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Safe Yield Data Collection and Evaluation

Workshop #2

March 21, 2023

Agenda

- Welcome
- Background and Objectives
- Groundwater Pumping
- 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

- Watermaster obligations for data collection and evaluation:
  - Ensure that production is metered, reported, and included in Assessment Packages
  - Collect data on cultural conditions
  - Evaluate data for material changes from existing and projected conditions or threatened undesirable results
  - Develop annual budgets for data collection and evaluation

Scope to Implement Court Order

- Collect the following data:
  - Land use
  - Groundwater pumping (evaluate only)
  - Managed recharge
  - Urban outdoor water use
  - Regional water infrastructure
- Evaluate the data:
  - 2020 SYR Projection versus 2019-22 Actual Data (FY 2019-2022)
  - 2020 SYR Projection versus 2023 Projection (FY 2023-2030)

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 2019-22 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. 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 2021/2022*

Key Takeaways from Today's Workshop

- The 2019-22 Actual Data and 2023 Projection for managed storage is 63,000 af less than the 2020 SYR → potential for **more** net recharge compared to 2020 SYR
  - Assuming a linear relationship between managed storage and net recharge:
    - Unlikely to result in lower groundwater levels and a greater net recharge by FY 2030
    - May result in a net increase of 800 afy in net recharge at end of FY 2030
- The 2019-22 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 effect of differences in managed storage and urban outdoor water use on net recharge **offset each other**
  - Anticipate deviation of net recharge less than 2.5% compared to current Safe Yield

Key Takeaways from Today's Workshop (cont.)

- 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 and pumping sustainability challenges that were not identified in the 2020 SYR.
- The 2019-22 Actual Data and 2023 Projection for regional water infrastructure are not significantly different than the 2020 SYR Projection.

Changes from FY 2021/22 Report

- Omitting land use comparison
- Updating methodology for assessing urban outdoor water use to include recycled water and associated urban land uses
- Incorporating Parties' 20-year operating plans forecasting near and long-term plans for pumping and use of managed storage
- Including more details on data comparisons

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Groundwater Pumping Data Collection and Evaluation

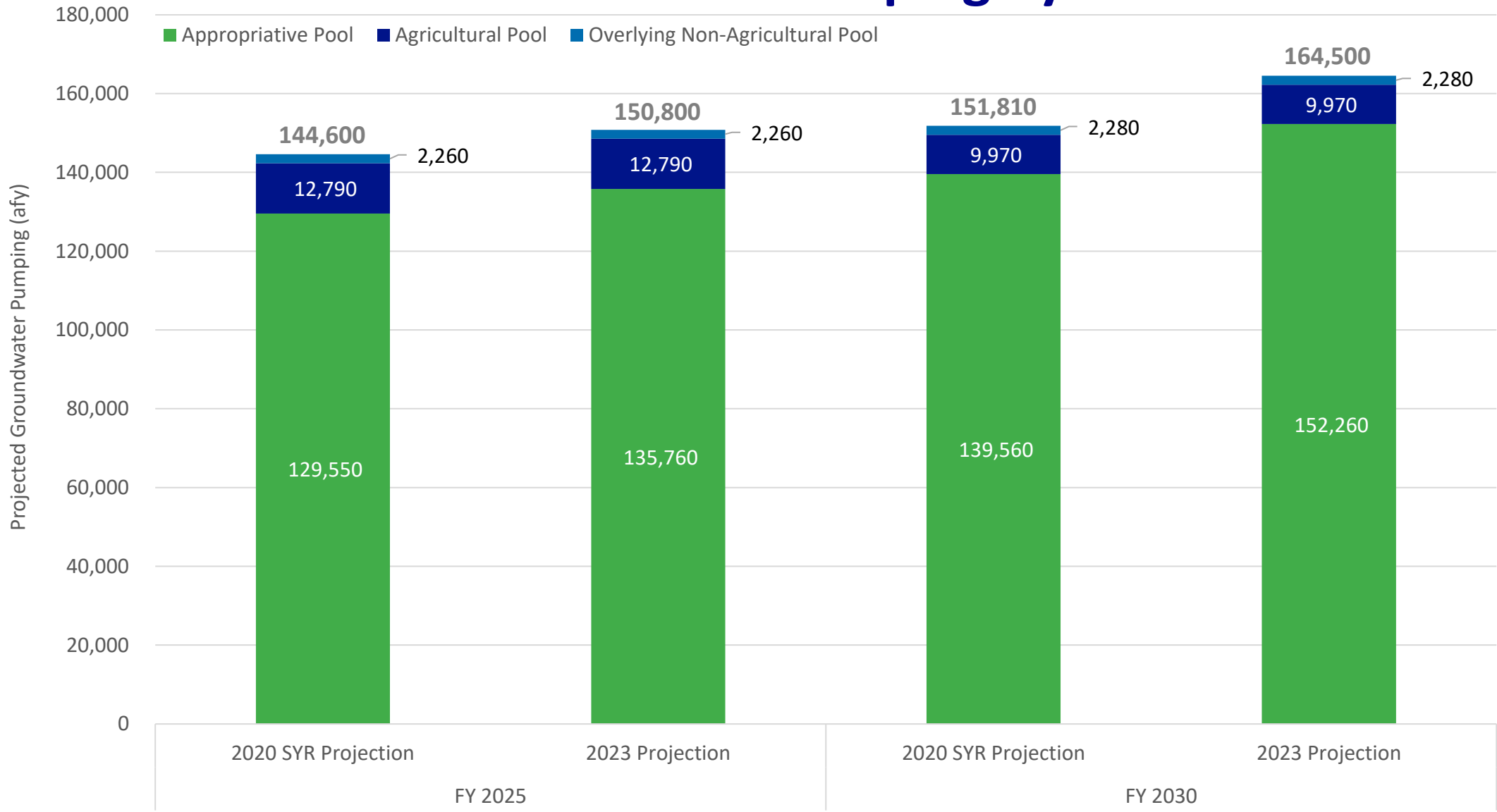
- 2020 SYR Projection:
  - Appropriative Pool – Projections provided by the Parties
  - Overlying Non-Ag Pool – Projections provided by the Parties or estimation based on historical patterns
  - Agricultural Pool – Estimation based on historical data, projected land use changes, and water supply data
  - DYYP was not included in the 2020 SYR projection scenario beyond historical operations (FY 2018)
- 2023 Projection:
  - Same sources as above

Comparison of 2020 SYR Projection and 2023 Projection

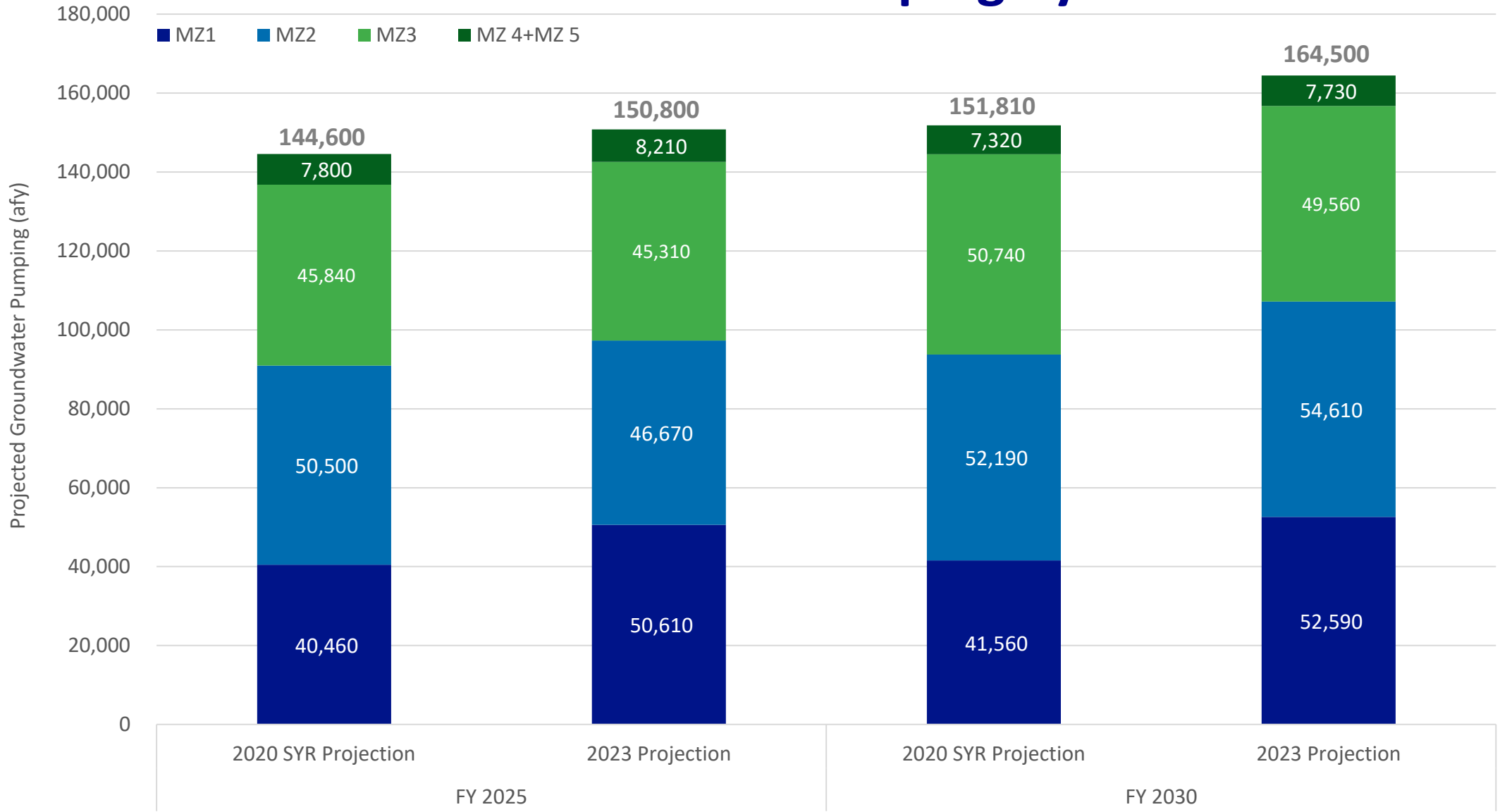
Process:

1. Projected groundwater pumping was requested (2023 Projection)
2. Compared total pumping:
   - By quarter/FY
   - Spatially (agency/MZ)
3. Compared total pumping to areas with:
   - Projected pumping sustainability challenges
   - Areas of subsidence concerns
   - Water quality concerns

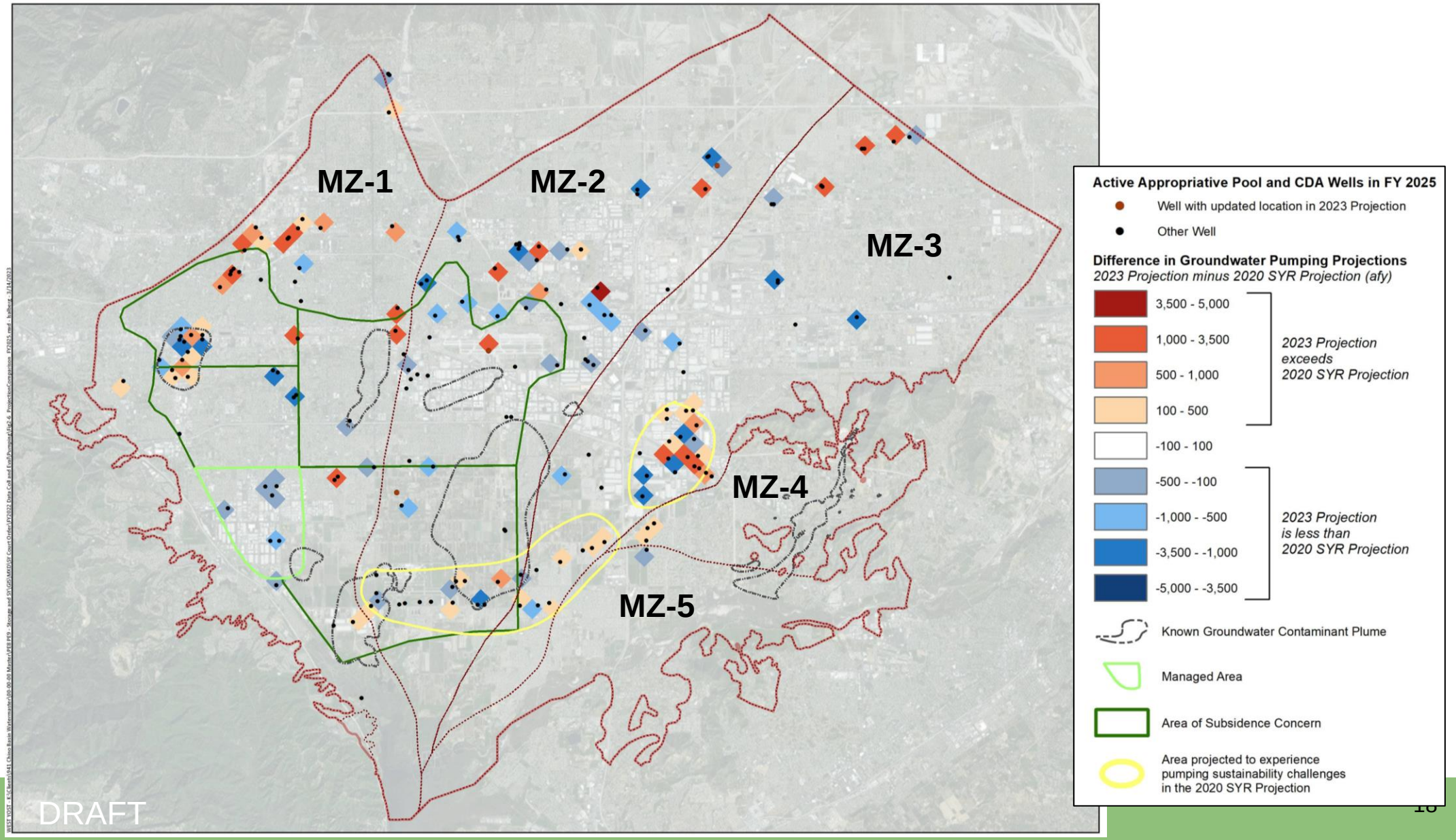
Comparison of 2020 SYR Projection and 2023 Projection for Groundwater Pumping by Pool



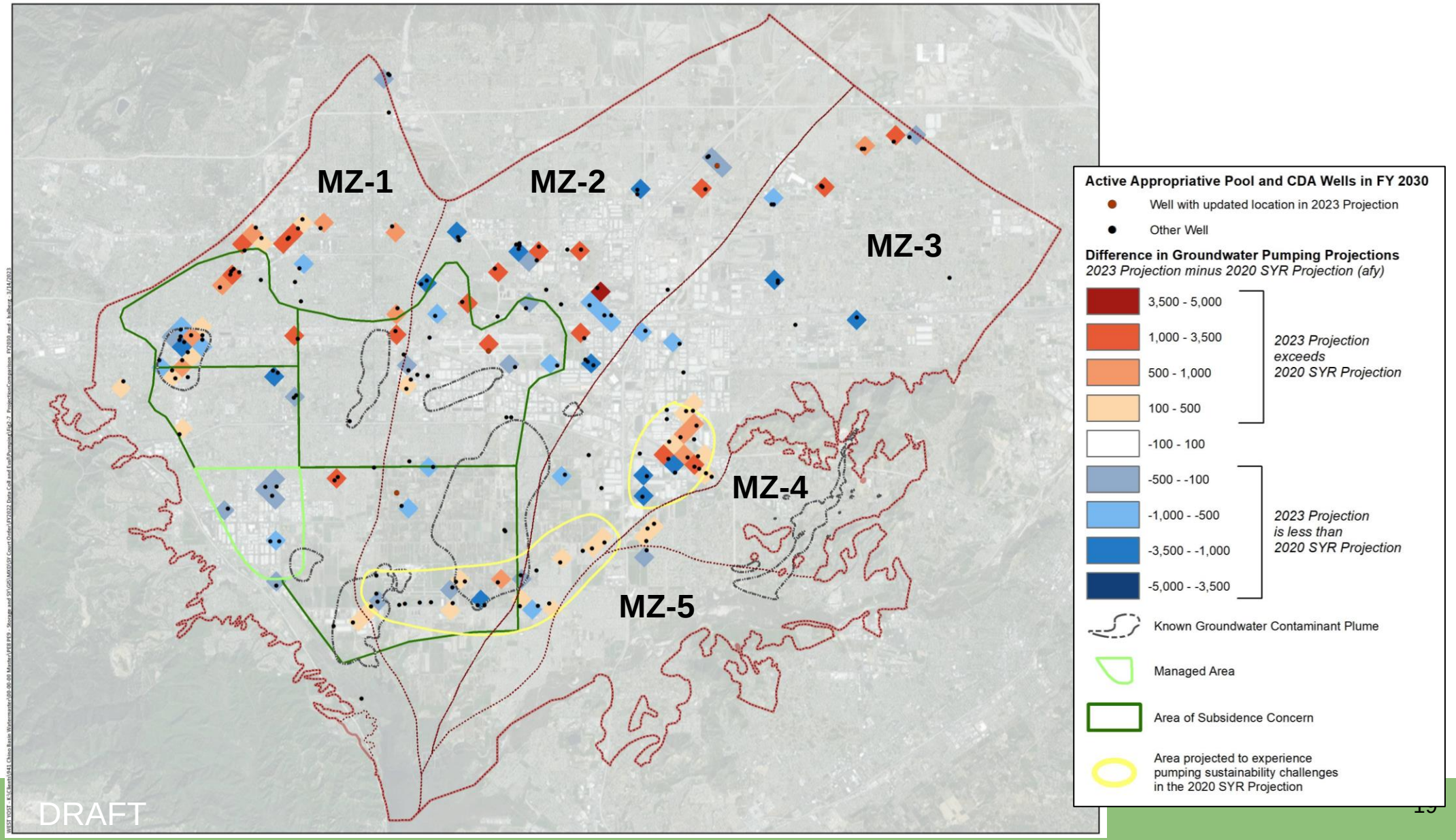
Comparison of 2020 SYR Projection and 2023 Projection for Groundwater Pumping by MZ



Comparison of 2020 SYR Projection and 2023 Projection for Groundwater Pumping – FY 2025



Comparison of 2020 SYR Projection and 2023 Projection for Groundwater Pumping – FY 2030



Summary and Conclusion of Impact - 2020 SYR Projection versus 2023 Projection for Groundwater Pumping

- 2023 Projection for groundwater pumping is greater than the 2020 SYR Projection by 6,200 afy and 12,700 afy in FY 2025 and FY 2030.
  - MZ1: 2020 SYR Projection for groundwater pumping was less than the 2023 Projection by 10,100 and 11,000 afy in FY 2025 and FY 2030.
  - MZ3: 2020 SYR Projection for groundwater pumping was greater than the 2023 Projection by 500 and 1,200 afy in FY 2025 and FY 2030.
- Differences between 2023 Projection and 2020 SYR Projection:
  - Are not expected to have a significant effect on net recharge.
  - Indicate the potential for increased risk of future land subsidence and pumping sustainability.

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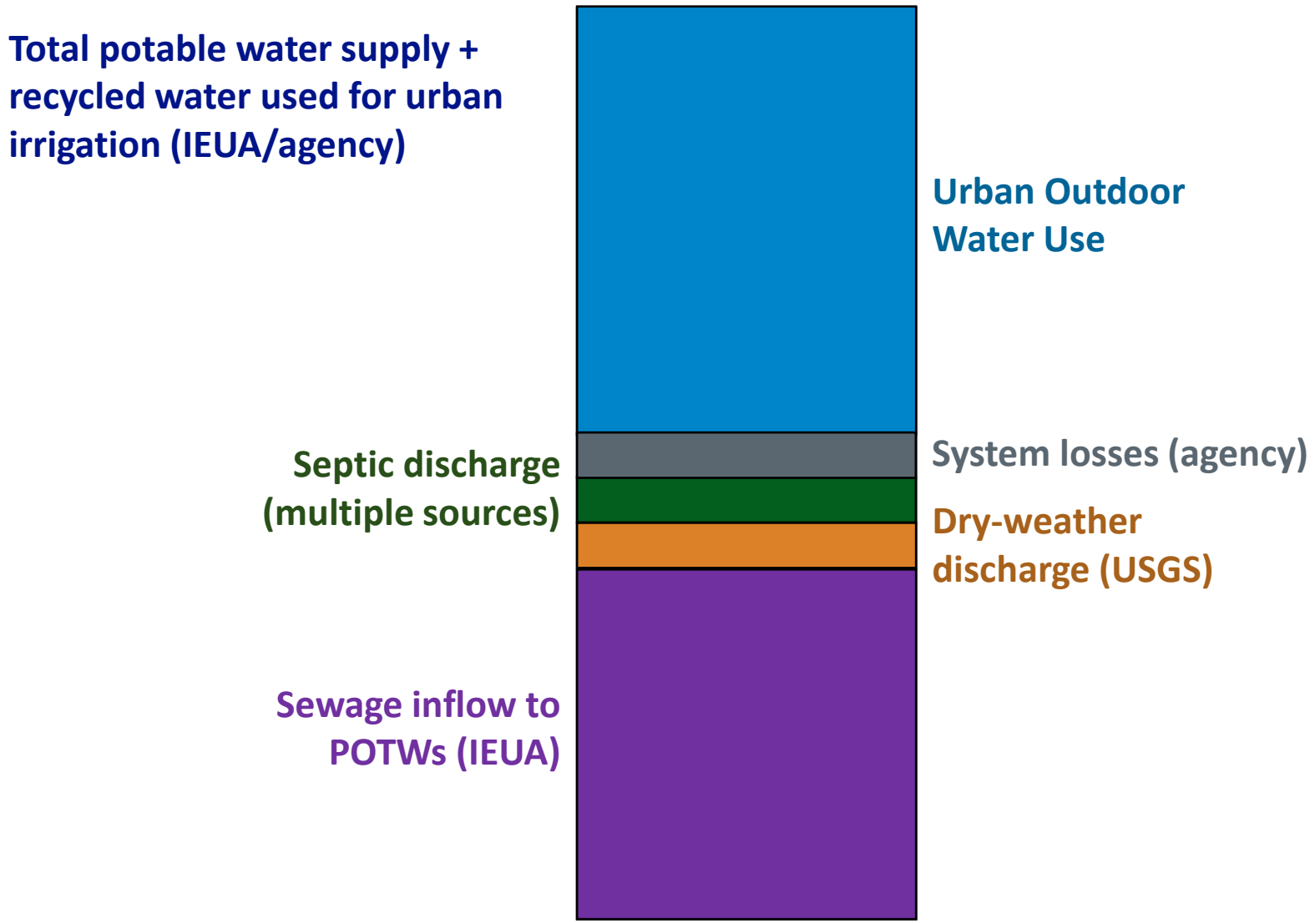
Urban Outdoor Water Use

- How is urban outdoor water use incorporated into the CVM?
  - Indoor/outdoor water use → Calibration of the R4 model and applied water assumptions
  - Applied water → Deep Infiltration of Precipitation and Applied Water → ***Recharge***

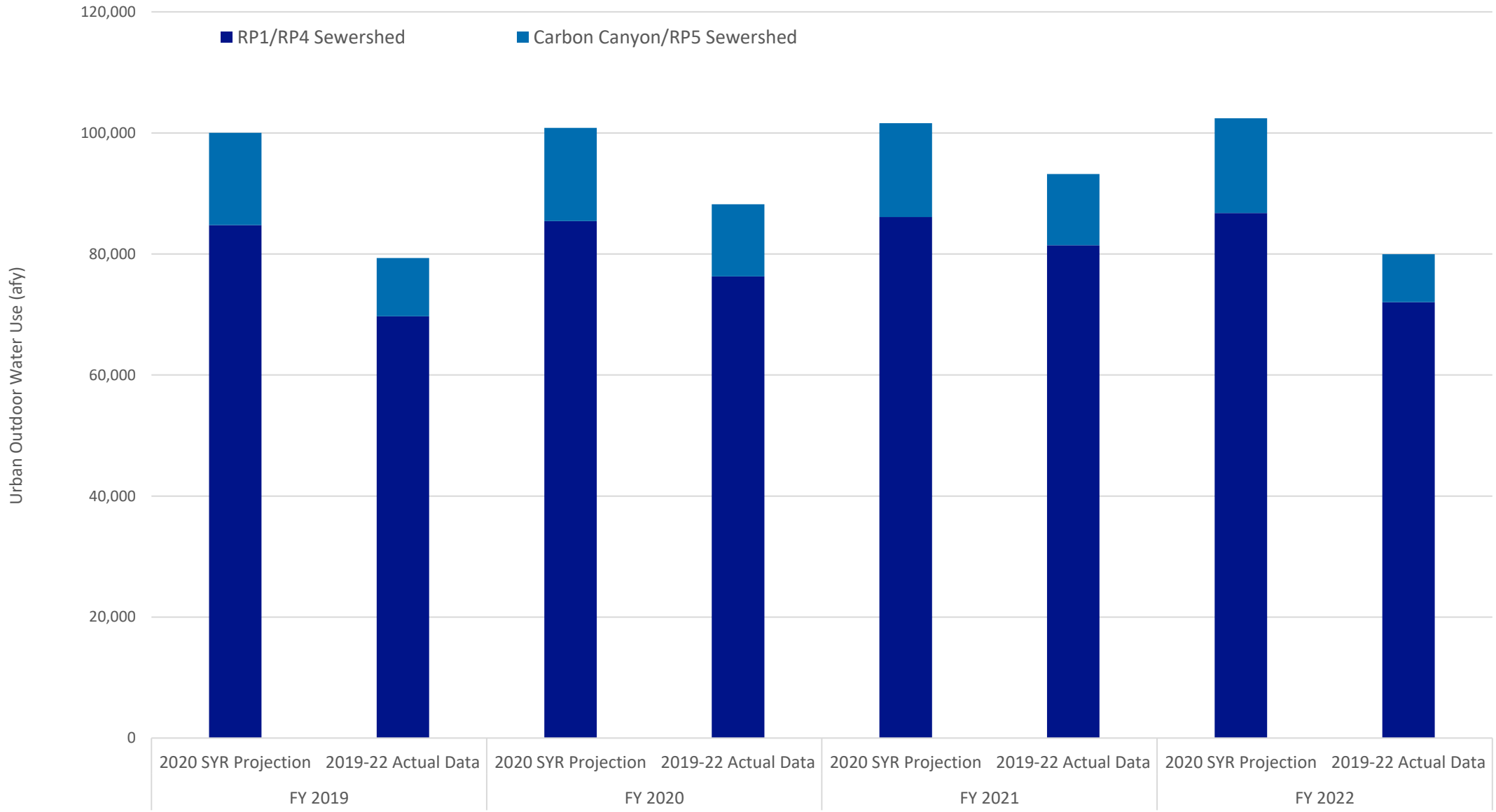
How is Actual Urban Outdoor Water Use Estimated?



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 2019-22 Actual Data and 2020 SYR Projection for Urban Outdoor Water Use



Summary and Conclusion of Impact – 2020 SYR Projection versus 2019-22 Actual Data for Urban Outdoor Water Use

- The 2020 SYR Projection for urban outdoor water use exceeds the 2019-22 Actual Data by 16,100 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

2023 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
- Discussed at December 2022 Workshop, Parties face uncertainty in:
  - Future restrictions in urban outdoor water use
  - The availability and efficacy of enforcement tools
  - Challenges in collecting reliable data on outdoor water use
- New information is insufficient to develop 2023 Projection, but expected less than 2020 SYR (consistent with 2019-22 Actual data)

Summary and Conclusion of Impact - 2020 SYR Projection versus 2023 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 2019-22 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

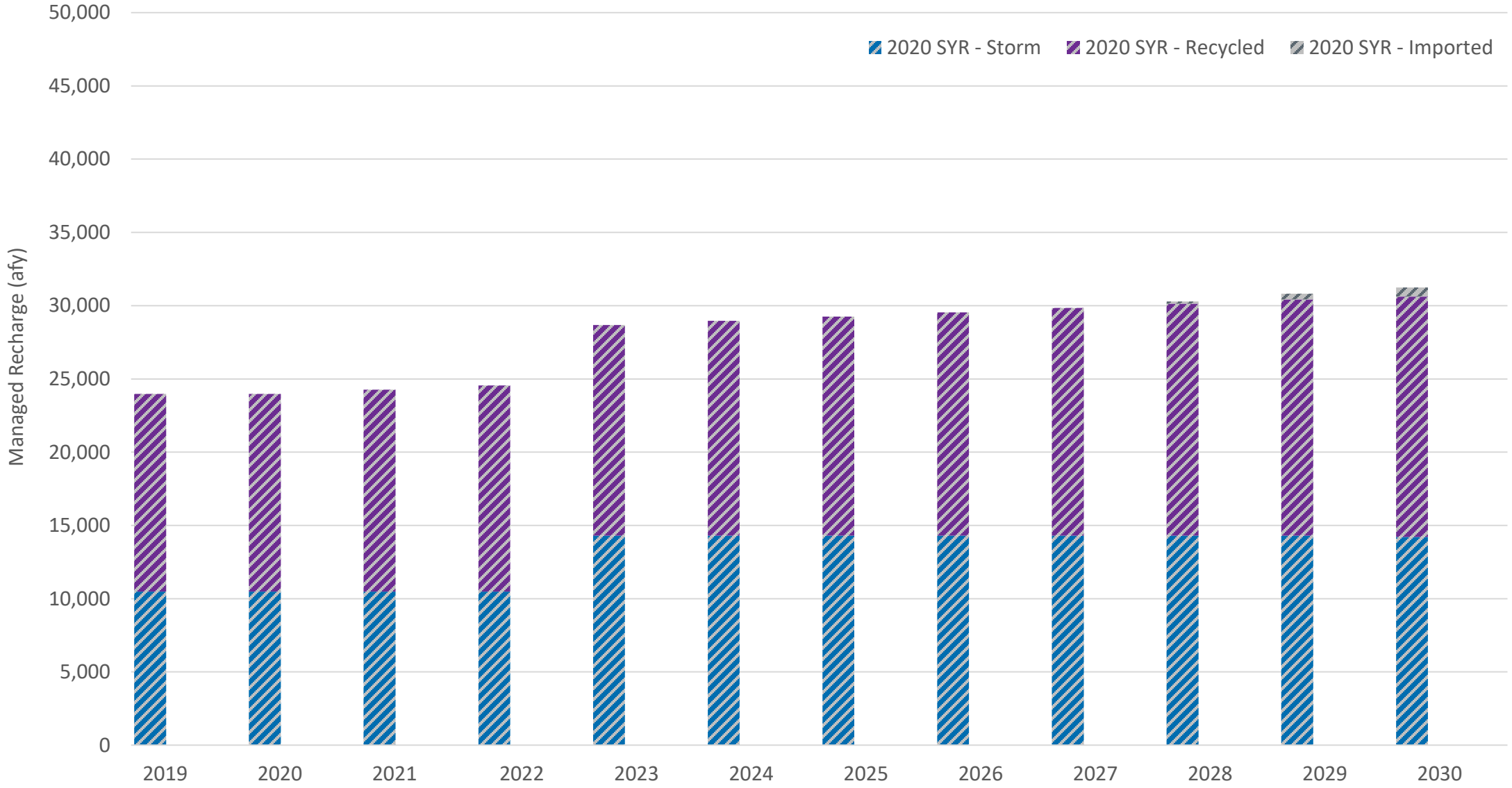
Managed Recharge in the CVM

- 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

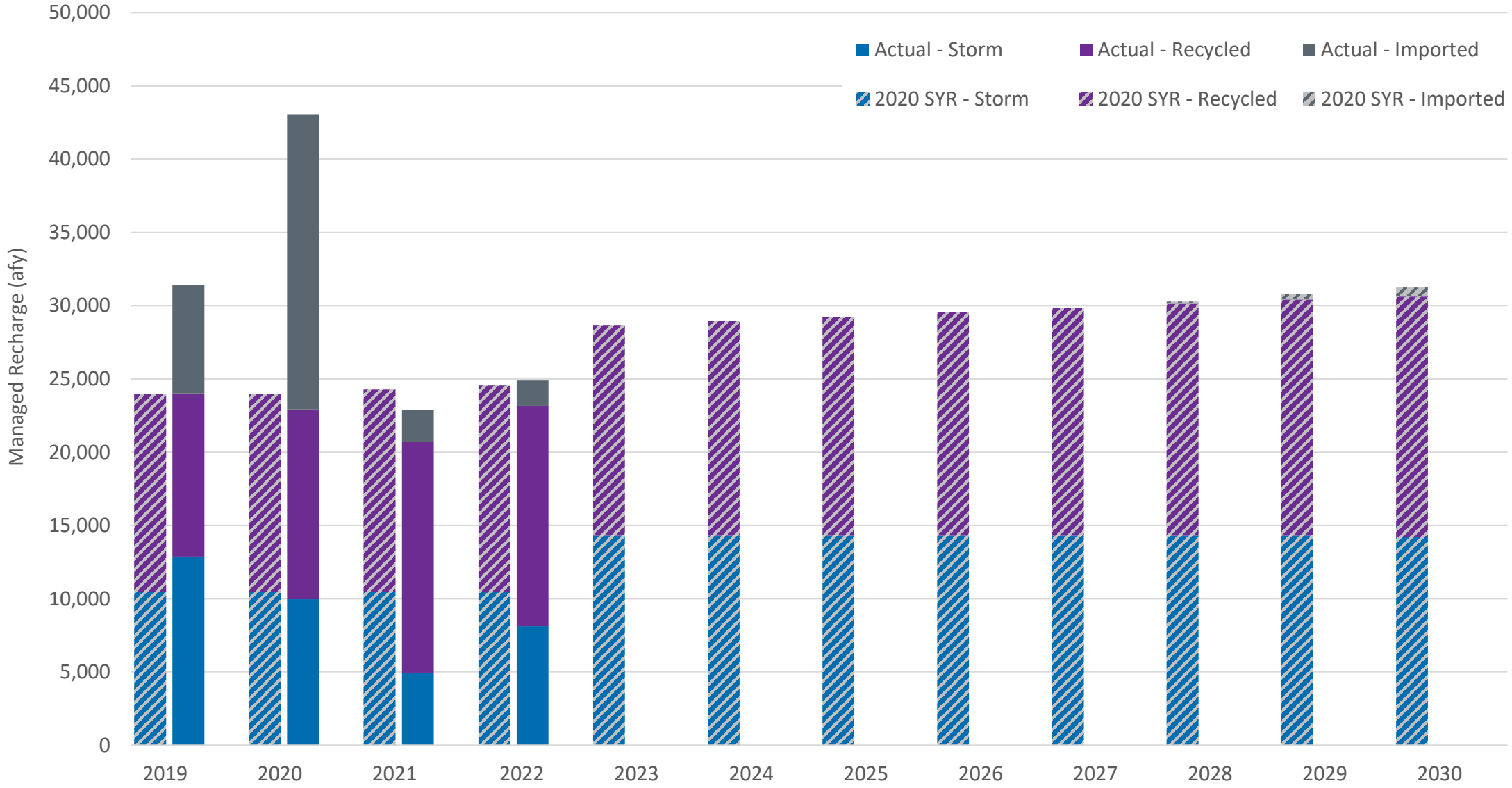
Parties' Projected Use of Managed Storage

- 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 90 percent of replenishment obligations (on average)
  - Indicated uncertainty based on future economic/water supply conditions
- 2023 Projection imported water recharge is based on 2023 Projection for groundwater pumping

Comparison of 2020 SYR Projection to Actual Managed Recharge and 2023 Projection



Comparison of 2020 SYR Projection to Actual Managed Recharge and 2023 Projection



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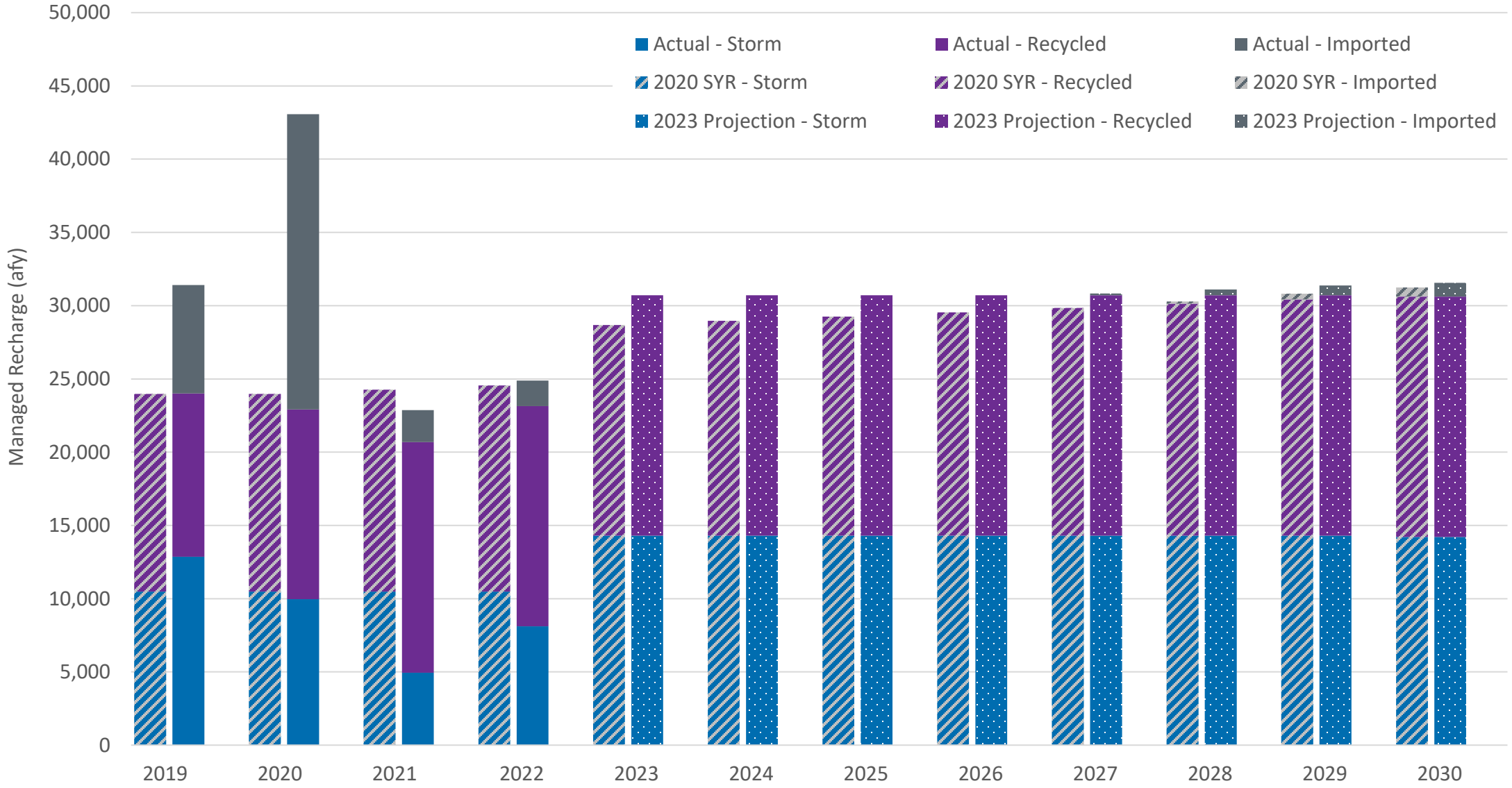
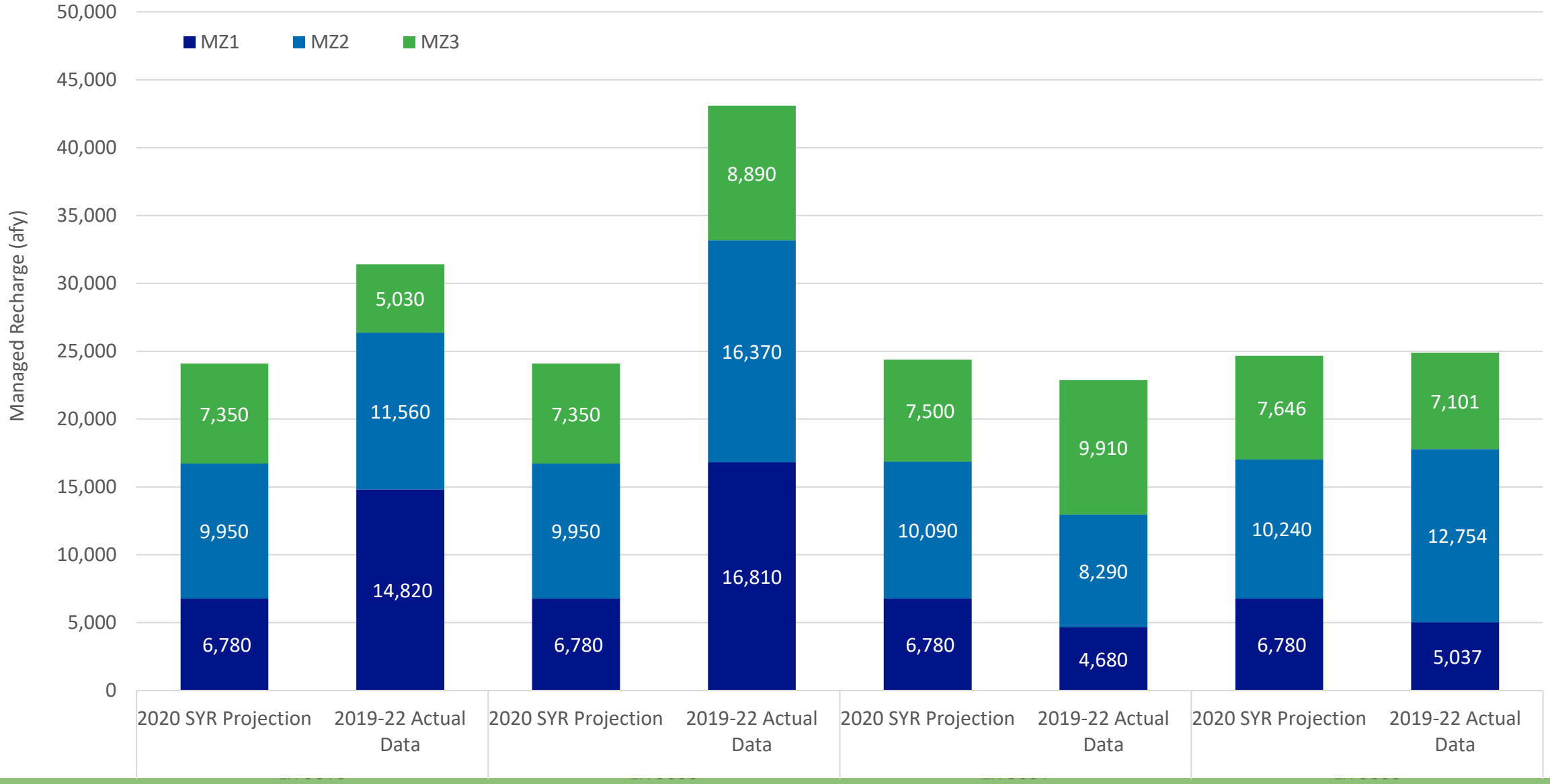


Comparison of 2019-22 Actual Data and 2020 SYR Projection for Managed Recharge – by MZ



Summary and Conclusion of Impact – 2020 SYR Projection versus 2019-22 Actual Data for Managed Recharge

- 2019-22 Actual stormwater recharge was less than the 2020 SYR Projection by an average of 1,500 afy
  - Year-to-year variation is expected.
- 2019-22 Actual recycled water recharge was about the same as the 2020 SYR Projection (13,700 afy)
- 2019-22 Actual imported water recharge was greater than the 2020 SYR Projection by an average of 7,870 afy
- 2019-22 Actual managed recharge was greater than the 2020 SYR Projection in MZ1 by an average of 3,600 afy
  - Can help support groundwater levels in MZ1 and mitigate the occurrence of land subsidence.

Summary and Conclusion of Impact – 2020 SYR Projection versus 2023 Projection for Managed Recharge

- 2023 Projection for stormwater recharge is about the same as the 2020 SYR Projection
- 2023 Projection for recycled water recharge is greater than the 2020 SYR Projection by an average of about 1,020 afy
- 2023 Projection for imported water recharge was greater than the 2020 SYR Projection by an average of about 230 afy over FY 2027-30
  - Due to higher pumping projections

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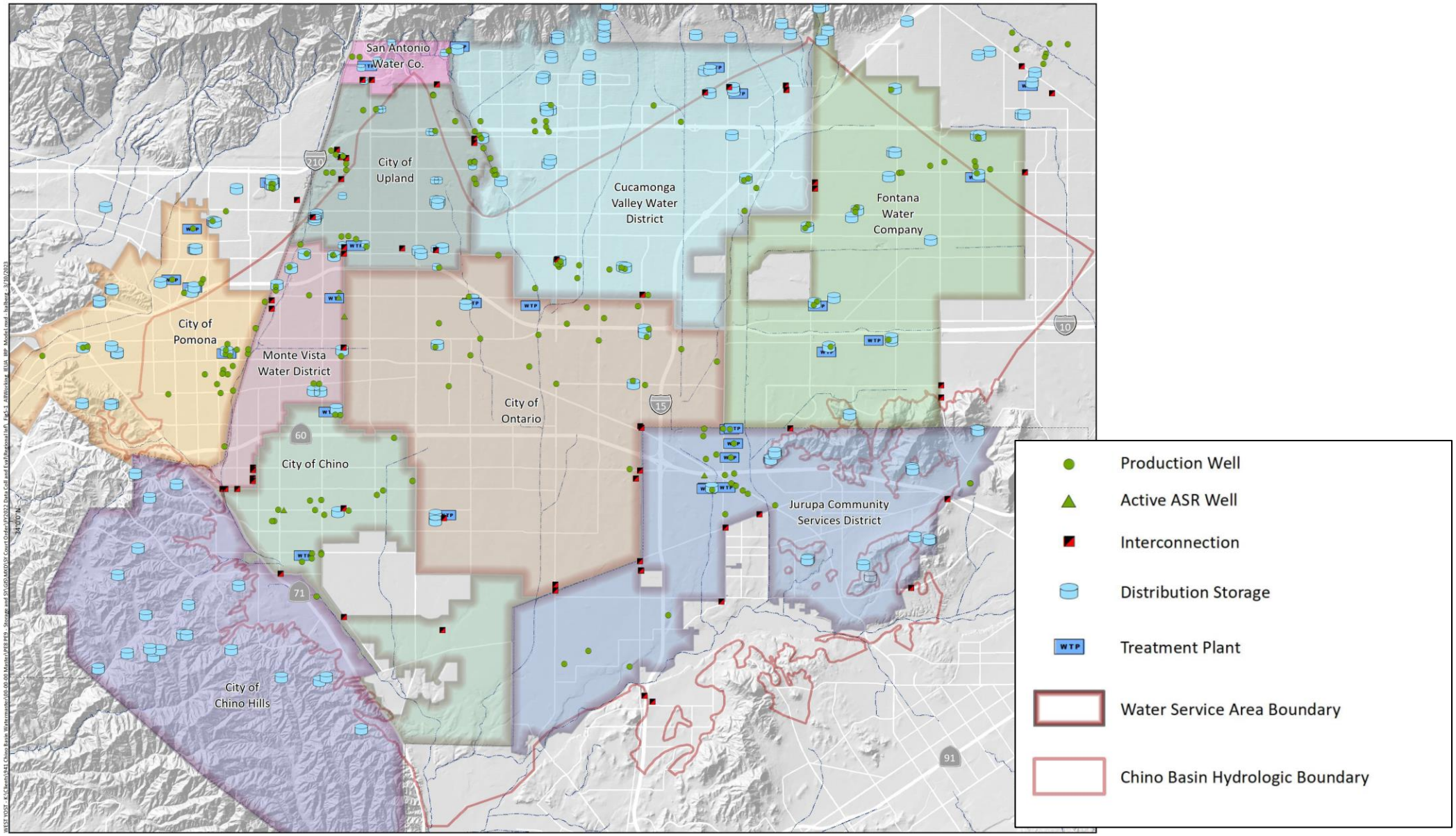
Regional Water Infrastructure

- 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
- Differences in regional infrastructure are not expected to have a significant effect on net recharge or increase risk of new undesirable results

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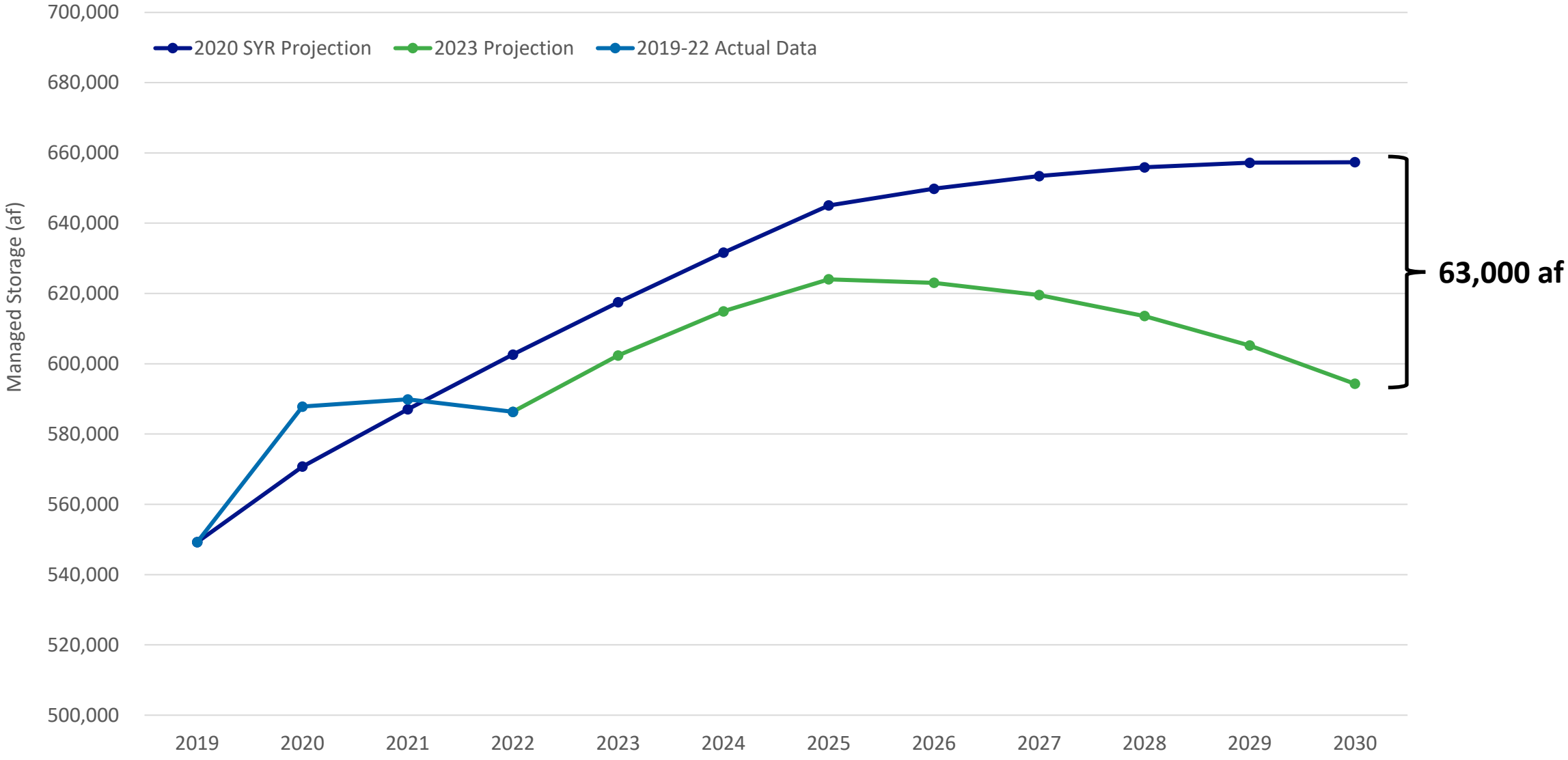
Comparison of 2019-22 Actual Data and Projected Managed Storage FY 2019 - 2030



Key Takeaways from Today's Workshop

- The 2019-22 Actual Data and 2023 Projection for managed storage is 63,000 af less than the 2020 SYR → potential for **more** net recharge compared to 2020 SYR
  - Assuming a linear relationship between managed storage and net recharge:
    - Unlikely to result in lower groundwater levels and a greater net recharge by FY 2030
    - May result in a net increase of 800 afy in net recharge at end of FY 2030
- The 2019-22 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 effect of differences in managed storage and urban outdoor water use on net recharge **offset each other**
  - Anticipate deviation of net recharge less than 2.5% compared to current Safe Yield

Key Takeaways from Today's Workshop (cont.)

- 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 and pumping sustainability challenges that were not identified in the 2020 SYR.
- The 2019-22 Actual Data and 2023 Projection for land use 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 2019-22 Actual and 2023 Projection for groundwater pumping exceeding the 2020 SYR Projection.
    I. Complete and implement a subsidence management plan for MZ1
    II. Collaborate with JCSD and other Parties with pumping wells in areas with an increased risk for pumping sustainability challenges
2. Develop multiple projection scenarios for the 2025 Safe Yield Reevaluation that represent the maximum range in future cultural conditions.

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Next Steps and Schedule

- Summarize feedback from today's workshop
- Please provide any additional feedback by Friday, April 21st
- Report will be finalized in April and included in May Watermaster process


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WATERMASTER
Partners in Basin Management

THANK YOU