WEST YOST

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# Safe Yield Data Collection and Evaluation

## Workshop #3

April 26, 2022

# Agenda

- Welcome
- Background and Objectives
- Groundwater Pumping
- Land Use
- Urban Outdoor Water Use
- Managed Recharge
- Regional Water Infrastructure
- Summary, Conclusions, and Recommendations
- Next Steps and Schedule

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# Background – April 28, 2017 Court Order

- April 28, 2017 Court Order
  - Approved current Safe Yield Reset methodology
  - Included a provision to update the Safe Yield Reset methodology
  - Required that the Chino Valley Model be updated and that the Safe Yield be reevaluated by June 30, 2025
  - Required annual data collection, evaluation, and reporting
  - Allowed for an interim correction of Safe Yield (+/- 2.5%)
  - Required a peer review process

# Background – April 28, 2017 Court Order

*"**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;*

# Background – April 28, 2017 Court Order

*"**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: […]*

*c) Evaluate 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 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;*

*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."*

# Considerations in scope development

- Comments on 2020 Safe Yield Recalculation
  - Comparison to prior work
  - Effects of projected cultural conditions on groundwater response
- Discussions with Appropriative Pool responding to comments in July 2021
  - Clarifying the data evaluation process
- February 2022 Watermaster Board recommendation
  - Collect additional data regarding Parties' 20-year operating projections that forecast their near- and long-term pumping and storage activities.

# Scope to Implement Court Order – Collection

- Collect the following data:
  - Land use
  - Groundwater pumping (evaluate only)
  - Managed recharge
  - Urban outdoor water use
  - Regional water infrastructure

# Scope to Implement Court Order – Evaluation

- Evaluate the data:
  - 2020 SYR Projection versus 2019-21 Actual Data (FY 2019-2021)
  - 2020 SYR Projection versus 2022 Projection (FY 2022-2030)

# Scope to Implement Court Order – Evaluation

Answer the following questions:

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 2019-21 Actual Data and the 2022 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. 17).

# Scope to Implement Court Order – Reporting

- Prepare annual report
  - Recommend future updates to data collection/evaluation process
  - Recommend additional analyses/modeling (if necessary)

# Meeting Goals

- Peer reviewers clearly understand the objectives and scope of work for the data collection/evaluation effort
- Communicate the findings and recommendations documented in the draft *Data Collection and Evaluation Report for FY 2020/2021*

# Key Takeaways from Today's Workshop

- The 2019-21 Actual Data and 2022 Projection for groundwater pumping indicate the potential for undesirable results related to increased risk of new land subsidence and pumping sustainability challenges that were not identified in the 2020 SYR.
- The 2019-21 Actual Data for urban outdoor water use and the information on the implementation of future conservation legislation indicate the potential for less net recharge and Safe Yield compared to the 2020 SYR.
- The 2019-21 Actual Data and 2022 Projection for land use, managed recharge, and regional water infrastructure are not significantly different than the 2020 SYR Projection.

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# Groundwater Pumping in the CVM

- How is groundwater pumping used in the CVM?
  - Historical data → Model calibration
  - Water-supply plans → Developing model scenarios for projections
- Why is it important to evaluate differences between projected and actual pumping?
  - Pumping (rate and location) affects groundwater levels, water budget, and net recharge
  - Net recharge = pumping + change in storage – supplemental water recharge

# Groundwater Pumping Data Collection and Evaluation

- 2019-21 Actual Data for groundwater pumping:
  - Appropriative Pool – Metered data provided by the Parties
  - Overlying Non-Ag Pool – Metered data provided by the Parties
  - Agricultural Pool – Metered data provided by the Parties and estimated data provided by Watermaster Staff

# Groundwater Pumping Data Collection and Evaluation

- 2020 SYR Projection:
  - Appropriative Pool – Projections provided by the Parties
  - Overlying Non-Ag Pool – Projections provided by the Parties or estimation based on historical patterns
  - Agricultural Pool – Estimation based on historical data, projected land use changes, and water supply data
  - DYYP was not included in the 2020 SYR projection scenario beyond historical operations (FY 2018)
- 2022 Projection:
  - Same sources as above

# Estimation of Agricultural Pool Pumping

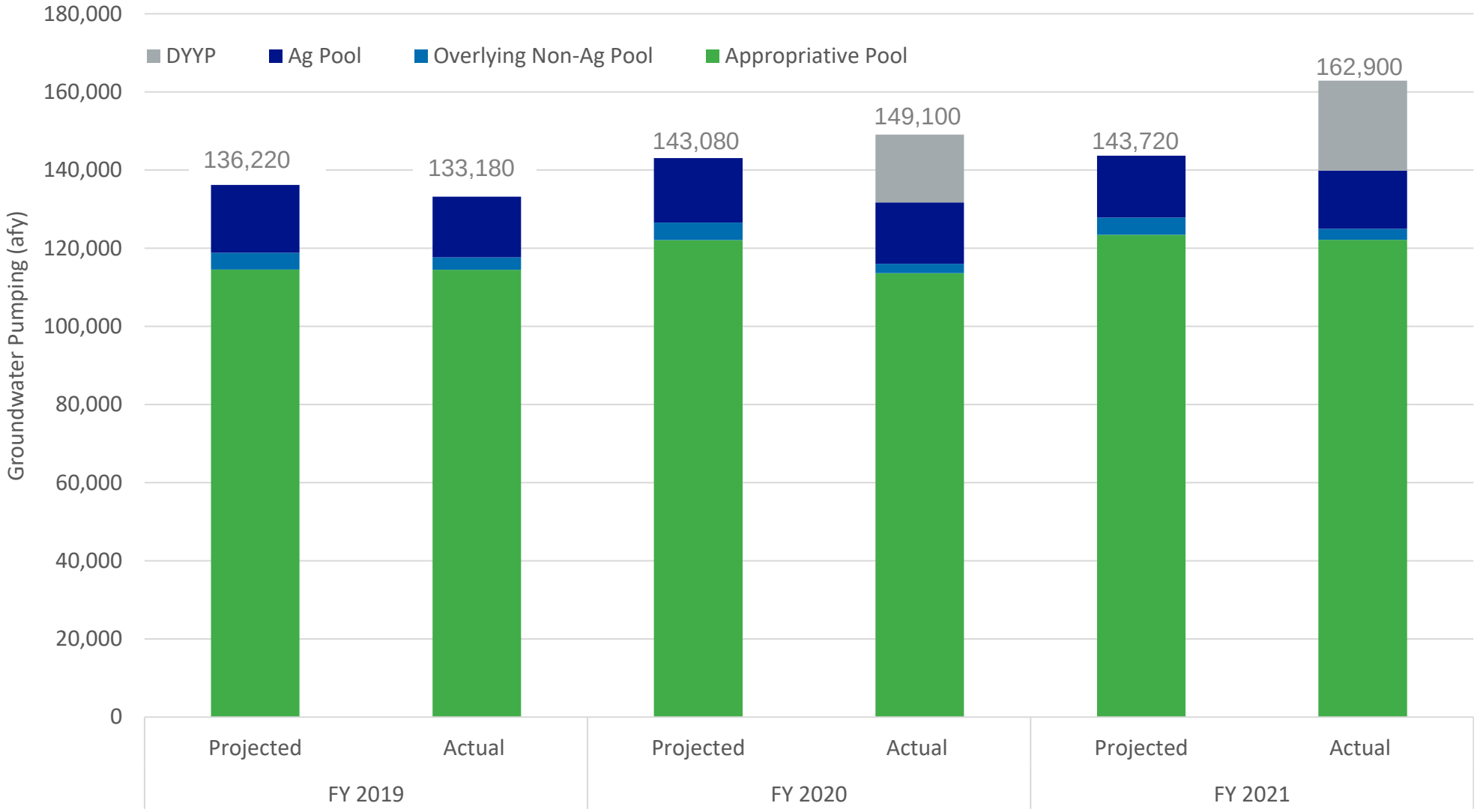
- Not feasible to meter all wells
- Watermaster Staff employs a water duty method to estimate production at unmetered wells
- Table/map of status of wells and meters as of FY 2021 included as Appendix B of report

# Comparison of 2020 SYR Projection and 2019-21 Actual Data for Groundwater Pumping

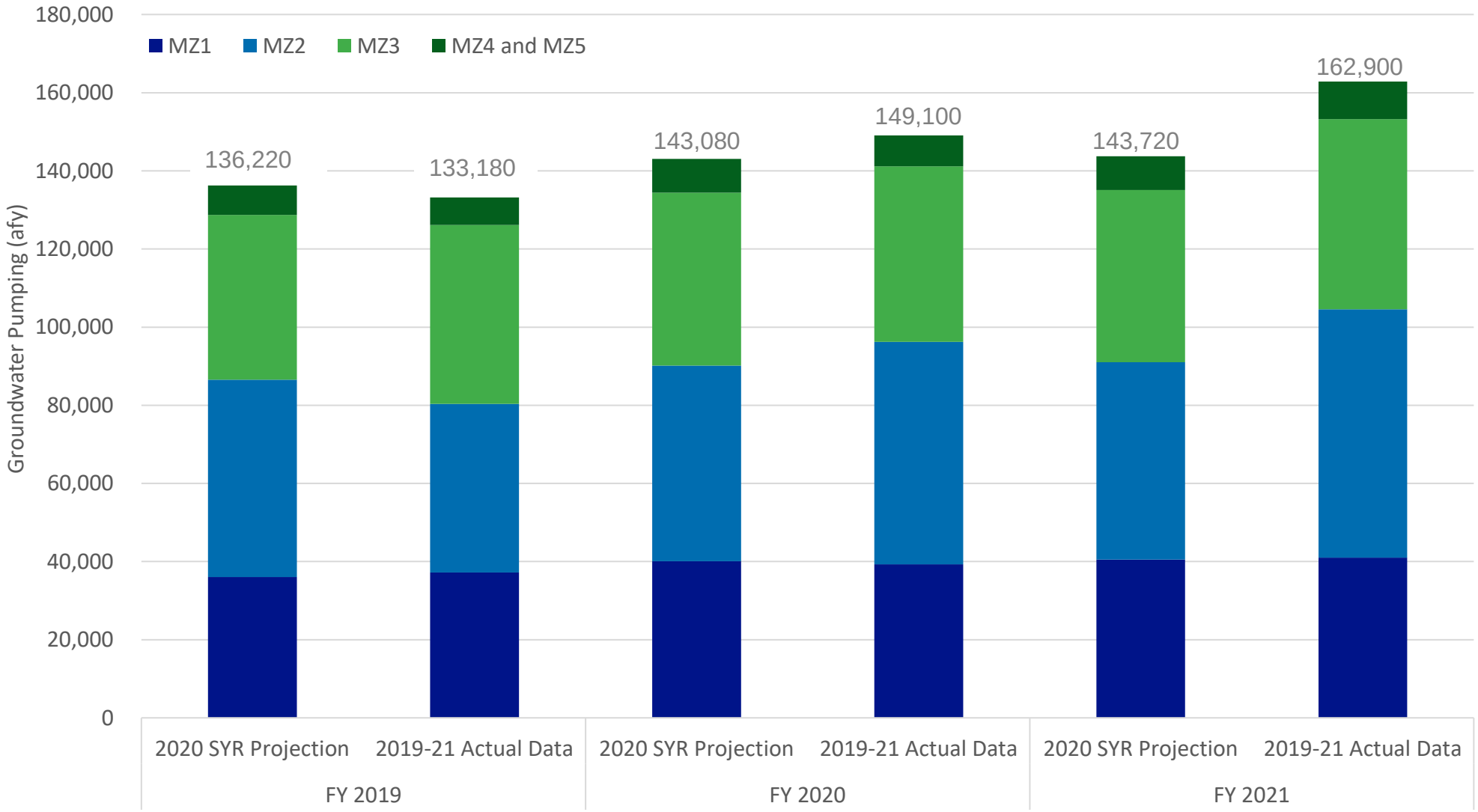
**Process:**

1. Compiled the 2019-21 Actual Data and 2020 SYR Projections of groundwater pumping data
2. Compared total pumping:
   - By quarter/FY
   - Spatially (agency/MZ)

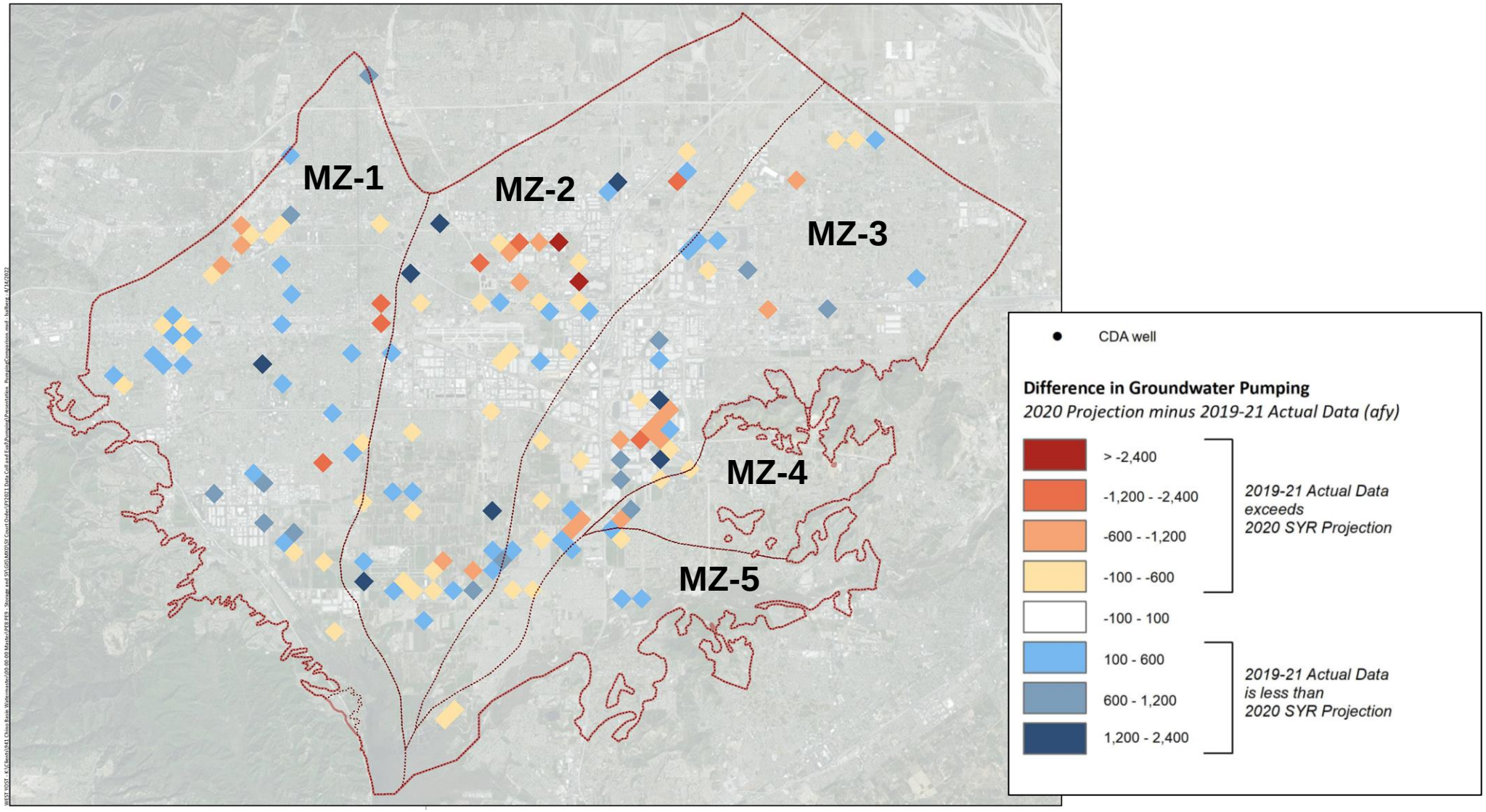
# Comparison of 2020 SYR Projection and 2019-21 Actual Data for Groundwater Pumping by Pool



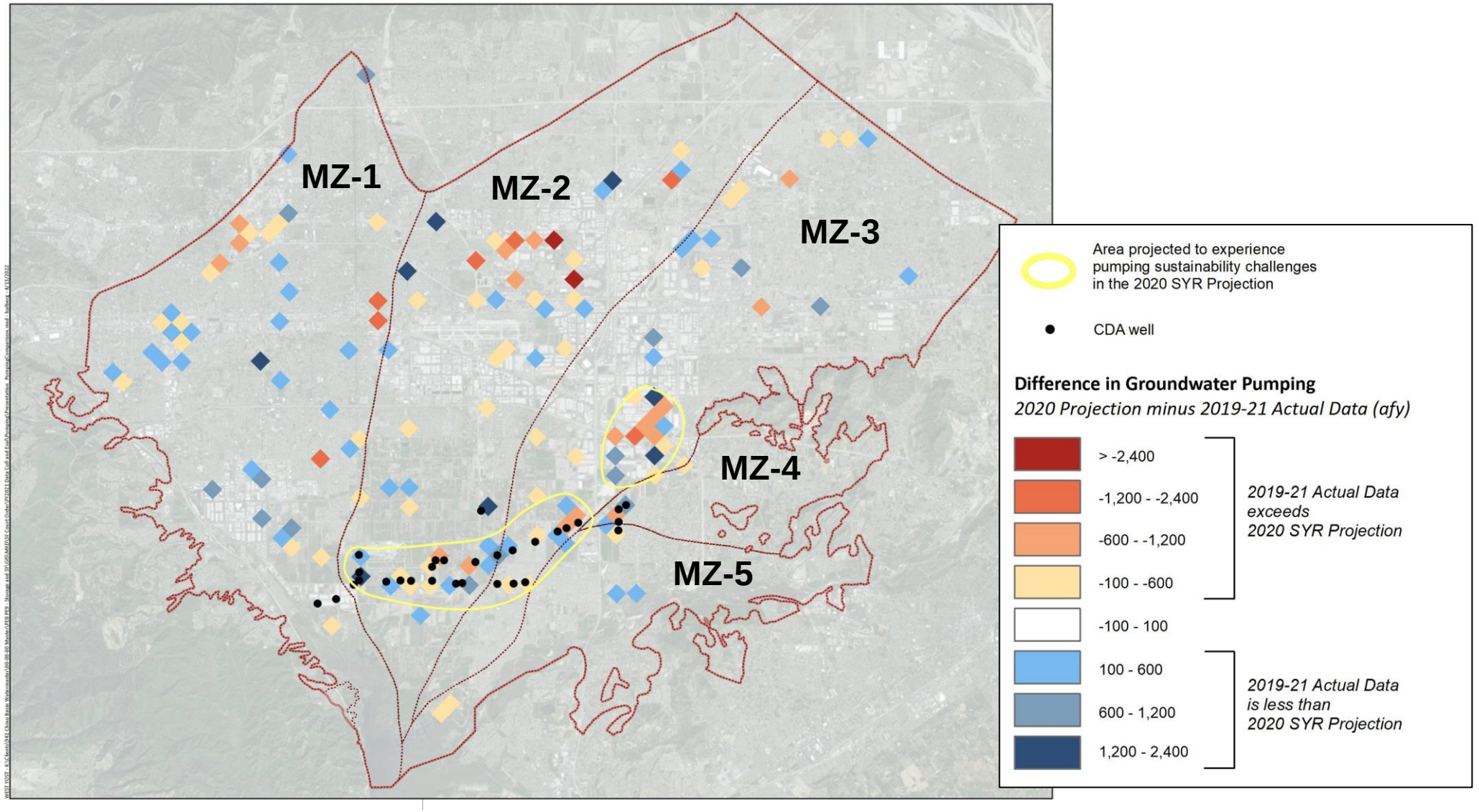
# Comparison of 2020 SYR Projection and 2019-21 Actual Data for Groundwater Pumping by MZ



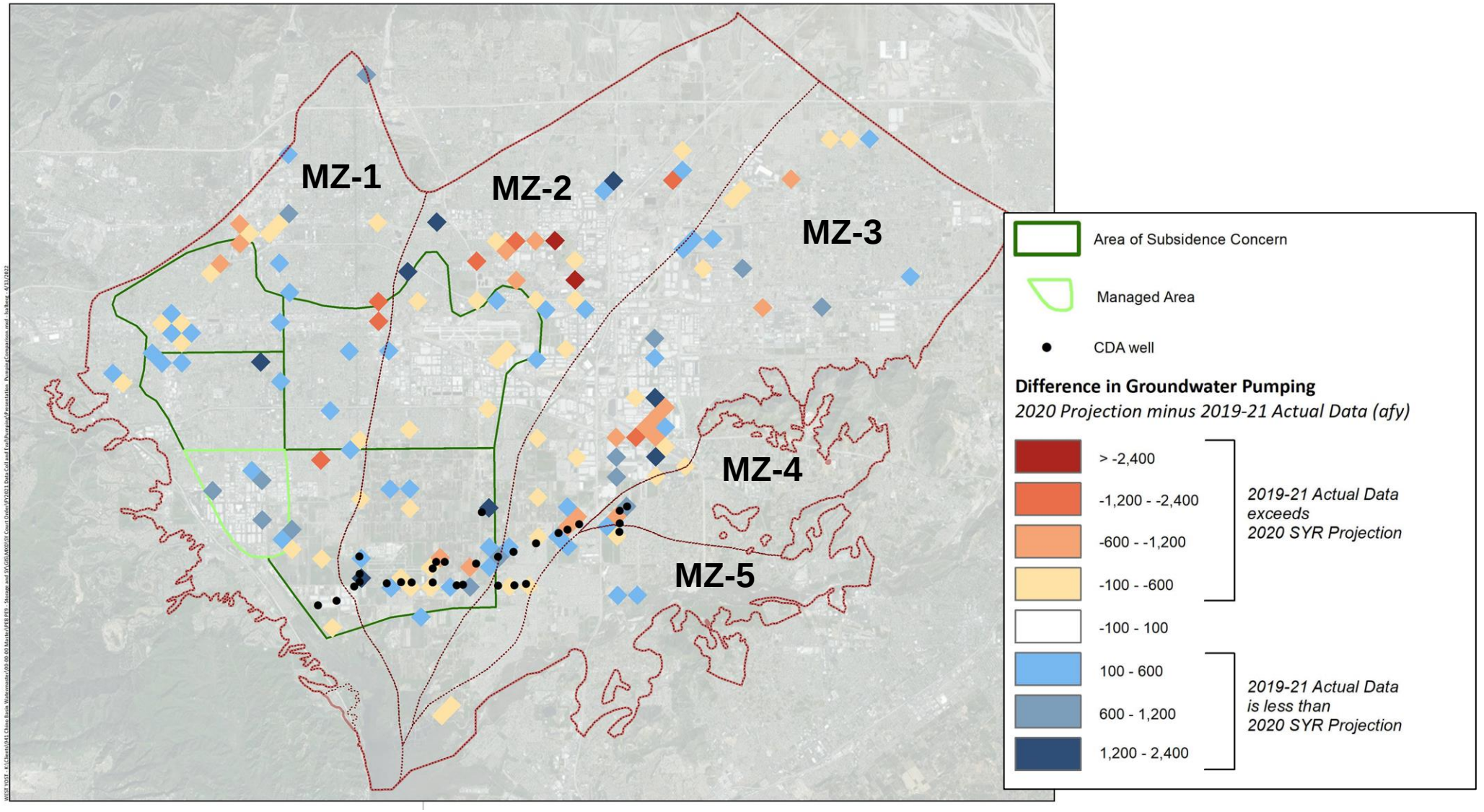
# Comparison of 2020 SYR Projection and 2019-21 Actual Data for Groundwater Pumping



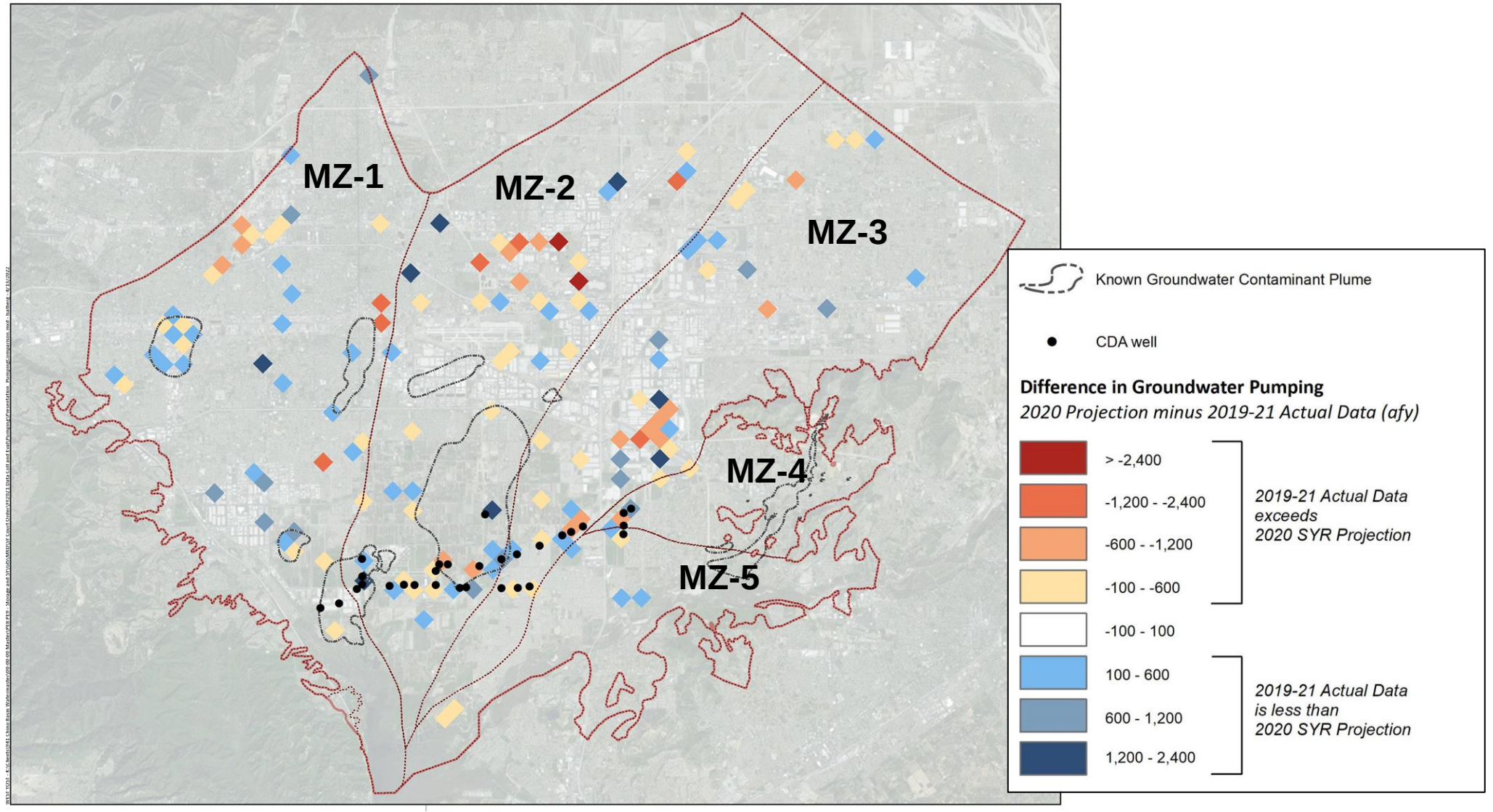
# Comparison of 2020 SYR Projection and 2019-21 Actual Data: Areas with Projected Pumping Sustainability Challenges



# Comparison of 2020 SYR Projection and 2019-21 Actual Data: Areas of Subsidence Concern



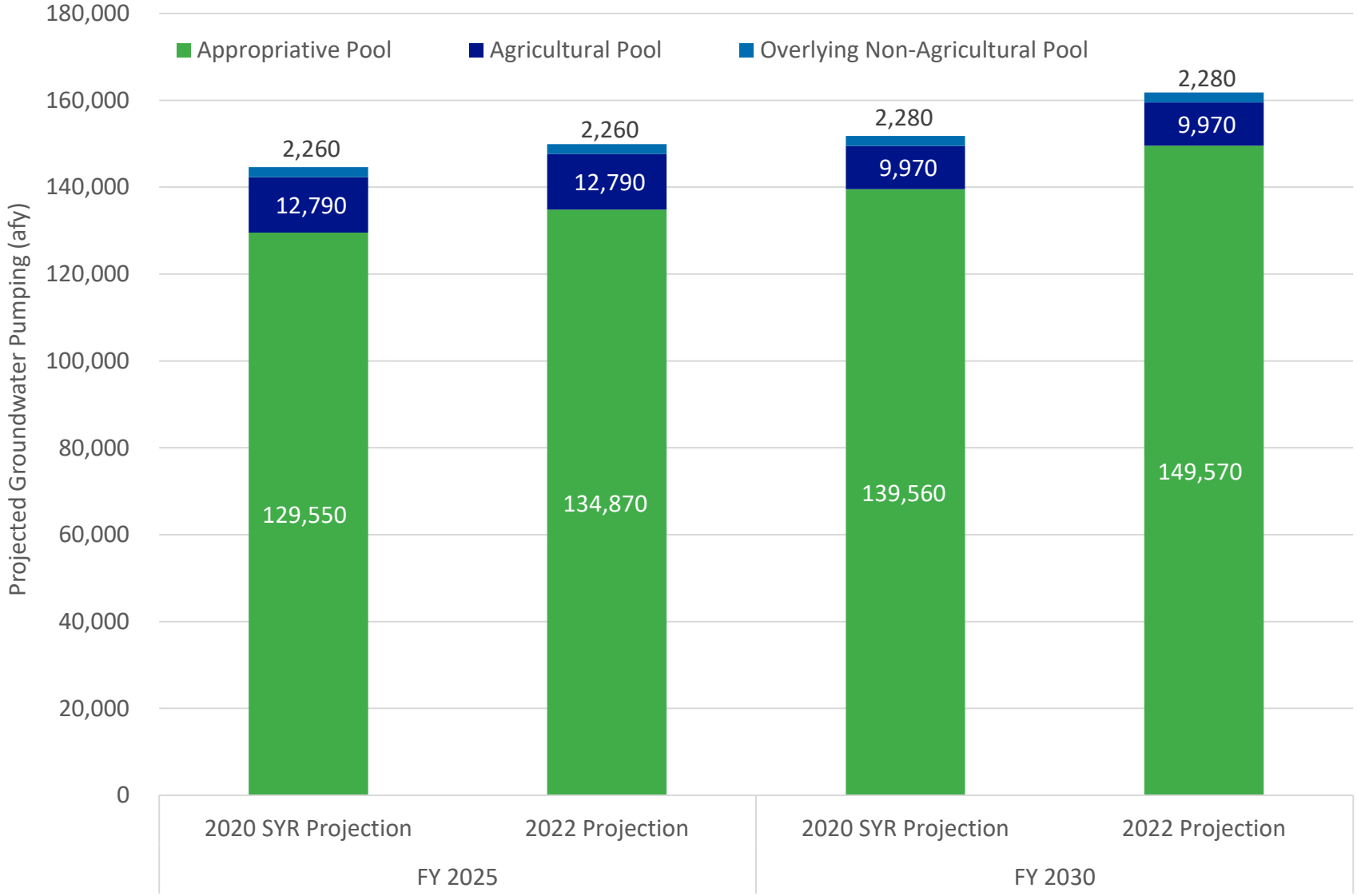
# Comparison of 2020 SYR Projection and 2019-21 Actual Data: Water Quality



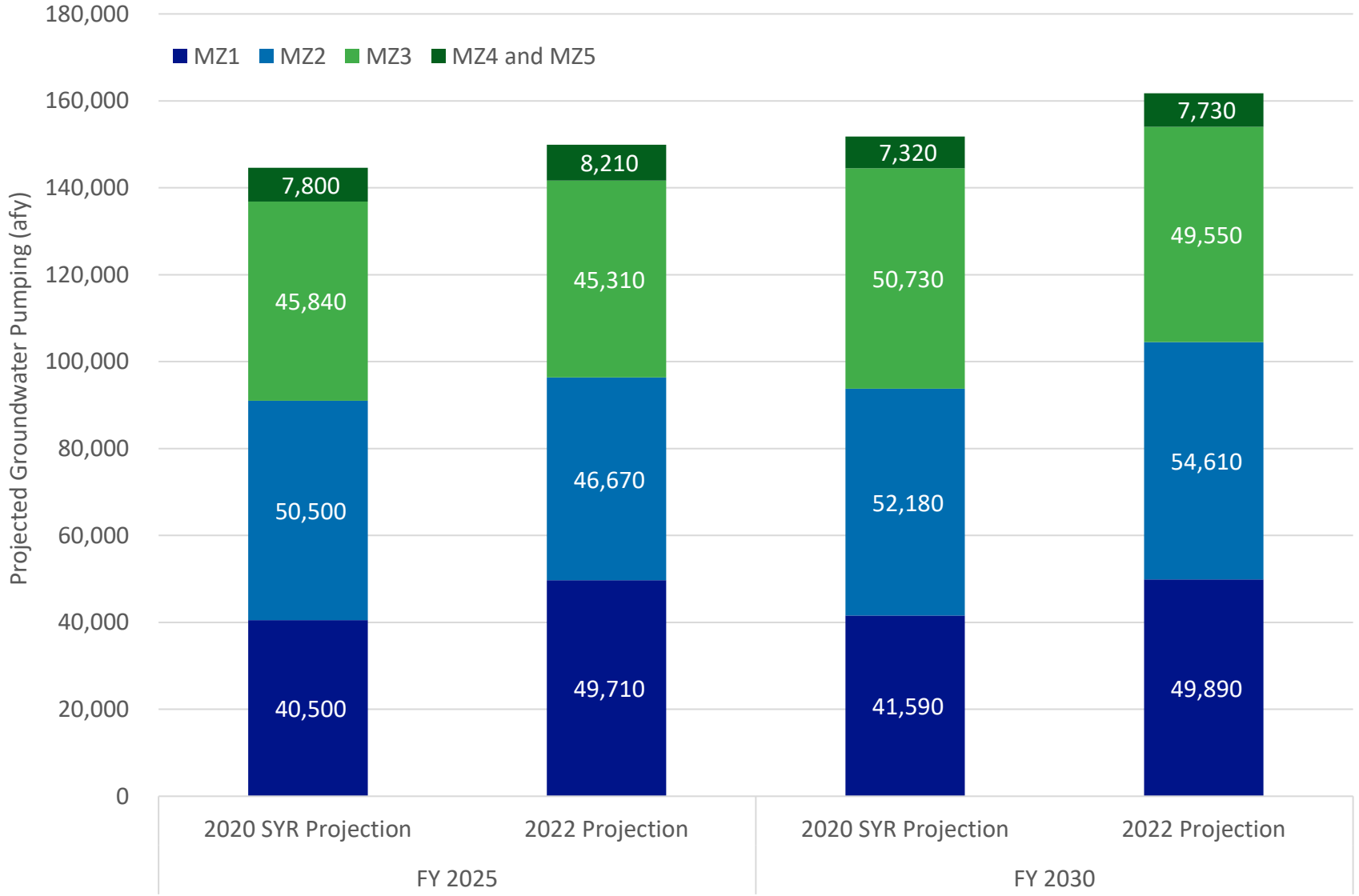
# Summary and Conclusion of Impact - 2020 SYR Projection versus 2019-21 Actual Data for Groundwater Pumping

- 2019-21 Actual groundwater pumping was greater than the 2020 SYR Projection by about 7,400 afy.
  - MZs 1 – 3: 2020 SYR Projection was less than 2019-21 Actual groundwater pumping for FY 2019 through 2021.
  - MZs 4 & 5: 2020 SYR Projection was greater than 2019-21 Actual groundwater pumping for FY 2019 though 2021.
- Differences between 2020 SYR Projection and 2019-21 Actual Data may increase the risk of future land subsidence and pumping sustainability.
  - Watermaster has existing processes to address these risks

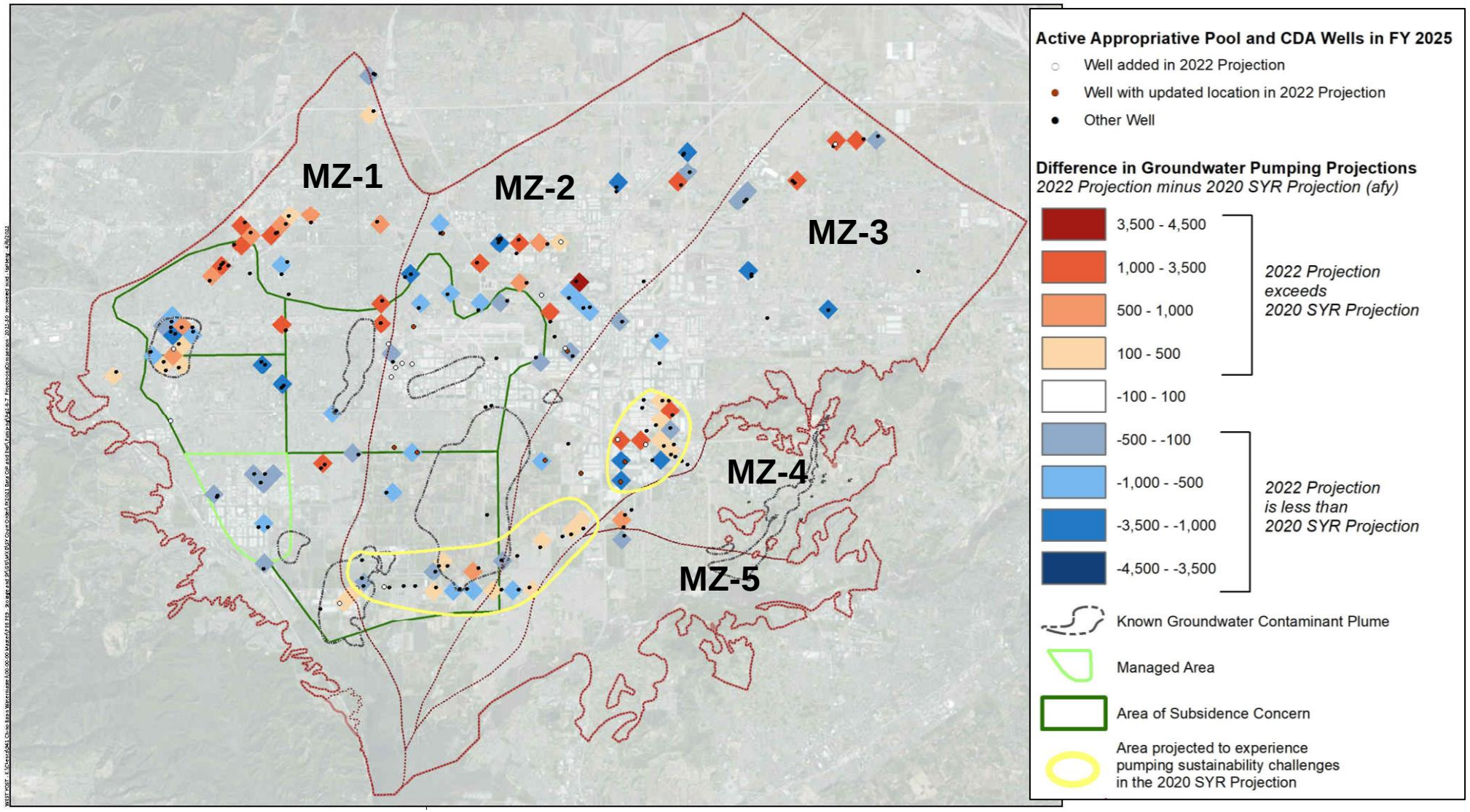
# Comparison of 2020 SYR Projection and 2022 Projection for Groundwater Pumping by Pool



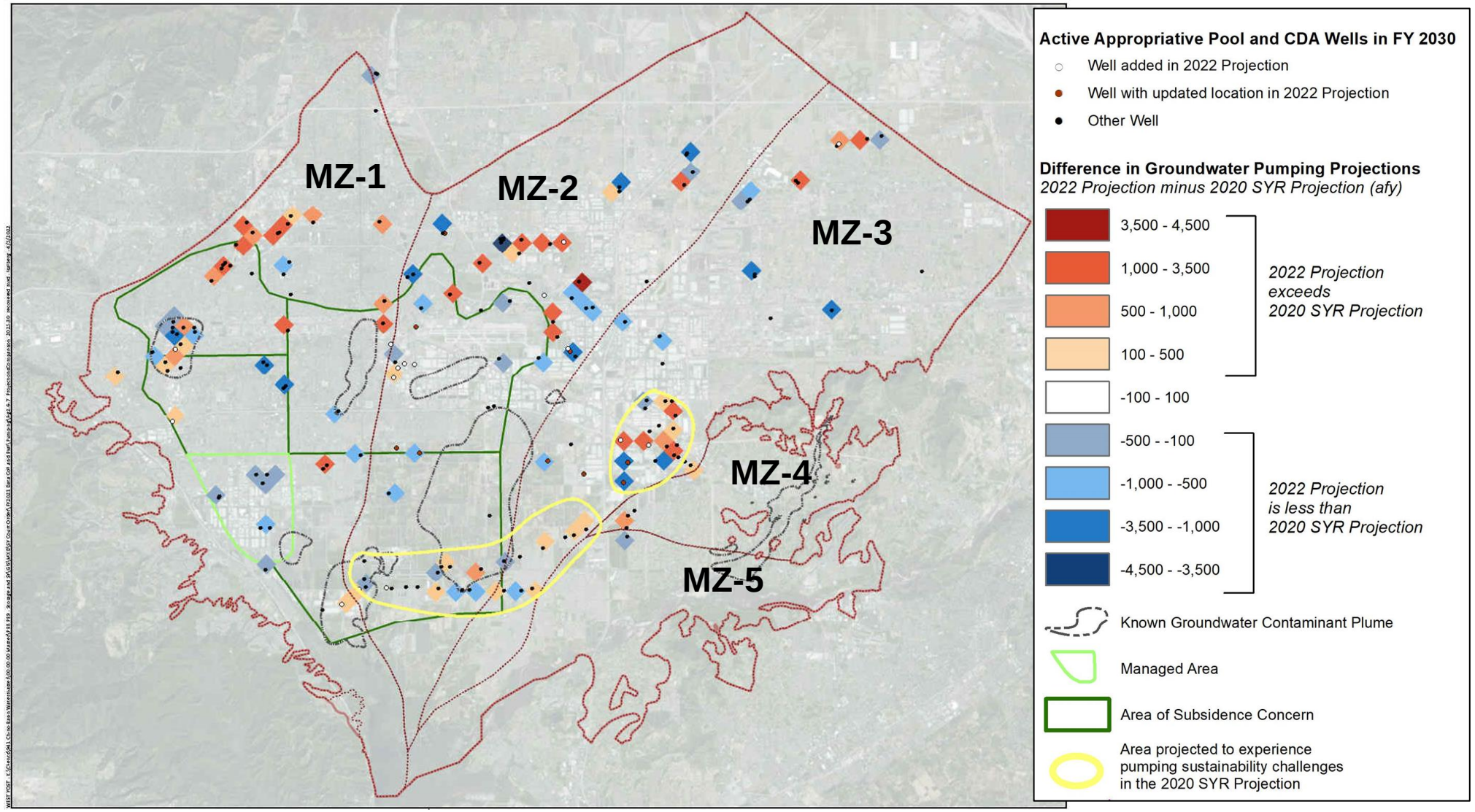
# Comparison of 2020 SYR Projection and 2022 Projection for Groundwater Pumping by MZ



# Comparison of 2020 SYR Projection and 2022 Projection for Groundwater Pumping – FY 2025



# Comparison of 2020 SYR Projection and 2022 Projection for Groundwater Pumping – FY 2030



# Summary and Conclusion of Impact - 2020 SYR Projection versus 2022 Projection for Groundwater Pumping

- 2022 Projection for groundwater pumping is greater than the 2020 SYR Projection by 5,300 afy and 10,000 afy in FY 2025 and FY 2030.
  - MZ1: 2020 SYR Projection for groundwater pumping was less than the 2022 Projection by 9,200 and 8,300 af in FY 2025 and FY 2030.
  - MZ3: 2020 SYR Projection for groundwater pumping was greater than the 2022 Projection by 500 and 1,200 af in FY 2025 and FY 2030.
- Differences between 2022 Projection and 2020 SYR Projection:
  - Are not expected to have a significant effect on net recharge.
  - May increase the risk of future land subsidence and pumping sustainability.

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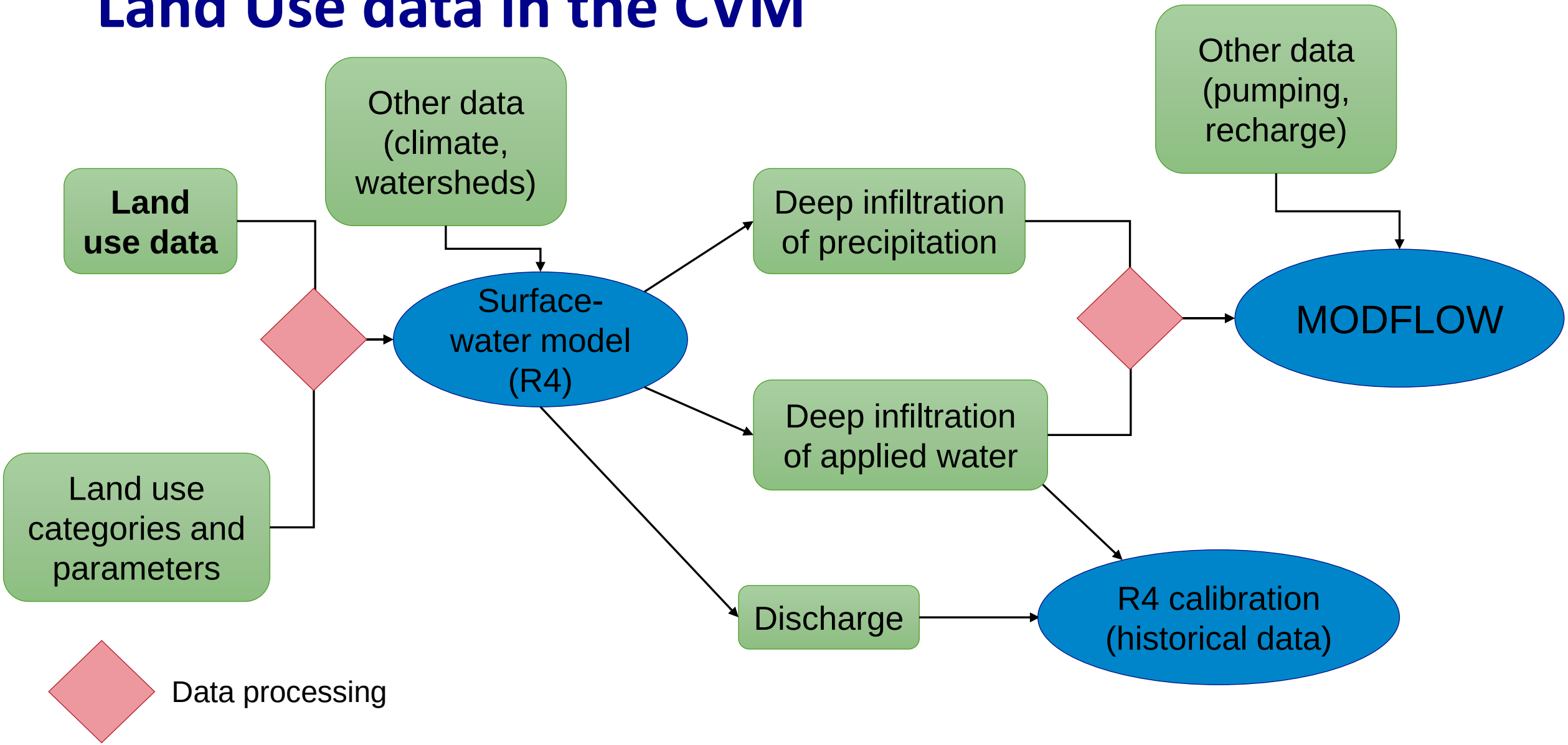
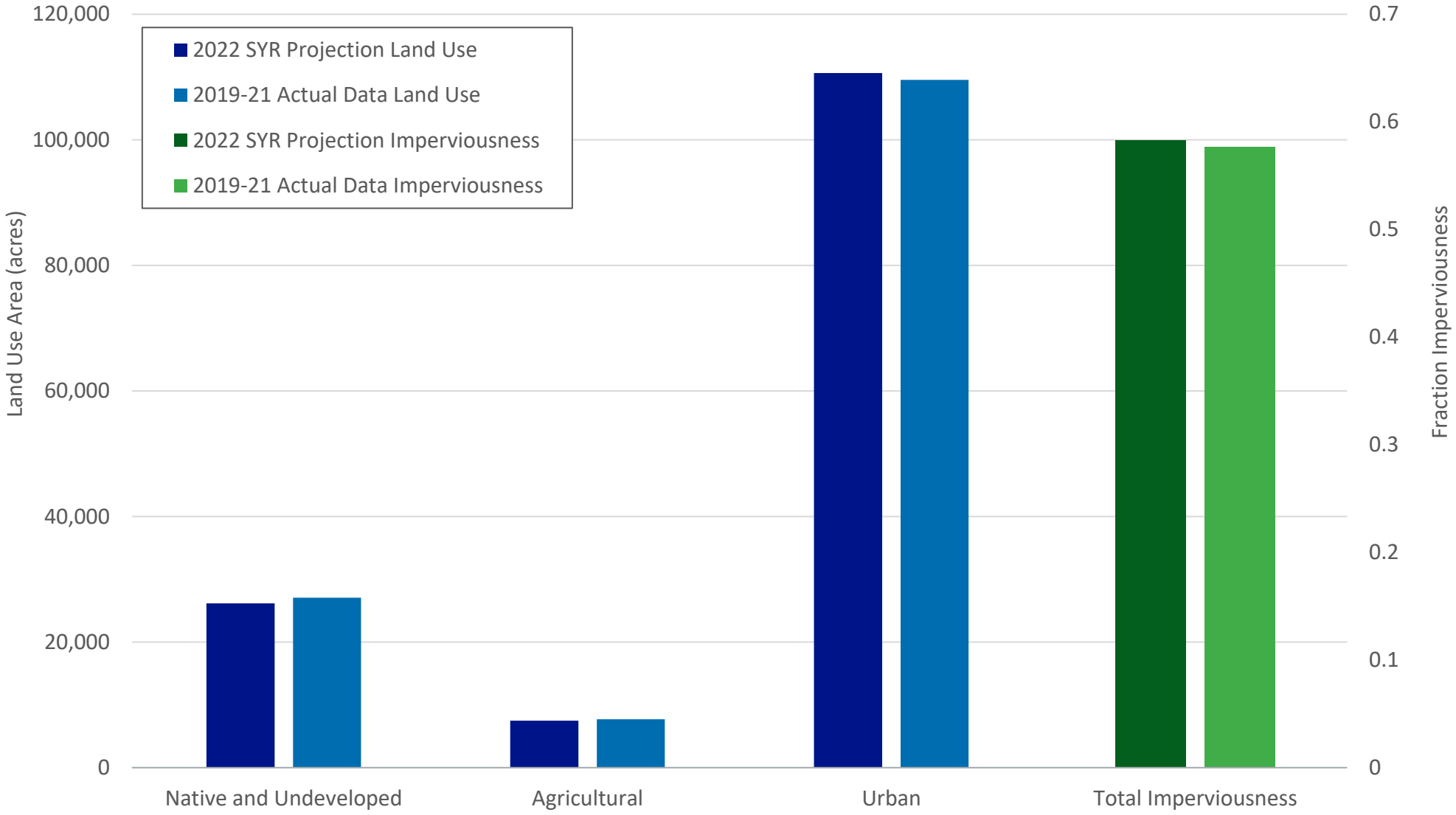
# Land Use data in the CVM



# Land Use Data Collection and Evaluation

- Methodology:
  - Compare the most recent land use data available (2019 SCAG data) to model assumptions on 2020 land use (2017 SCAG data).
  - Estimate the differences in land use by category and imperviousness under 2020 conditions.
  - Compare the most recent agricultural land conversion estimates (based on the 2020 UWMP) to the model assumptions on agricultural land conversion (based on water supply projections developed in 2017).
  - Estimate the differences in land use conversion in future conditions.

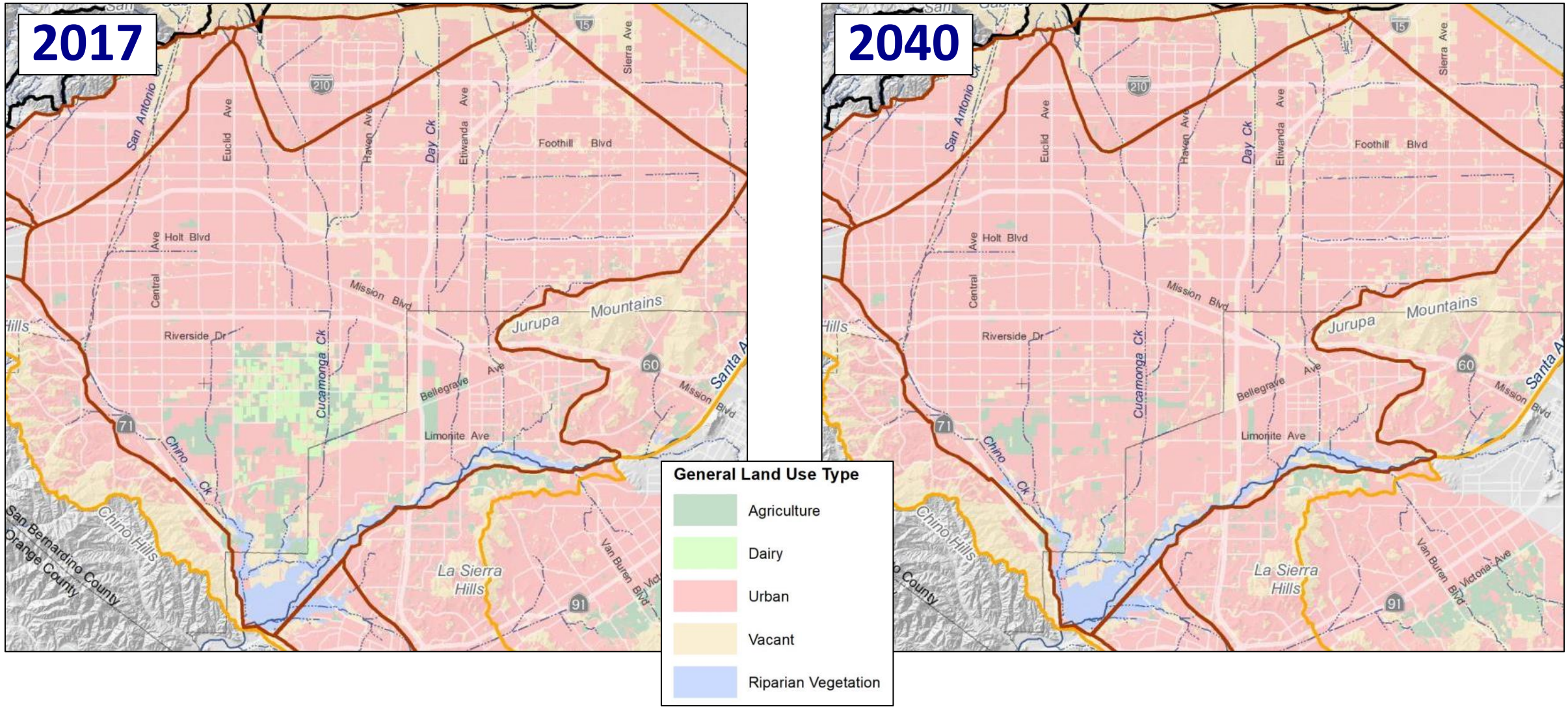
# Comparison of 2019-21 Actual Data and 2020 SYR Projection for Land Use



# Summary and Conclusion of Impact – 2019-21 Actual Data versus 2020 SYR Projection for Land Use

- Differences in area by major land use category are less than 3 percent
- Differences in percent imperviousness are less than 1 percent
- These differences are likely overestimated because actual data is based in 2019 land use
- Differences between 2019-21 Actual Data and 2020 SYR Projection for land use are not expected to have a significant effect on net recharge or increase the risk of new undesirable results

# Land Use Data – 2020 SYR Projection



# Comparison of 2020 SYR Projection and 2022 Projection for Land Use

- 2020 SYR Projection land use based on General Plan land use data
- Buildout years for Parties with agricultural land in service area:

**Comparison of Buildout Year Projections for Parties with Projected Development**

| Party | 2020 SYR Buildout Year | 2022 Projection Buildout Year |
|---|---|---|
| City of Ontario | 2040 | 2040 |
| City of Chino | 2040 | 2040 |
| JCSD | 2039 | 2035 |

*Source: Agency 2015 and 2020 UWMPs*

- 2022 Projection for land use is not significantly different than the 2020 SYR Projection

# Summary and Conclusion of Impact - 2020 SYR Projection versus 2022 Projection for Land Use

- Differences between the 2022 Projection and 2020 SYR Projection for land use are not expected to have a significant effect on net recharge or increase the risk of new undesirable results

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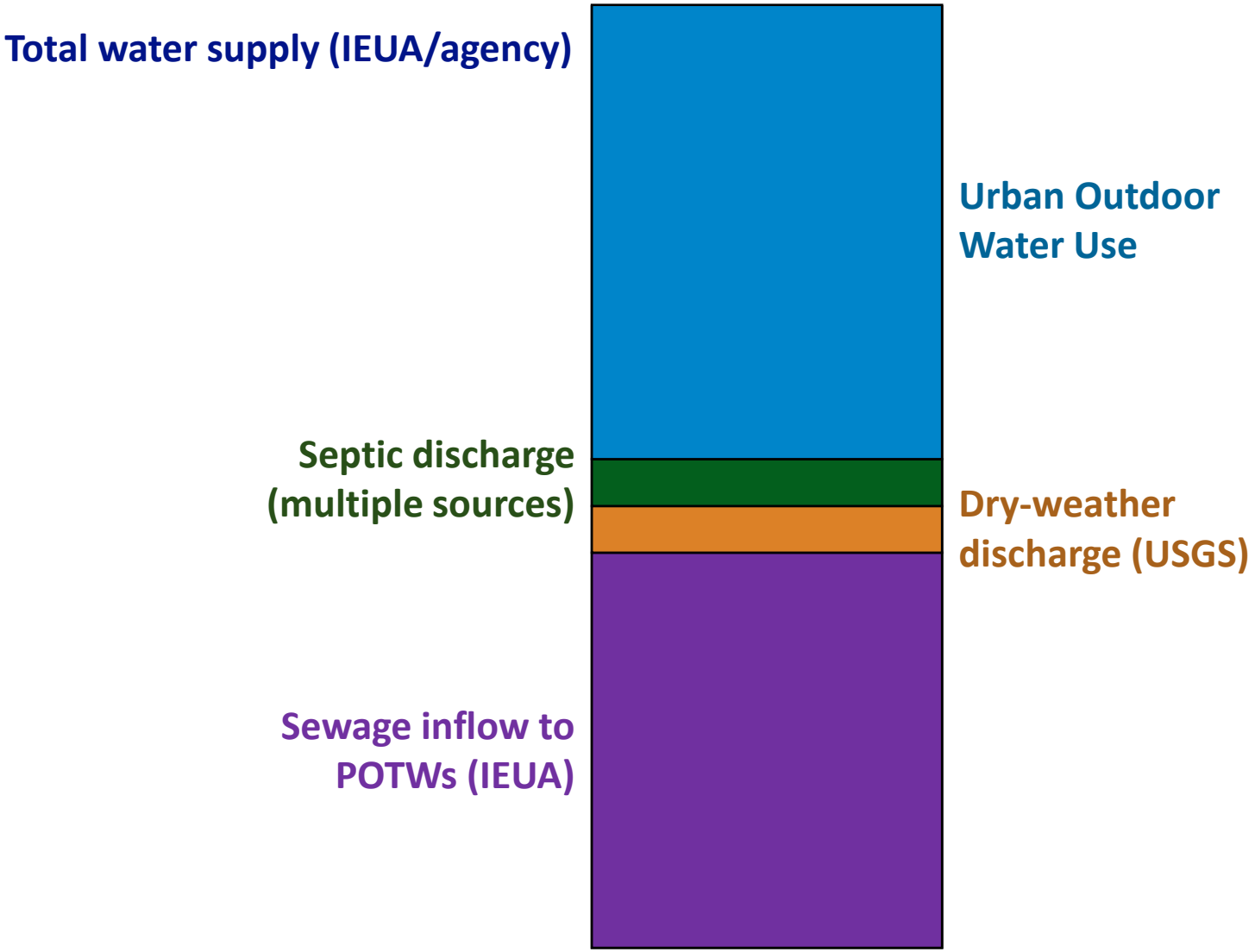
# Urban Outdoor Water Use

- How is urban outdoor water use incorporated into the CVM?
  - Indoor/outdoor water use → Calibration of the R4 model and applied water assumptions
- Data on indoor/outdoor water use includes:
  - Land use
  - Water efficiency regulations
  - Waste increment reports (IEUA)

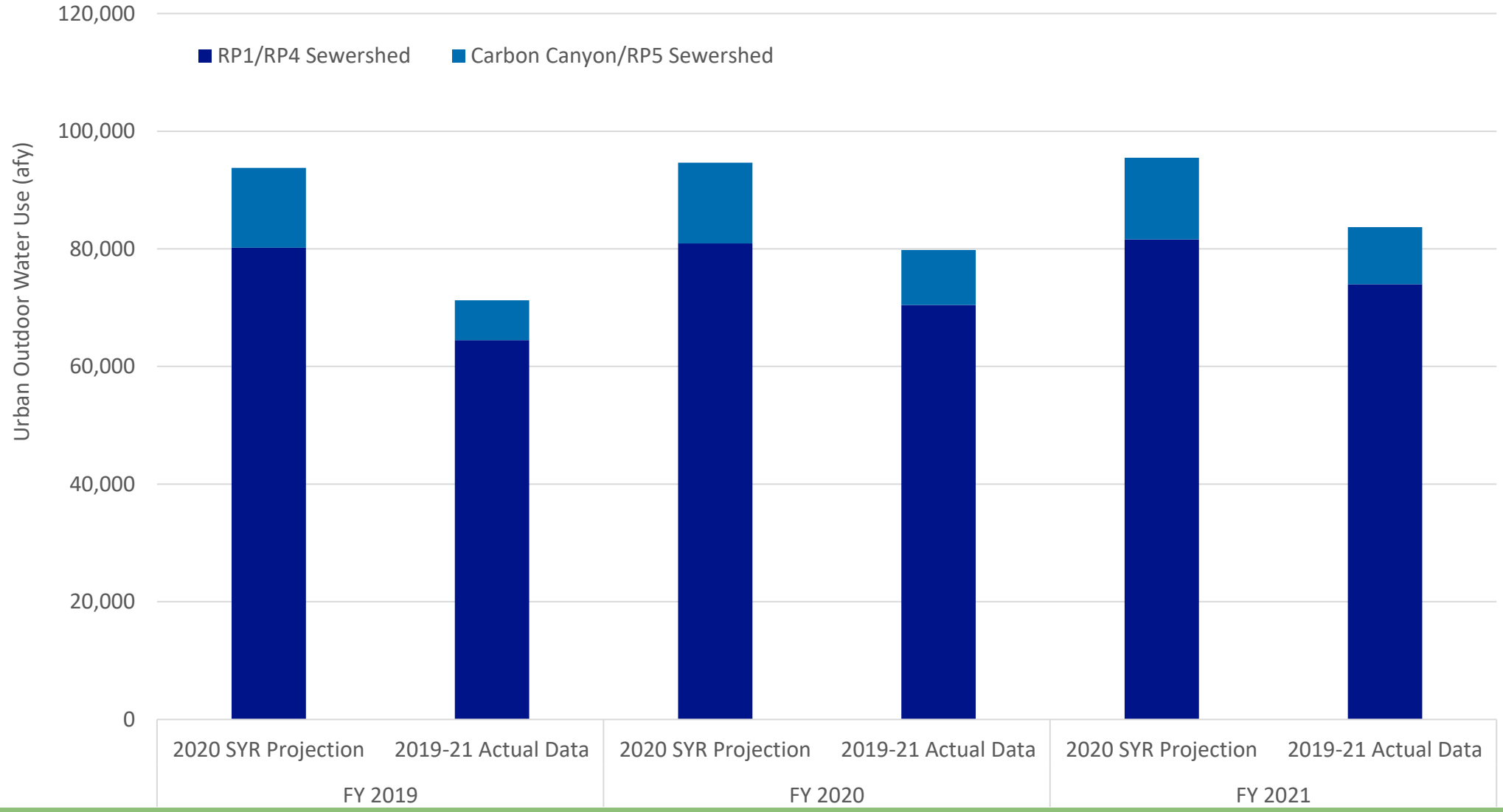
# How is Actual Urban Outdoor Water Use Estimated?



# 2020 SYR Projection for Urban Outdoor Water Use

- Future land use
- Future expected-value hydrology adjusted for climate change
- Impact of current and future urban outdoor water use conservation legislation was not included
  - Available information was insufficient to project behavioral changes

# Comparison of 2019-21 Actual Data and 2020 SYR Projection for Urban Outdoor Water Use



# Summary and Conclusion of Impact – 2020 SYR Projection versus 2019-21 Actual Data for Urban Outdoor Water Use

- The 2020 SYR Projection for urban outdoor water use exceeds the 2019-21 Actual Data by 16,500 afy
- This difference would likely result in less net recharge compared to the 2020 SYR Projection
  - Timing depends on the travel time between the root zone and the groundwater table, which ranges from less than one year to over 30 years in the Chino Basin

# 2022 Projection for Urban Outdoor Water Use

- October 2021: DWR proposed a provisional method to calculate agency-specific water efficiency objectives to implement 2018 water conservation legislation
- State Water Resources Control Board has not approved the DWR's proposed method
- New information is insufficient to develop 2022 Projection

# Summary and Conclusion of Impact - 2020 SYR Projection versus 2022 Projection for Urban Outdoor Water Use

- Future urban outdoor water use is likely to be less than the 2020 SYR Projection, based on historical trends (including 2019-21 Actual Data) and current information
- This difference would likely result in less net recharge compared to the 2020 SYR Projection

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# Managed Recharge in the CVM

- Managed recharge = stormwater + supplemental water
- Supplemental water = recycled water + imported water
- How is managed recharge data used in the CVM?
  - Historical data → Model calibration
  - Projections → Develop model scenarios
- Why is it important to evaluate differences between projected and actual managed recharge?
  - Recharge (rate and location) affects groundwater levels, water budget, and net recharge
  - Net recharge = pumping + change in storage – supplemental water recharge

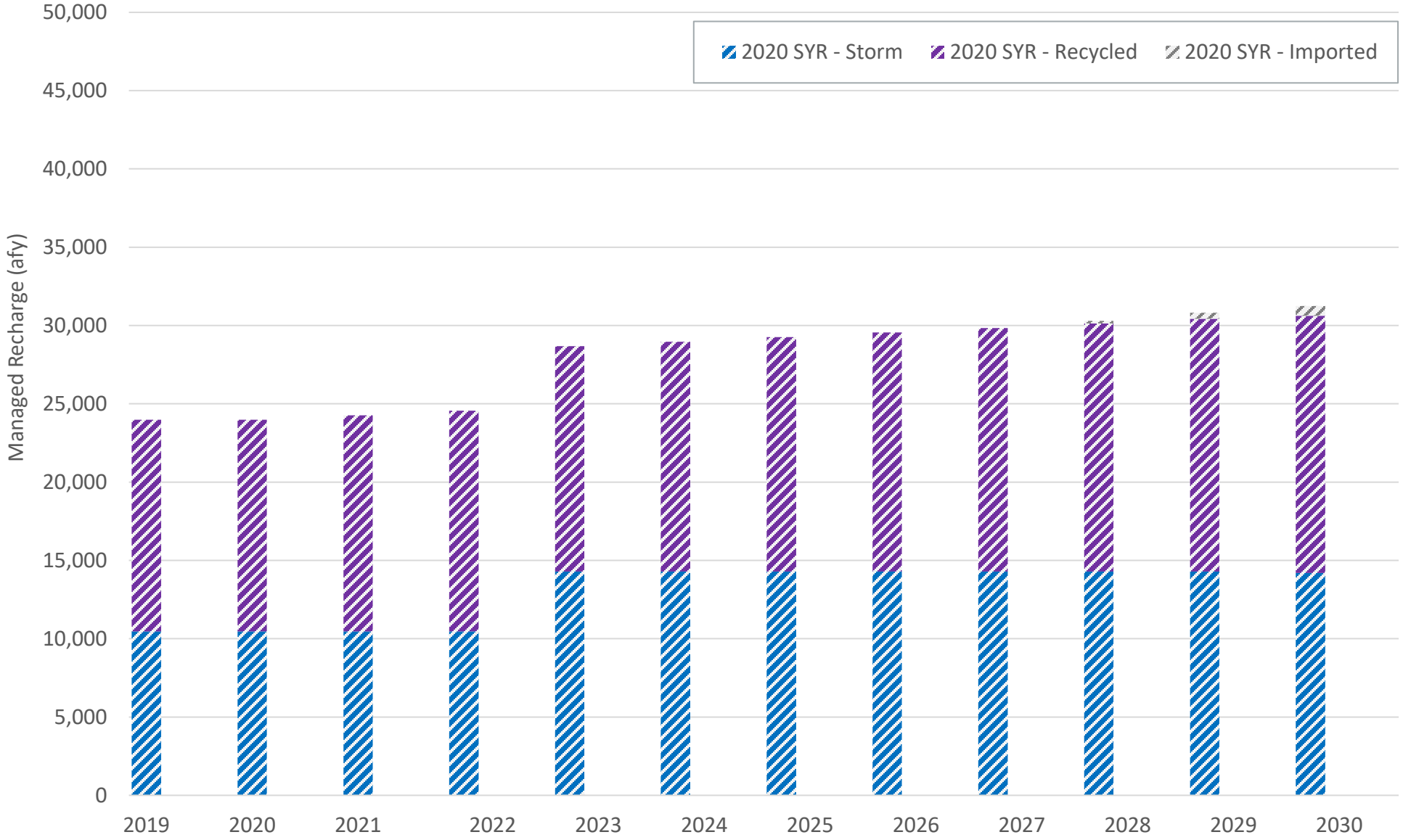
# Managed Recharge in the CVM

- Historical data provided by IEUA
- Projected recycled water recharge data provided by IEUA
- Projected imported water recharge estimated by:
  - Projected pumping/net recharge
  - Parties' projected use of managed storage versus wet-water (supplemental) recharge to satisfy replenishment obligations
- DYYP was not included in the 2020 SYR projection scenario beyond historical operations (FY 2018)
- Projected stormwater recharge estimated with R4 model
  - Assuming all 2013 RMPU projects are online by FY 2023

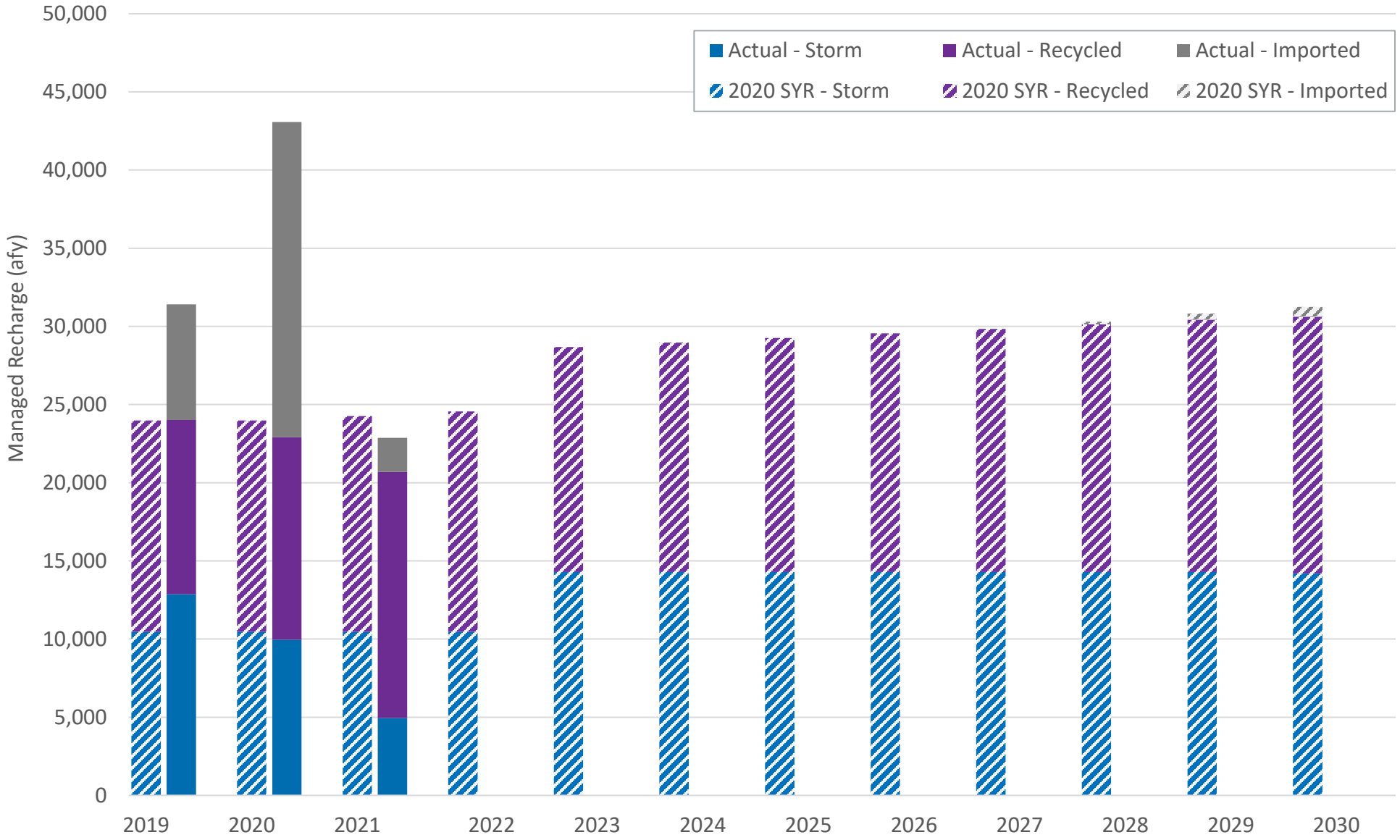
# Parties' Projected Use of Managed Storage

- 2020 SYR Projection: 80 percent of replenishment obligations were satisfied from managed storage
  - Based on historical data
- Parties provided updated projections in 2022 for future use of managed storage
  - Expected to use managed storage to satisfy 50 to 100 percent of replenishment obligations, usually closer to 100 percent
  - Indicated some uncertainty based on future economic/water supply conditions
  - No recommended change in 80 percent assumption
- 2022 Projection imported water recharge is based on 2022 Projection for groundwater pumping

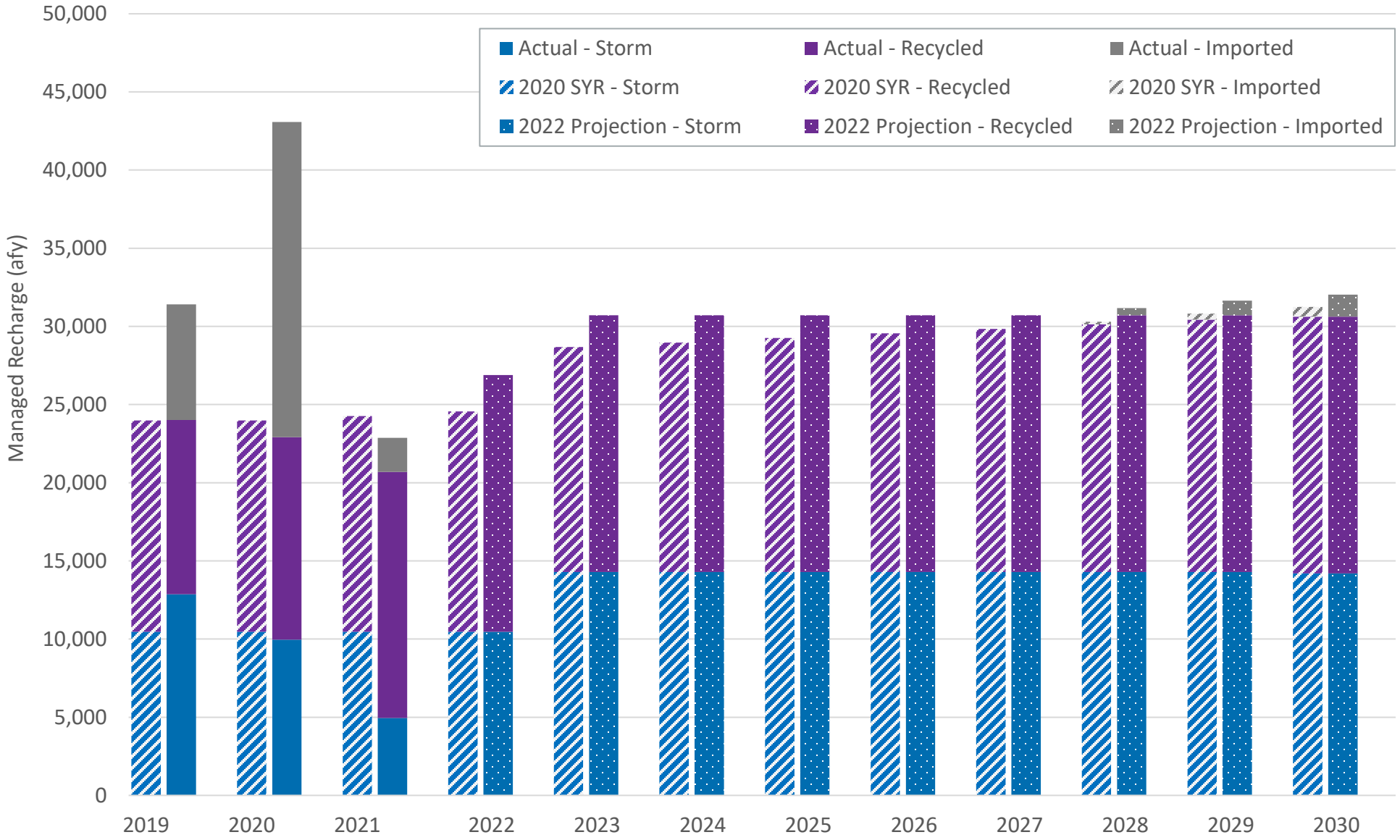
# Comparison of 2020 SYR Projection to Actual Managed Recharge and 2022 Projection



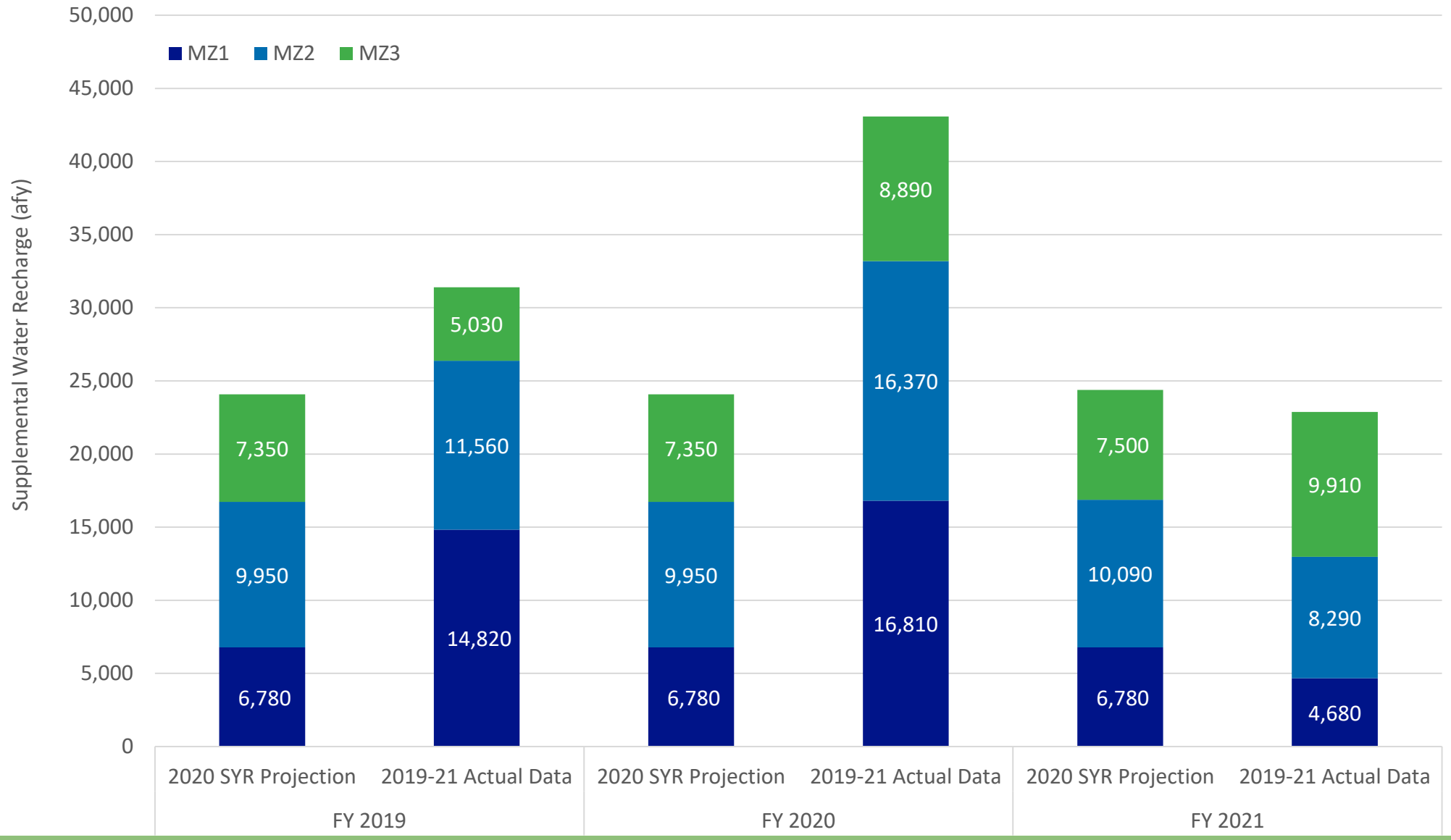
# Comparison of 2020 SYR Projection to Actual Managed Recharge and 2022 Projection



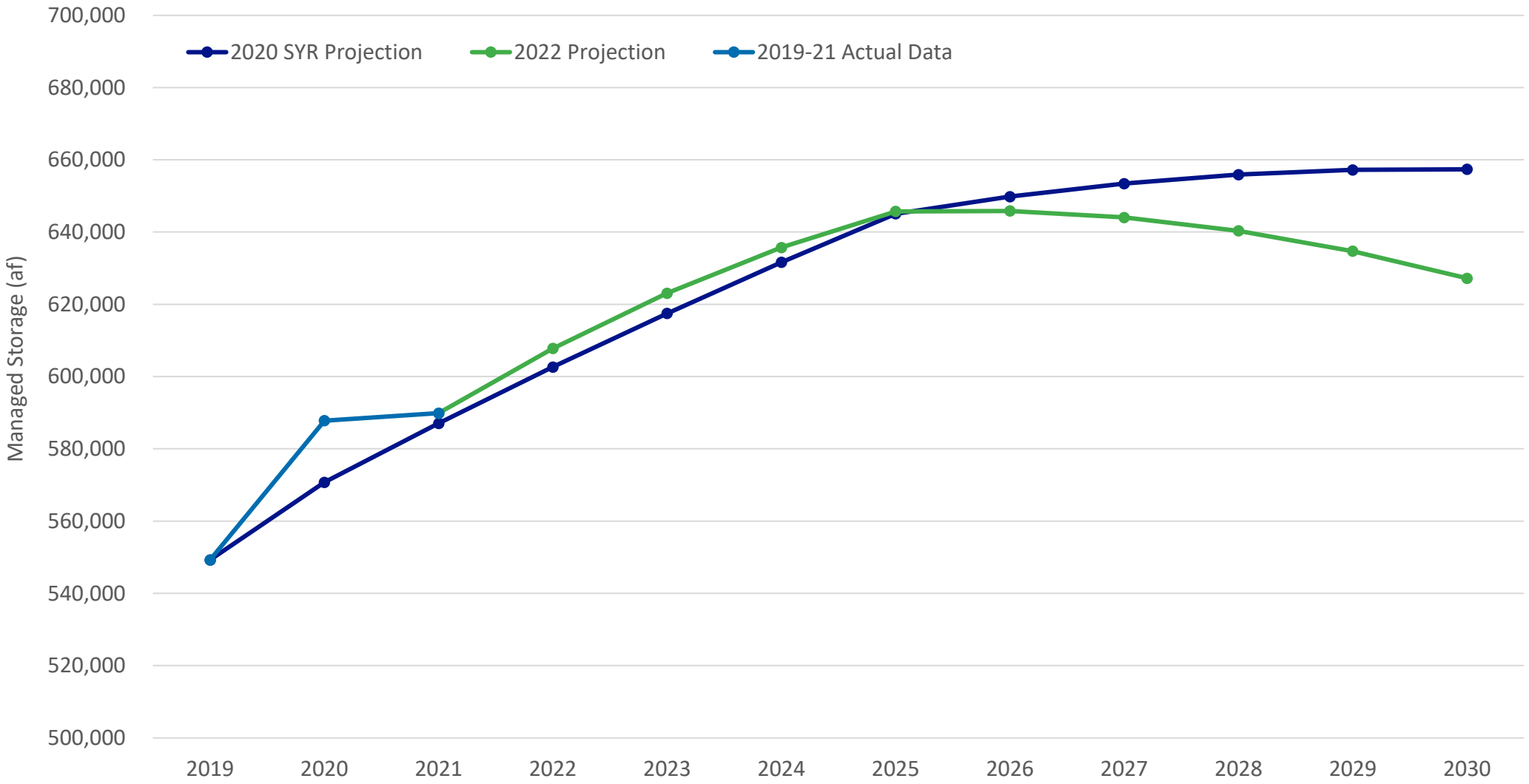
# Comparison of 2020 SYR Projection to Actual Managed Recharge and 2022 Projection



# Comparison of 2019-21 Actual Data and 2020 SYR Projection for Managed Recharge – by MZ



# Comparison of 2019-21 Actual Data and Projected Managed Storage FY 2019 - 2030



# Summary and Conclusion of Impact – 2020 SYR Projection versus 2019-21 Actual Data for Managed Recharge

- 2019-21 Actual stormwater recharge was less than the 2020 SYR Projection by an average of 1,200 afy
  - Year-to-year variation is expected.
- 2019-21 Actual recycled water recharge was less than the 2020 SYR Projection by an average of 300 afy
- 2019-21 Actual imported water recharge was greater than the 2020 SYR Projection by an average of 9,900 afy
- 2019-21 Actual managed recharge was greater than the 2020 SYR Projection in MZ1 by an average of 5,300 afy
  - Can help support groundwater levels in MZ1 and mitigate the occurrence of land subsidence.

# Summary and Conclusion of Impact – 2020 SYR Projection versus 2022 Projection for Managed Recharge

- 2022 Projection for stormwater recharge is identical to the 2020 SYR Projection
- 2022 Projection for recycled water recharge is greater than the 2020 SYR Projection by an average of about 1,170 afy
- 2022 Projection for imported water recharge was greater than the 2020 SYR Projection by an average of about 540 afy over FY 2028-30
  - Due to higher pumping projections

# Summary and Conclusion of Impact - 2020 SYR Projection versus 2019-21 Actual Data/2022 Projection for Managed Storage

- Differences in managed storage are not expected to have a significant effect on net recharge

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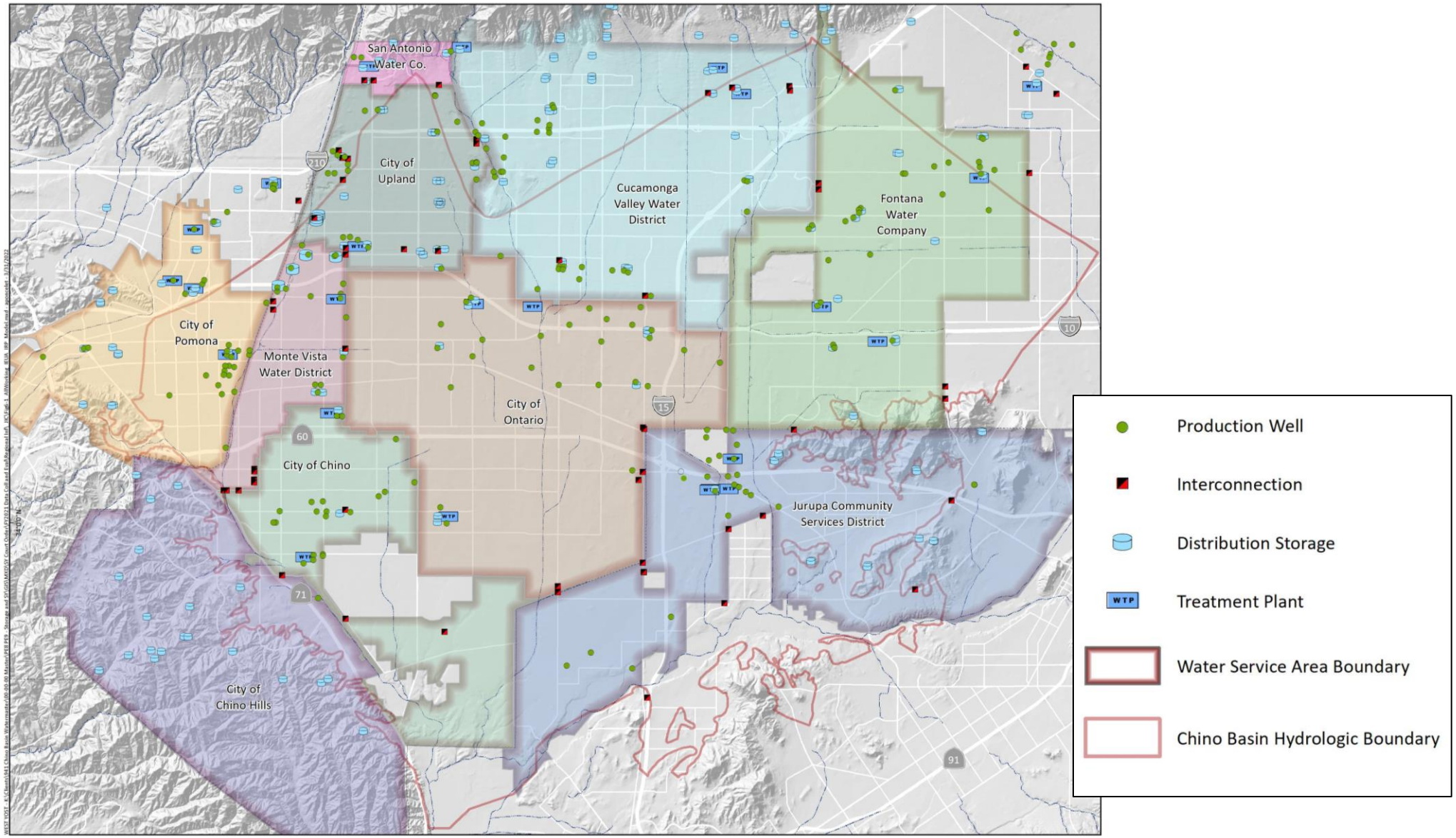
# Regional Water Infrastructure

- Regional water infrastructure includes:
  - Water treatment plants
  - Interconnections
  - Reservoirs
  - Anything that would impact pumping from Chino Basin
- Information on regional water infrastructure provided by the Parties and IEUA

# Regional Water Infrastructure

- Objective for review of regional water infrastructure:
  - Does the information suggest the potential for behavioral changes that would affect the assumptions we make in our development of future scenarios?

# Regional Water Infrastructure



# Summary and Conclusion of Impact - Regional Water Infrastructure

- Future infrastructure is expected to increase the capacity to pump from the Chino Basin
  - New wells
  - New treatment facilities
  - New conveyance facilities
- No significant changes from prior projections

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# Key Takeaways from Today's Workshop

- The 2019-21 Actual Data and 2022 Projection for groundwater pumping indicate the potential for undesirable results related to increased risk of new land subsidence and pumping sustainability challenges that were not identified in the 2020 SYR.
- The 2019-21 Actual Data for urban outdoor water use and the information on the implementation of future conservation legislation indicate the potential for less net recharge and Safe Yield compared to the 2020 SYR.
- The 2019-21 Actual Data and 2022 Projection for land use, managed recharge, and regional water infrastructure are not significantly different than the 2020 SYR Projection.

# Recommendations

1. Through Watermaster's existing programs, address the potential for new undesirable results resulting from the 2019-21 Actual and 2022 Projection for groundwater pumping exceeding the 2020 SYR Projection

2. Reduce the frequency of the evaluation of changes in land use

3. Include the newly collected information on urban outdoor water use practices in the forthcoming model update and reevaluation of the Safe Yield

4. Obtain 20-year operating plans that forecast near- and long-term plans for pumping and use of managed storage

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# Next Steps and Schedule

- Summarize feedback from today's workshop
- Please provide any additional feedback by April 29th (Friday)
- Report will be finalized next week and included in May Watermaster process


CHINO BASIN
WATERMASTER
Partners in Basin Management

# THANK YOU