	Ontario, City Of	3	34.07412	-117.58091	N	N	Metered	N	1603.8
0600690	39	Ontario, City Of	3	34.06678	-117.55580	N	N	Metered	N	0.0
0600920	41	Ontario, City Of	3	34.08042	-117.60208	N	N	Metered	N	2673.8
0600922	40	Ontario, City Of	3	34.06408	-117.62501	N	N	Metered	N	720.6
0600956	50	Ontario, City Of	3	34.01861	-117.56416	N	N	Metered	N	980.4
0601011	42	Ontario, City Of	3	34.07001	-117.56065	N	N	Metered	N	0.0
0601012	43	Ontario, City Of	3	34.06140	-117.57978	N	N	Metered	N	0.0
0601013	44	Ontario, City Of	3	34.07620	-117.63090	N	N	Metered	N	686.7
0601014	45	Ontario, City Of	3	34.06861	-117.64156	N	N	Metered	N	2850.1
0601015	46	Ontario, City Of	3	34.09188	-117.61700	N	N	Metered	N	32.5
0601016	47	Ontario, City Of	3	34.07502	-117.56038	N	N	Metered	N	3982.4
0601017	48	Ontario, City Of	3	34.04907	-117.57501	N	N	Metered	N	0.0
0601018	49	Ontario, City Of	3	34.04928	-117.56161	N	N	Metered	N	574.3
0601019	51	Ontario, City Of	3	34.05670	-117.56641	N	N	Metered	N	0.0
0601099	52	Ontario, City Of	3	34.07776	-117.62941	N	N	Metered	N	299.5
3600010	25	Ontario, City Of	3	34.06819	-117.58953	N	N	Metered	N	0.0
3600012	26	Ontario, City Of	3	34.06290	-117.57604	N	N	Metered	N	0.0
3601777	09	Ontario, City Of	3	34.08678	-117.65033	N	N	Metered	N	0.0
3601778	11	Ontario, City Of	3	34.05527	-117.62481	N	N	Metered	N	0.0
3601952	27	Ontario, City Of	3	34.04786	-117.55677	N	N	Metered	N	0.0
3602051	15	Ontario, City Of	3	34.05028	-117.67009	N	N	Metered	N	0.0
3602107	17	Ontario, City Of	3	34.05902	-117.62932	N	N	Metered	N	0.0
3602267	20	Ontario, City Of	3	34.07894	-117.55863	N	N	Metered	N	0.0
3602457	24	Ontario, City Of	3	34.06951	-117.57521	N	N	Metered	N	214.6
1901715	06	Pomona, City Of	3	34.05767	-117.72935	N	N	Metered	N	579.4
1901719	10	Pomona, City Of	3	34.05938	-117.71993	N	N	Metered	N	1499.2
1901722	14	Pomona, City Of	3	34.05093	-117.73063	N	N	Metered	N	0.0
1901723	15	Pomona, City Of	3	34.05081	-117.72825	N	N	Metered	N	153.4
1901724	16	Pomona, City Of	3	34.05707	-117.72751	N	N	Metered	N	560.4
1901725	17	Pomona, City Of	3	34.05364	-117.72629	N	N	Metered	N	488.3
1901726	18	Pomona, City Of	3	34.05227	-117.73018	N	N	Metered	N	0.0

Table C-2. Pumping Wells in the Chino Basin in FY 2022

CBWM Well ID	Name	Owner[a]	Pool	Latitude	Longitude	New in FY 2022	Abandoned/ Destroyed in FY 2022	Metered/ Estimated	Minimal Producer	FY 2022 Production
1902804	21	Pomona, City Of	3	34.04384	-117.75269	N	N	Metered	N	245.6
1902875	23	Pomona, City Of	3	34.04742	-117.73269	N	N	Metered	N	724.3
1903016	02	Pomona, City Of	3	34.05926	-117.72471	N	N	Metered	N	1461.9
1903063	25	Pomona, City Of	3	34.04444	-117.73130	N	N	Metered	N	1417.6
1903079	26	Pomona, City Of	3	34.04525	-117.72620	N	N	Metered	N	705.7
1903113	27	Pomona, City Of	3	34.07560	-117.71319	N	N	Metered	N	1198.9
1903126	29	Pomona, City Of	3	34.02615	-117.72956	N	N	Metered	N	0.0
1903156	30	Pomona, City Of	3	34.06670	-117.71703	N	N	Metered	N	0.0
1904001	34	Pomona, City Of	3	34.05784	-117.72029	N	N	Metered	N	523.1
1904002	35	Pomona, City Of	3	34.06122	-117.72865	N	N	Metered	N	0.0
1904003	36	Pomona, City Of	3	34.05075	-117.73778	N	N	Metered	N	33.3
1904004	05B	Pomona, City Of	3	34.05903	-117.72909	N	N	Metered	N	592.6
0600589	San Antonio 16	San Antonio Water Company	3	34.14668	-117.64440	N	N	Metered	N	401.8
3601561	12	San Antonio Water Company	3	34.08508	-117.63447	N	N	Metered	N	0.0
3601563	15	San Antonio Water Company	3	34.14681	-117.64465	N	N	Metered	N	0.7
0600468	SS2	San Bernardino, County of (Shooting Park)	3	33.93701	-117.65645	N	N	Metered	N	19.8
0600469	SS1	San Bernardino, County of (Shooting Park)	3	33.93714	-117.65644	N	N	Metered	N	0.0
3300973	03	Santa Ana River Water Company	3	34.00181	-117.51507	N	N	Metered	N	0.0
3301945	01A	Santa Ana River Water Company	3	33.97421	-117.53566	N	N	Metered	N	0.0
3302078	03A	Santa Ana River Water Company	3	34.00160	-117.51502	N	N	Metered	N	0.0
0600524	#37	West Valley Water District	3	34.06611	-117.43007	N	N	Metered	N	0.0
1902353	Alt 2	ANG II (Multi) LLC	2	34.05960	-117.74483	N	N	Metered	N	27.3
0600660	INFIELD WELL	California Speedway Corporation	2	34.08862	-117.50017	N	N	Metered	N	367.2
3601364	1-Race track Use	California Speedway Corporation	2	34.08967	-117.50989	N	N	Metered	N	35.6
3601365	2	California Speedway Corporation	2	34.08448	-117.50985	N	N	Metered	N	542.0
3601159	Deep Well No. 3	California Steel Industries, Inc.	2	34.07843	-117.50580	N	N	Metered	N	129.4
3601719		CalMat Co.	2	34.09534	-117.69936	N	N	Metered	N	0.0
0600677	EW-2	General Electric Company	2	34.05003	-117.65214	N	N	Metered	N	128.8
0600931	EW-1	General Electric Company	2	34.04059	-117.65573	N	N	Metered	N	511.4
0601093	IW-01	General Electric Company	2	34.03650	-117.63689	N	N	Metered	N	3.0
0601101	IW-02	General Electric Company	2	34.03655	-117.63518	N	N	Metered	N	3.3
0601103	IW-03	General Electric Company	2	34.03579	-117.63519	N	N	Metered	N	1.0
0601021	DOM	Riboli Family and San Antonio Winery, Inc.	2	34.02211	-117.55919	N	N	Metered	N	15.7
3600555	1	TAMCO	2	34.09322	-117.52832	N	N	Metered	N	2.1
0600027	Dry-Dom	Ag Pool Misc	1	33.99724	-117.62476	N	N	Metered	N	55.3
0600102	Dairy/Dom	Ag Pool Misc	1	34.00455	-117.61169	N	N	Metered	N	8.3
0600104	DOM	Ag Pool Misc	1	34.00552	-117.63118	N	N	Metered	N	21.1
0600115	DOM	Ag Pool Misc	1	33.99483	-117.64966	N	N	Metered	N	0.0
0600116	IRR	Ag Pool Misc	1	33.99652	-117.64952	N	N	Metered	N	9.0
0600150	IRR	Ag Pool Misc	1	34.00127	-117.62157	N	N	Metered	N	4.4
0600176	DAIRY-640C	Ag Pool Misc	1	34.01161	-117.64251	N	N	Metered	N	87.1
0600202	IRR	Ag Pool Misc	1	34.00444	-117.62227	N	N	Metered	N	0.0
0600216	Irr/Dy	Ag Pool Misc	1	34.00964	-117.62760	N	N	Metered	N	3.1
0600225	DAIRY	Ag Pool Misc	1	34.00458	-117.60993	N	N	Metered	N	0.0
0600226	Dairy/Dom	Ag Pool Misc	1	33.98623	-117.62873	N	N	Metered	N	14.4
0600272	Dairy/Dom	Ag Pool Misc	1	34.01639	-117.61471	N	N	Metered	N	21.0
0600301	Dairy/Dom	Ag Pool Misc	1	34.00430	-117.60060	N	N	Metered	N	3.9
0600345	DOM	Ag Pool Misc	1	34.00413	-117.63743	N	N	Metered	N	26.7
0600358	DOM	Ag Pool Misc	1	34.00244	-117.62753	N	N	Metered	N	12.6
0600418	IRR-25P	Ag Pool Misc	1	34.01190	-117.64391	N	N	Metered	N	0.1
0600444	DOM	Ag Pool Misc	1	34.00975	-117.61904	N	N	Metered	N	0.0
0600503	DOM-#1 West	Ag Pool Misc	1	34.00481	-117.61742	N	N	Metered	N	0.0
0600531	HOUSE	Ag Pool Misc	1	34.00536	-117.64376	N	N	Metered	N	0.0
0600532		Ag Pool Misc	1	33.99868	-117.60222	N	N	Metered	N	10.4
0600575		Ag Pool Misc	1	34.01333	-117.64775	N	N	Metered	N	34.2
0600622	Dairy/Dom	Ag Pool Misc	1	34.01208	-117.61227	N	N	Metered	N	0.0
3300195	D-1	Ag Pool Misc	1	33.95155	-117.56524	N	N	Metered	N	35.0

Table C-2. Pumping Wells in the Chino Basin in FY 2022

CBWM Well ID	Name	Owner[a]	Pool	Latitude	Longitude	New in FY 2022	Abandoned/ Destroyed in FY 2022	Metered/ Estimated	Minimal Producer	FY 2022 Production
3300834	#3-WINEVILLE	Ag Pool Misc	1	33.98707	-117.54510	N	N	Metered	N	943.9
3600162	Dairy/Dom - 6	Ag Pool Misc	1	33.99781	-117.61169	N	N	Metered	N	14.9
3600423	Dairy-in shed	Ag Pool Misc	1	33.99018	-117.63026	N	N	Metered	N	10.1
3600432	DAIRY-640C	Ag Pool Misc	1	33.99736	-117.61810	N	N	Metered	N	4.4
3600629	Dom/IRR	Ag Pool Misc	1	34.01924	-117.63835	N	N	Metered	N	20.3
3601212	Irr-400' E/Bon View	Ag Pool Misc	1	34.01907	-117.63495	N	N	Metered	N	0.0
3602043	Dairy/Dom	Ag Pool Misc	1	34.01567	-117.64163	N	N	Metered	N	93.9
3602077	Backup	Ag Pool Misc	1	34.01209	-117.61284	N	N	Metered	N	26.3
3602078	IRR	Ag Pool Misc	1	34.01854	-117.63684	N	N	Metered	N	0.0
3602532	ANIMALS	Ag Pool Misc	1	34.00749	-117.64344	N	N	Metered	N	3.5
3602535	Dairy-in garage	Ag Pool Misc	1	34.00989	-117.63734	N	N	Metered	N	15.8
0600003	Dairy	Ag Pool Misc	1	33.99878	-117.62773	N	N	Estimated	N	2.4
0600129	DAIRY-640C	Ag Pool Misc	1	33.99375	-117.61808	N	N	Estimated	N	62.5
0600151	Dairy	Ag Pool Misc	1	34.00053	-117.61990	N	N	Estimated	N	14.7
0600171	main well	Ag Pool Misc	1	33.95942	-117.65040	N	N	Estimated	N	62.6
0600229	Dairy/Dom	Ag Pool Misc	1	33.96110	-117.64869	N	N	Estimated	N	10.6
0600245	Dairy/Dom	Ag Pool Misc	1	34.00472	-117.62765	N	N	Estimated	N	7.6
0600370	Dairy/IRR	Ag Pool Misc	1	33.99868	-117.60246	N	N	Estimated	N	122.5
0600463	Dairy	Ag Pool Misc	1	33.97532	-117.59405	N	Y	Estimated	N	11.8
0600508	Dairy-#2	Ag Pool Misc	1	34.00726	-117.60653	N	N	Estimated	N	83.3
0600559	Nursery/crops	Ag Pool Misc	1	34.01265	-117.62690	N	N	Estimated	N	37.6
0600661	DAIRY	Ag Pool Misc	1	34.00435	-117.62235	N	N	Estimated	N	2.8
0601112		Ag Pool Misc	1	34.01580	-117.63673	N	N	Estimated	N	57.1
3600421	Dairy/Dom	Ag Pool Misc	1	34.00326	-117.59462	N	N	Estimated	N	1.7
3601205	IRR	Ag Pool Misc	1	34.00809	-117.59345	N	Y	Estimated	N	33.9
3602534	IRR-in shed	Ag Pool Misc	1	34.00854	-117.63721	N	N	Estimated	N	31.6
3602597	Dairy/Dom	Ag Pool Misc	1	33.96151	-117.64685	N	N	Estimated	N	8.5
0601170	West Irr	Artesia Sawdust Products Inc.	1	34.00813	-117.60302	N	N	Estimated	N	13.6
0601171	East Irr	Artesia Sawdust Products Inc.	1	34.00814	-117.60280	N	N	Estimated	N	13.6
3600239	IRR	Artevel of California LLC	1	34.00217	-117.65034	N	N	Metered	N	16.3
3601625	Dairy/Dom	Artevel of California LLC	1	34.00220	-117.65013	N	N	Metered	N	44.5
3602480	DAIRY	Artevel of California LLC	1	34.00442	-117.64667	N	N	Metered	N	19.9
0600103	Dom	Bangma Brothers Dairy	1	34.00455	-117.61298	N	N	Metered	N	11.9
0600632	IRR	Barth Farms	1	34.01379	-117.59471	N	N	Metered	N	26.2
0600432	Dairy/Dom	Bas Van Dam & Sons Dairy	1	33.98947	-117.57807	N	N	Metered	N	0.6
0600230	Dairy	Basque American Dairy	1	34.00792	-117.61989	N	N	Metered	N	1.5
0600447	Dairy	Basque American Dairy	1	34.00530	-117.62009	N	N	Metered	N	0.0
0600616	Dairy/Dom	Basque American Dairy	1	34.00654	-117.62755	N	N	Metered	N	7.9
0600067	BACKUP	Basque American Dairy	1	34.00535	-117.62013	N	N	Estimated	N	86.9
3600900	Alf-Jun-Sep	Bidart Family Trust	1	34.01350	-117.63713	N	N	Metered	N	100.6
0600341	IRR	Bollema Dairy	1	34.00492	-117.62396	N	N	Metered	N	24.6
0600342	Dairy/Dom	Bollema Dairy	1	34.00449	-117.62491	N	N	Estimated	N	0.0
3601824	IRR - 2	Boys Republic	1	34.00244	-117.72279	N	N	Metered	N	151.6
0600246	IRR - 2	Calvary Church	1	33.99925	-117.65847	N	N	Metered	N	79.1
0600247	Dairy - 3	Calvary Church	1	34.00097	-117.65149	N	N	Estimated	N	27.0
0600460	IRR - 2	Coelho Dairy	1	34.00130	-117.61863	N	N	Metered	N	50.9
0600459	Dairy - 1	Coelho Dairy	1	34.00050	-117.61896	N	N	Estimated	N	91.0
0600148	DOM	Costa View Farmer	1	33.99228	-117.63658	N	N	Metered	N	13.6
0600193	DOM	Costa View Farmer	1	33.99543	-117.63662	N	N	Estimated	N	31.3
0600223	Dairy	County Of San Bernardino	1	34.00033	-117.63619	N	N	Metered	N	24.7
3600460	IRR - 50 HP	County Of San Bernardino	1	33.99030	-117.63699	N	N	Metered	N	0.1
3602603	IRR/DOM	County Of San Bernardino	1	34.00304	-117.63587	N	N	Metered	N	74.4
0600200	Dairy/Dom	County Of San Bernardino	1	33.98981	-117.63923	N	N	Estimated	N	0.9
3602214	IRR	County Of San Bernardino	1	33.99339	-117.64492	N	N	Estimated	N	3.6
3602602	Dairy	County Of San Bernardino	1	34.00449	-117.63318	N	N	Estimated	N	20.1
3600324	IRR 2	De Groot Family Trust	1	33.99749	-117.63792	N	N	Metered	N	141.1
0600695		De Groot Family Trust	1	33.99712	-117.63948	N	N	Estimated	N	107.5

Table C-2. Pumping Wells in the Chino Basin in FY 2022

CBWM Well ID	Name	Owner(a)	Pool	Latitude	Longitude	New in FY 2022	Abandoned/ Destroyed in FY 2022	Metered/ Estimated	Minimal Producer	FY 2022 Production
0600006		DM Thousand Oaks	1	33.99854	-117.59360	N	N	Estimated	N	9.8
3601400	Dairy	Dou Family Trust	1	34.01019	-117.63677	N	N	Metered	N	118.9
0600263	Dairy	Eagle Livestock, Inc.	1	34.00823	-117.62769	N	N	Metered	N	6.1
0600391	Lake Dischg	El Prado Golf Course	1	33.95373	-117.66208	N	N	Metered	N	513.0
0600634	8Ac/Nursery	Falloncrest Farms	1	33.99128	-117.64996	N	N	Metered	N	13.5
3601399	IRR	Falloncrest Farms	1	34.01201	-117.63191	N	N	Metered	N	34.1
0600446	Dairy/Dom	Falloncrest Farms	1	34.00531	-117.64330	N	N	Estimated	N	44.4
0601022	Bldg A East	Fuji Natural Foods	1	34.01081	-117.55938	N	N	Metered	N	271.2
0601023	Bldg A West	Fuji Natural Foods	1	34.01079	-117.55999	N	N	Metered	N	131.4
0601025	Bldg B South	Fuji Natural Foods	1	34.00719	-117.56133	N	N	Metered	N	164.9
0601024	Bldg B North	Fuji Natural Foods	1	34.00804	-117.56133	N	N	Estimated	N	122.6
0600147	DOM	G H Dairy	1	33.99713	-117.62991	N	N	Metered	N	121.1
0600921		G H Dairy	1	33.92539	-117.61528	N	N	Metered	N	365.1
3600406	Dairy/Dom	G H Dairy	1	33.99750	-117.63653	N	N	Estimated	N	3.6
0300249	DOM-New	Goose Creek Golf Club	1	33.96387	-117.53263	N	N	Metered	N	1.8
0300250	#2-IRR	Goose Creek Golf Club	1	33.96577	-117.53173	N	N	Metered	N	0.0
0300052	IRR	Goose Creek Golf Club	1	33.96426	-117.53215	N	N	Estimated	N	467.0
0300581		Goose Creek Golf Club	1	33.96474	-117.53158	N	N	Estimated	N	137.4
0600212	IRR	H & R Barthelemy Dairy	1	33.95545	-117.64182	N	N	Metered	N	26.7
0600214	Dairy/IRR	H & R Barthelemy Dairy	1	33.95719	-117.63394	N	N	Metered	N	9.1
0600429	DAIRY-400C	Haringa Farms	1	33.98421	-117.62865	N	N	Metered	N	38.4
3600050	IRR-5P	Haringa Farms	1	33.98485	-117.63019	N	N	Metered	N	0.0
0600461	Dairy/Dom-North	Heims Pride Dairy	1	34.00980	-117.61986	N	N	Estimated	N	34.4
3602332	S IRR-1	Heman G Stark Youth Correctional Facilit	1	33.98023	-117.65759	N	N	Metered	N	0.0
0600136	Dairy/Dom	Henry De Haan Dairy	1	34.00478	-117.60749	N	N	Estimated	N	61.1
3601698	IRR/Dom	Hofer Ranch	1	34.04938	-117.58570	N	N	Estimated	N	175.5
0600201	Dom/Irr	Hogg Brothers	1	34.01264	-117.62503	N	N	Metered	N	24.1
0601122	PT IRR	Hogg Brothers	1	34.01397	-117.61535	N	N	Estimated	N	39.2
3602590	Chickens/Nursery	Hohberg Nursery	1	34.01317	-117.63604	N	N	Estimated	N	37.0
3600437	3-IRR	J.G.J. Joint Venture	1	34.01913	-117.64924	N	N	Metered	N	158.6
3600433	#7 - IRR	J.G.J. Joint Venture	1	34.01795	-117.62308	N	N	Estimated	N	40.5
3600434	1-IRR	J.G.J. Joint Venture	1	34.01935	-117.62820	N	N	Estimated	N	242.0
0600422	GH #2	Joseph A. Borba Trust	1	33.98991	-117.64244	N	N	Estimated	N	159.1
0600924	0	Kellogg Supply	1	34.00477	-117.61726	N	N	Metered	N	88.4
3600975	CWW	Knudsen Brothers	1	34.01897	-117.61687	N	N	Metered	N	34.1
0300571		Leal Ranches	1	33.98230	-117.56468	N	N	Metered	N	8.9
3300749	E/IRR-road	Leal Ranches	1	33.98251	-117.56181	N	N	Metered	N	0.0
3301443	E/Dairy-submersible	Leal Ranches	1	33.98157	-117.56055	N	N	Metered	N	0.2
0600404	DOM	Legend Dairy Farms #2	1	34.01914	-117.60251	N	N	Metered	N	181.1
3600811	IRR	Legend Dairy Farms #2	1	34.01436	-117.64904	N	N	Metered	N	14.9
0600036	Dom	Legend Dairy Farms #2	1	33.99072	-117.63921	N	N	Estimated	N	5.2
0600203	DAIRY/DOM	Legend Dairy Farms #2	1	34.01149	-117.60549	N	N	Estimated	N	7.3
0600438	Dairy/Dom	Legend Dairy Farms #2	1	34.01446	-117.64947	N	N	Estimated	N	22.0
0600542	DOM	Lizze Custom Processing	1	33.95676	-117.64558	N	N	Metered	N	11.3
3600502	BARN #2	Loyola Properties I	1	33.95917	-117.62304	N	N	Metered	N	73.0
3602608	Dairy #2	Loyola Properties I	1	33.99330	-117.56867	N	N	Metered	N	12.6
3600446	Dom	Maclin Markets Inc	1	34.01883	-117.64360	N	N	Metered	N	6.9
0600327		Manalisco Growers	1	34.01720	-117.64094	N	N	Metered	N	14.2
0601031		Manalisco Growers	1	34.00117	-117.63051	N	N	Metered	N	110.9
0600544	DAIRY/DOM	Marquez Dairy	1	33.95562	-117.64363	N	N	Metered	N	0.3
0600002	Dom TV3	No Longer Ag Owner	1	34.01193	-117.60876	N	N	Metered	N	57.8
0600013	Dairy	No Longer Ag Owner	1	34.00051	-117.64513	N	N	Metered	N	28.6
0600019	Dairy/Barn	No Longer Ag Owner	1	33.99718	-117.62061	N	N	Metered	N	96.3
0600026	DOM	No Longer Ag Owner	1	33.99737	-117.62271	N	N	Metered	N	123.2
0600033	Dairy	No Longer Ag Owner	1	33.99330	-117.62748	N	N	Metered	N	29.4
0600232	Dairy-in shed	No Longer Ag Owner	1	33.99698	-117.64429	N	N	Metered	N	20.6
0600337	Dairy/Dom	No Longer Ag Owner	1	33.99661	-117.56970	N	N	Metered	N	8.6

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CBWM Well ID	Name	Owner[(a)]	Pool	Latitude	Longitude	New in FY 2022	Abandoned/ Destroyed in FY 2022	Metered/ Estimated	Minimal Producer	FY 2022 Production
0600397	Dairy	No Longer Ag Owner	1	33.99672	-117.57382	N	N	Metered	N	100.5
0600400	GAS/ BCKUP	No Longer Ag Owner	1	34.01859	-117.57237	N	N	Metered	N	0.0
0600472	DOM-2 homes	No Longer Ag Owner	1	33.99730	-117.55943	N	N	Metered	N	3.8
0600679		No Longer Ag Owner	1	33.96781	-117.64105	N	N	Metered	N	0.0
3300833	BEHIND OFFICE	No Longer Ag Owner	1	33.98982	-117.54508	N	N	Metered	N	187.7
3602609	out of svs	No Longer Ag Owner	1	33.96783	-117.64093	N	N	Metered	N	0.0
0300211	DOM	No Longer Ag Owner	1	33.99215	-117.54503	N	N	Estimated	N	4.0
0600122	Dairy/Dom	No Longer Ag Owner	1	33.99012	-117.61403	N	Y	Estimated	N	0.0
0600130	DOM	No Longer Ag Owner	1	33.99649	-117.59090	N	Y	Estimated	N	0.0
0600179	DOM	No Longer Ag Owner	1	33.99992	-117.60776	N	N	Estimated	N	34.6
0600183	DOM	No Longer Ag Owner	1	34.00444	-117.64189	N	N	Estimated	N	5.4
0600189	Dairy/Dom	No Longer Ag Owner	1	33.98355	-117.61171	N	Y	Estimated	N	0.0
0600209	IRR-SCH/VYD	No Longer Ag Owner	1	34.01583	-117.61473	N	N	Estimated	N	70.7
0600228	Dairy/Dom	No Longer Ag Owner	1	34.01571	-117.64091	N	N	Estimated	N	29.5
0600233	Dairy	No Longer Ag Owner	1	33.99687	-117.64338	N	N	Estimated	N	25.5
0600339	Dom	No Longer Ag Owner	1	33.99002	-117.61602	N	Y	Estimated	N	0.0
0600372	Dairy/Dom	No Longer Ag Owner	1	33.99685	-117.57739	N	N	Estimated	N	19.0
0600419	1500C	No Longer Ag Owner	1	34.01811	-117.57267	N	N	Estimated	N	194.2
0600481	DOM	No Longer Ag Owner	1	33.99144	-117.62752	N	N	Estimated	N	20.9
0600613	DOM/Dairy	No Longer Ag Owner	1	33.99014	-117.61279	N	Y	Estimated	N	0.0
0600620		No Longer Ag Owner	1	33.99664	-117.57073	N	N	Estimated	N	220.4
3600127	Dom TV3	No Longer Ag Owner	1	34.01170	-117.60979	N	N	Estimated	N	75.1
3600318	DAIRY-ESIDE-650C	No Longer Ag Owner	1	33.99703	-117.64647	N	N	Estimated	N	98.0
3600427	GH #1	No Longer Ag Owner	1	33.99021	-117.62131	N	Y	Estimated	N	0.0
3600858	Dairy/Dom	No Longer Ag Owner	1	33.99377	-117.61982	N	N	Estimated	N	34.1
3601111	Dairy/Dom	No Longer Ag Owner	1	34.00289	-117.59416	N	N	Estimated	N	0.0
3601320	IRR	No Longer Ag Owner	1	33.99697	-117.56291	N	Y	Estimated	N	0.0
3602491	DAIRY	No Longer Ag Owner	1	33.99008	-117.61837	N	Y	Estimated	N	0.0
3602540	Dairy/Dom	No Longer Ag Owner	1	33.99726	-117.62735	N	N	Estimated	N	75.0
3602556	Dairy/Dom	No Longer Ag Owner	1	33.99670	-117.56263	N	Y	Estimated	N	0.0
3602565	Half&Half	No Longer Ag Owner	1	33.98980	-117.62772	N	Y	Estimated	N	0.0
3602584	Irr	No Longer Ag Owner	1	34.01864	-117.57791	N	N	Estimated	N	147.0
0600010	Calves	None	1	34.00562	-117.64453	N	N	Metered	N	0.9
0600540	DAIRY/DOM	None	1	34.00571	-117.64100	N	N	Metered	N	6.1
0601032		None	1	34.04329	-117.69954	N	N	Metered	N	0.2
0601067	0	None	1	34.04236	-117.70779	N	N	Metered	N	6.2
0600123	IRR-Flushing	None	1	33.99034	-117.61650	N	Y	Estimated	N	0.0
0600623	Dom	None	1	33.94223	-117.63020	N	N	Estimated	N	1.4
0601094		None	1	34.04481	-117.69812	N	N	Estimated	N	19.6
0601114		None	1	33.98290	-117.60676	N	N	Estimated	N	1.8
0601149		None	1	34.01495	-117.57642	N	N	Estimated	N	122.5
0300591	Raahauge	OCWD	1	33.92400	-117.61868	Y	N	Metered	N	3.7
0600664	DOM	OCWD	1	33.92411	-117.61697	N	N	Metered	N	0.0
3300863	IRR-50AC/ALF	OCWD	1	33.92349	-117.61777	N	N	Metered	N	69.3
0600049	IRR/Dom	Ontario Christian School	1	34.03202	-117.66508	N	N	Metered	N	66.3
0600154	DOM	Ontario, City Of	1	33.99045	-117.58558	N	N	Metered	N	0.0
0600054	Dairy/Dom	Ontario, City Of	1	33.99305	-117.57627	N	Y	Estimated	N	0.0
0601124		Ontario, City Of	1	33.99452	-117.59223	N	Y	Estimated	N	0.0
0300231	CMG/PTI/J&A	Orange County Flood Control District	1	33.93227	-117.60962	N	N	Estimated	N	0.0
0600194	irr/3 ac misc plnts	Paul A. Briano Separate Property Trust	1	34.01185	-117.63941	N	N	Estimated	N	76.8
0600275	Irr	Pete Vanderham Dairy Inc	1	34.00951	-117.61930	N	N	Estimated	N	78.7
0600276	Dairy/Dom	Pete Vanderham Dairy Inc	1	34.00730	-117.61895	N	N	Estimated	N	69.8
1902981	IRR	Pomona Cemetery Association	1	34.03870	-117.74535	N	N	Metered	N	182.6
0600188	Dairy/Dom	R & V Dairy	1	34.01171	-117.62990	N	N	Metered	N	8.8
3301536	IRR-150HP-Gas Pwr	Riverside Cnty Reg Park & Open Sp Dist	1	33.92734	-117.60402	N	N	Estimated	N	1.5
0601128		San Bernardino County Regional Parks	1	33.92688	-117.65204	N	N	Metered	N	140.0
0600470	PARKS DEPT 2	San Bernardino County Regional Parks	1	33.93725	-117.65477	N	N	Estimated	N	190.0

Table C-2. Pumping Wells in the Chino Basin in FY 2022

CBWM Well ID	Name	Owner[a]	Pool	Latitude	Longitude	New in FY 2022	Abandoned/ Destroyed in FY 2022	Metered/ Estimated	Minimal Producer	FY 2022 Production
0601127		San Bernardino County Regional Parks	1	33.92635	-117.65288	N	N	Estimated	N	1.9
0600519	DAIRY	SD Farms II	1	34.01171	-117.64714	N	N	Metered	N	250.8
3602604	IRR	SD Farms II	1	34.01192	-117.64628	N	N	Estimated	N	146.3
0300169	STN4800	Skyline Construction Services	1	33.99938	-117.46579	N	N	Estimated	N	17.6
0600094	450 heifers 1 hse	Southwood Limited	1	34.00447	-117.64480	N	Y	Estimated	N	17.1
0600691	CIM 14	State Of CA CIM	1	33.97792	-117.68103	N	N	Metered	N	0.0
0600692	CIM 15	State Of CA CIM	1	33.97791	-117.67903	N	N	Metered	N	29.3
0600694	CIM 16	State Of CA CIM	1	33.98511	-117.67242	N	N	Metered	N	69.1
3600339	01	State Of CA CIM	1	33.98745	-117.68155	N	N	Metered	N	0.0
3600340	03	State Of CA CIM	1	33.99667	-117.67191	N	N	Metered	N	180.1
3600345	10--Field 14	State Of CA CIM	1	33.98290	-117.66732	N	N	Metered	N	454.9
3600346	09	State Of CA CIM	1	33.97561	-117.66728	N	N	Metered	N	678.3
3601827	01A	State Of CA CIM	1	33.98271	-117.67845	N	N	Metered	N	962.7
3602461	11A	State Of CA CIM	1	33.98484	-117.68427	N	N	Metered	N	41.2
3600348	07--Field 11	State Of CA CIM	1	33.98136	-117.67194	N	N	Estimated	N	0.0
3602691	13--Field 24	State Of CA CIM	1	33.97715	-117.66183	N	N	Estimated	N	525.646
0600608	4	State Of CA/CIW	1	33.94618	-117.63661	N	N	Metered	N	0.0
3601246	1	State Of CA/CIW	1	33.94945	-117.63338	N	N	Metered	N	0.0
0601126	0	TDN Land Company	1	33.99615	-117.69125	N	N	Estimated	N	17.2
0600158	Fire Logs	The Davenport Group	1	34.01261	-117.62267	N	N	Metered	N	3.5
0601102	0	The Root 66 Garden	1	34.10281	-117.54016	N	N	Estimated	N	18.4
0600022	Domestic	Trustor Resources	1	34.00530	-117.63329	N	N	Estimated	N	2.7
0600462	Office Bldg	Unitex Corporation	1	34.14195	-117.48666	N	N	Metered	N	1.1
0600208	DOM	Veenendaal Dairy	1	34.00774	-117.63742	N	N	Metered	N	54.7
0600192	Dairy/Dom	Whitegold Ventures	1	33.99197	-117.62862	N	N	Metered	N	84.6
0600284	Dairy/Dom	Whitegold Ventures	1	34.01169	-117.63404	N	N	Estimated	N	2.5
0300021		ABG Group LLC	1	33.93598	-117.59102	N	N	Estimated	Y	3.6
0300053	offc/lndscp	Ag Pool Misc	1	33.93339	-117.60954	N	N	Estimated	Y	1.8
0300154		Ag Pool Misc	1	33.98339	-117.47364	N	N	Estimated	Y	1.8
0300240		Ag Pool Misc	1	33.96307	-117.60223	N	N	Estimated	Y	1.8
0600029		Ag Pool Misc	1	34.00433	-117.63028	N	N	Estimated	Y	3.6
0600042	1 home/lndscp	Ag Pool Misc	1	34.01456	-117.61581	N	N	Estimated	Y	5.9
0600106	dom/5 horses	Ag Pool Misc	1	34.01160	-117.63675	N	N	Estimated	Y	3.6
0600107	Dom/Sm Nursery	Ag Pool Misc	1	34.01550	-117.65150	N	N	Estimated	Y	3.6
0600110	DOM	Ag Pool Misc	1	34.00846	-117.62788	N	N	Estimated	Y	1.8
0600114	Dom	Ag Pool Misc	1	34.01554	-117.60173	N	N	Estimated	Y	8.5
0600120		Ag Pool Misc	1	33.99373	-117.65811	N	N	Estimated	Y	5.4
0600152	MILK PROCESSING	Ag Pool Misc	1	34.03662	-117.72499	N	N	Estimated	Y	0.0
0600191	Dairy/Dom	Ag Pool Misc	1	33.99919	-117.66324	N	N	Estimated	Y	28.8
0600330		Ag Pool Misc	1	33.99402	-117.63753	N	N	Estimated	Y	8.2
0600392	20-30K Chickens	Ag Pool Misc	1	34.00037	-117.62872	N	N	Estimated	Y	5.4
0600614		Ag Pool Misc	1	33.95760	-117.64926	N	N	Estimated	Y	49.7
0601030		Ag Pool Misc	1	34.02320	-117.58368	N	N	Estimated	Y	2.8
0601150		Ag Pool Misc	1	33.99301	-117.64950	N	N	Estimated	Y	2.9
0601201	0	Ag Pool Misc	1	34.01463	-117.73263	N	N	Estimated	Y	1.8
0810009		Ag Pool Misc	1	34.01750	-117.63745	N	N	Estimated	Y	3.6
3600821	DAIRY	Ag Pool Misc	1	34.00453	-117.63126	N	N	Estimated	Y	2.6
3602605		Ag Pool Misc	1	34.00837	-117.64927	N	N	Estimated	Y	3.5
0600580	IRR	Ambrosia Farms	1	34.04500	-117.70130	N	N	Estimated	Y	1.8
0600618	Dom	Archibald Ranch Community Church	1	34.01124	-117.59338	N	N	Estimated	Y	4.6
0600134	IRR	Bishop Of San Bernardino Corp. Sole	1	34.02430	-117.62738	N	N	Estimated	Y	2.8
0600366		Bohlander & Holmes	1	34.00029	-117.66365	N	N	Estimated	Y	9.8
0810004	Dom	C & N Cattle	1	34.01270	-117.63299	N	N	Estimated	Y	7.2
0600528	Dairy/Dom	Central Eleven	1	34.01417	-117.63334	N	N	Estimated	Y	1.4
0600016		Crossroads Auto Dismantlers	1	34.01983	-117.55517	N	N	Estimated	Y	1.4
0300161	DOM	Galleano Winery Inc	1	34.01069	-117.54168	N	N	Estimated	Y	5.4
0600530	DOM	Grooman's Pump	1	33.95377	-117.63268	N	N	Estimated	Y	0.7

Table C-2. Pumping Wells in the Chino Basin in FY 2022

CBWM Well ID	Name	Owner[a]	Pool	Latitude	Longitude	New in FY 2022	Abandoned/ Destroyed in FY 2022	Metered/ Estimated	Minimal Producer	FY 2022 Production
0601097	0	JLC Markets, Inc.	1	34.01303	-117.59730	N	N	Estimated	Y	3.2
0600639	Dom 300 heifers	JRJ Investments LP	1	34.00537	-117.63383	N	N	Estimated	Y	1.8
0600570		Louisa Thorsheim	1	33.99722	-117.65113	N	N	Estimated	Y	1.8
0300033		No Longer Ag Owner	1	33.95916	-117.57527	N	N	Estimated	Y	3.6
3600064	DAIRY	No Longer Ag Owner	1	33.99801	-117.64734	N	N	Estimated	Y	4.3
3600978		No Longer Ag Owner	1	34.02164	-117.64165	N	Y	Estimated	Y	0.0
3602209	1 hse 11 ac nursery	No Longer Ag Owner	1	33.99813	-117.63050	N	N	Estimated	Y	2.5
0300011	PED5071	None	1	33.99555	-117.47585	N	N	Estimated	Y	1.8
0300229	DOM	None	1	33.97746	-117.49800	N	N	Estimated	Y	2.1
0600004	DOM	None	1	34.00072	-117.59846	N	N	Estimated	Y	9.8
0600011	DI	None	1	33.99868	-117.62846	N	N	Estimated	Y	5.4
0600119	Dom	None	1	33.99786	-117.65026	N	N	Estimated	Y	1.8
0600402	Dom/1 house	None	1	34.00574	-117.62974	N	N	Estimated	Y	1.8
3601097		None	1	33.99872	-117.65175	N	N	Estimated	Y	2.1
0600217	DOM	Paul A. Briano Separate Property Trust	1	34.01337	-117.62844	N	N	Estimated	Y	80.0
0600222		Prologis L.P.	1	33.98357	-117.60887	N	N	Estimated	Y	1.8
0600367	Nursery	Robinson Calf Ranch	1	33.99820	-117.62290	N	N	Estimated	Y	22.1
3602086	Crawford Cyn	Unitex Corporation	1	34.14701	-117.48397	N	N	Estimated	Y	0.0
0600606	DOM	Victory Baptist Church	1	33.99724	-117.65877	N	N	Estimated	Y	3.6

(a) Well owners are current as of the end of FY 2022. A well whose owner is listed as “No Longer Ag Owner” indicates a well in a developing area where the property ownership, well ownership, and water use can change multiple times within a year. The ownership of these wells is uncertain as of the end of FY 2022.

Appendix D

Responses to Questions and Comments on Draft Report

STATE OF CALIFORNIA/WSP (RICHARD REES, PG, CHG)

Comment 1 – 2023 Projection for Groundwater Pumping

Section 2.2.3, 2023 Projection. The 2023 Projection provides a substantial update to the data collection and evaluation reporting, which should provide a more accurate estimate of the potential deviation from the current Safe Yield. However, the report lacks information on the data collected. It appears that data estimates were provided in five-year increments (2025, 2030, etc.). Is that correct? Did all of the Appropriative Pool parties respond to the request or was some of the information estimated by Watermaster?

Response:
The 2023 Projection for groundwater pumping was based on the data collected from the Appropriative Pool Parties for FY 2025 and FY 2030. To develop the annual groundwater pumping used in the 2023 Projection, we interpolated between the actual data in FY 2022 and the projected data for FY 2025 and FY 2030. When we prepared the draft 20-year production and storage projections for this year's data request, we presented the Appropriative Pool Parties with the interpolated production data based on last year's data request. All the Appropriative Pool Parties from whom we requested data responded to our request for updated water supply plans. We did not request data from the non-municipal Appropriative Pool Parties (e.g., BlueTriton Brands, CalMat). We have updated Section 2.2.3 of the report to add more detail on the data collected for this effort.

Comment 2 – Potential Deviation from Current Safe Yield

Section 6.1.2, Potential Deviation from Current Safe Yield. The report describes a decline in net recharge as a result of decline in outdoor water use (actual data and 2023 Projection) and an increase in net recharge based on the 2023 Projection of a decrease in the volume of managed storage by 2030 compared to the 2020 SYR Projection. The report states that "The effects of these two factors on net recharge will offset each other, likely resulting in a deviation of net recharge of less than 2.5 percent compared to the current Safe Yield." In Section 6.1.1 Managed Storage, the effect of a decrease in managed storage on net recharge is semi-quantified as likely an increase of about 800 afy based an approximate linear relationship between net recharge and volume in managed storage. What is the basis for the estimate in a decline in outdoor water use on net recharge that allows Watermaster to assume that these two factors will offset each other?

Response:
Our qualitative estimate is based on the magnitude of the difference between the 2020 SYR projection and the actual data/2023 projection and our understanding of the timing of the changes in outdoor water use on DIPAW from the vadose zone to the saturated zone and net recharge.

The relationship between applied water and discharge to the vadose zone is not linear and depends on a variety of climate and cultural conditions (e.g., land use, irrigation efficiency, crop type, precipitation). Any changes in applied water in the near-term will take years to decades to affect the discharge from the vadose zone to the saturated zone. Therefore, any changes in urban outdoor water use have a gradual impact on net recharge.

Our development of the 2023 Projection for urban outdoor water use indicates that the future patterns of urban outdoor water use would be less than the 2020 SYR Projection. However, the information to develop precise projections of urban outdoor water use is currently insufficient. Based on current trends, our conclusion on the cumulative impact of the differences between the 2020 SYR Projection and the 2019-22 Actual Data/2023 Projection for urban outdoor water use is that the cumulative impact is not likely to result in a significant difference in the Safe Yield over FY 2021 through 2030. When the Safe Yield is reevaluated by 2025, we will simulate the effects of differences in urban outdoor water use on discharge to the vadose zone, DIPAW, and net recharge.

Comment 3 – Agricultural Wells

Appendix C, Table C-2, Pumping Wells in the Chino Basin in FY 2022: We note that there are several wells with ownership described as “No Longer Ag Owner” but are identified with production in Pool 1. This suggests that the Ownership may not coincide with production information. We suggest adding a note as to when the table was updated with ownership information.

Response:
The information in Appendix C is based on the latest version of Watermaster’s database, and therefore has the most up to date ownership information as of the end of FY 2022. A well whose owner is listed as “No Longer Ag Owner” indicates a well in a developing area where the property ownership, well ownership, and water use can change multiple times within a year. The ownership of these wells is uncertain as of the end of FY 2022. We have added a footnote to Appendix C to clarify.

CUCAMONGA VALLEY WATER DISTRICT (JIWON SEUNG)

Question 1 – Land Use

If not annually, how often will land use data be evaluated?

Response:
In response to a comment in the FY 2020/21 Data Collection and Evaluation Report, we stated the following:

“Watermaster will determine the need for future evaluations of land use data based on future data availability and model exercises. The report purposefully omitted a specific timeline for land use evaluation to allow for flexibility in determining when an evaluation is necessary. For example, during the forthcoming model update that will be completed by the end of FY 2025, it will be helpful to document a comparison of the land use assumed in the 2020 SYR to the current land use data that will be used in the model update. Based on the work to develop this first annual report, we anticipate that re-evaluating land use for the model update will not be an onerous process and will have minimal budget impact compared to the collection and evaluation of other data. The scopes and budgets for future data collection and evaluation efforts will indicate whether land use will be evaluated.”

The Southern California Association of Governments (SCAG), which is our primary source of land use data, has not released a new dataset since 2019. However, we have a land use survey from Land IQ that was completed in September 2022 for the southern portion of Chino Basin. This land use data was a deliverable Watermaster’s agricultural production estimation efforts. The data will be incorporated into our R4 model to represent the land use at the end of the calibration period for the 2025 SYR, which will go through FY 2022. We plan to evaluate this land use data in next year’s Data Collection and Evaluation Report.

Question 2 – Projection Scenarios in the 2025 SYR

It is recommended to “develop multiple projection scenarios for the 2025 SYR that represent the maximum range in future cultural conditions”. Will these scenarios be included within the multiple safe yield projections for the 2025 SYR? As in, would the number of model runs for the 2025 SYR increase by a magnitude of the number of cultural projection scenarios?

Response:
The scenarios that we are recommending based on the findings in the Data Collection and Evaluation Report are within what is currently contemplated for the 2025 SYR. The 2025 SYR will include multiple projection scenarios representing unique combinations of cultural conditions and climate scenarios.

Question 3 – Assumptions Regarding the DYYP in the 2025 SYR

How will the DYY be included in the 2025 SYR?

Response:
The calibrated realizations for the 2025 SYR will be simulated through June 30, 2022 and will include the historical data for the DYYP operations. The projection scenarios for the 2025 SYR will start on July 1, 2022. We will include DYYP operations if the extent of future operations (i.e., location, magnitude, timing) is defined with a reasonable degree of certainty. This is similar to our assumption in the 2020 Safe Yield Recalculation; at that time, any future operations were speculative and not included in the projection scenario.

CITY OF CHINO (DAVE CROSLEY, PE)

Comment 1

We suggest it would be helpful for us to better understand the potential of MPI from either subsidence or pumping sustainability if a tabulated water budget were available pertaining to the Managed Storage change with time presented by Figure 6-1. The graph indicates the amount of water in Managed Storage will increase over the time period charted, so it is unclear how that will result in MPI.

Response:
We have updated the report to include a table (now Table 6-1) showing the calculations used to develop the 2023 Projection of Managed Storage. Developing a water budget table simulating the precise impacts to the Basin due to the differences between the 2020 SYR Projection, the 2019-22 Actual Data, and the 2023 Projection, would require the use of the groundwater model and is beyond the scope of this effort.

We do not believe that the differences between the 2023 Projection and the 2020 SYR Projection for Managed Storage are likely to increase the risk for a deviation of the Safe Yield by greater than 2.5 percent or cause MPI. Our conclusions about the potential for undesirable results related to increased risk of new land subsidence and pumping sustainability challenges are based on projected pumping differences at specific locations (i.e., projected increased pumping in Northwest MZ-1 and near the JCSD well field relative to the 2020 SYR Projection) and do not apply to the entire Basin. We have clarified the language in Section 6.1.3 to address this.