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Borrego Springs Watermaster

Technical Advisory Committee Meeting

November 19, 2024

Today's Agenda

1. Public Comment
2. Review of Board and Public Comments on the draft Redetermination of the 2025 Sustainable Yield
3. Draft Scope of Work for the 2030 Redetermination of the Sustainable Yield
4. Analysis of Carryover Rules
5. Draft Results of the Storage Change Calculation for Spring 2023 to Spring 2024
6. Public Comment

Redetermination of the 2025 Sustainable Yield

- 2025 Sustainable Yield must be redetermined by January 1, 2025
- 2025 Sustainable Yield was the primary topic of discussion at:
  - Stakeholder Open House
  - November 7, 2024 Board Meeting
- Board and public provided verbal comments
  - Written comments were accepted through November 14, 2024

Public Comments

Comments/questions focused on the technical work performed to estimate 2025 Sustainable Yield.

- Specific questions are documented in agenda package memo

Members of the public recommended that the Board adopt:

- Sustainable Yield of 7,952 afy based on the majority TAC recommendation
- Sustainable Yield of 7,900 afy because this does not imply a level of accuracy to the nearest acre-foot

Board Member Comments

- The most defensible Sustainable Yield is derived from the "most defensible" version of the BVHM (*i.e.,* 7,952 afy) because that represents best available science
- Adopt a Sustainable Yield with a rounded value to avoid implying a level of accuracy to the nearest acre-foot
- Express a range of uncertainty along with the redetermined Sustainable Yield
  - Use the results of the uncertainty analysis
- How is the Technical Consultant's recommendation of 7,900 afy representative of best available science?
- Pumpers will not experience a significant difference in their Rampdown schedule if the adopted Sustainable Yield falls within the range of uncertainty of 7,800 to 7,952 afy

Next Steps

- **November 22, 2024:** TAC members submit revisions to TAC Recommendation Report
  - *Note*: Technical Consultant plans to revise its Recommendation Report to include discussion of best available science
- **December 2, 2024:** TAC Recommendation Report finalized and published
- **December 5, 2024:** Board meeting to consider adoption of 2025 Sustainable Yield*

*If needed, the 2025 Sustainable Yield can be discussed at future TAC and Board meetings in December, 2024

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3. **Draft Scope of Work for the 2030 Redetermination of the Sustainable Yield**
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2030 Scope of Work

- The Judgment requires the Board to approve a scope of work for WY 2026-2029 to redetermine the 2030 Sustainable Yield by January 1, 2025
  - Scope of work should rely on best available science
- Scope will be used by the Board to establish budget priorities for WY 2026-29
- Work Completed To-Date:
  - TAC provided recommendations and rankings for potential tasks
  - West Yost presented the TAC recommendations/rankings at the November Board meeting
  - West Yost has incorporated Board feedback and revised the presentation of the potential scope into logical workflows
- **Today's Objective**: Solicit TAC input on the scope of work and workflows to support the preparation of the draft TAC Recommendation Report

Board Comments

- Focus on monitoring. We don’t need to develop a perfect model.
- Available financial resources should be considered in recommending a scope of work – financial resources are limited absent grant funding
- The TAC recommendations and rankings will be useful for the Board in making their decision to approve a scope of work

Minimum Required Scope of Work

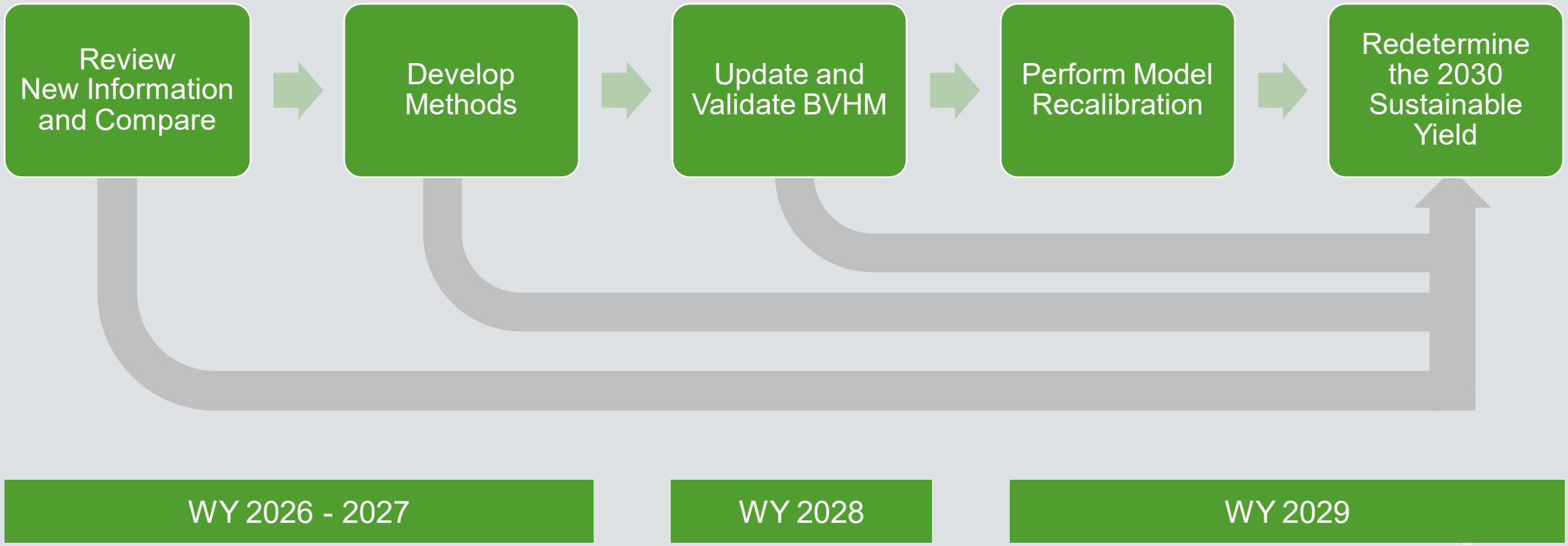
- **Objective:** Determine 2030 Sustainable Yield ***efficiently*** and at the ***lowest cost***
  - No further improvements to the BVHM
  - Use same methods to determine the Sustainable Yield as in 2025 effort
- **Steps:**
  1. Extend BVHM through WY 2028 (using updated data – metered pumping, land use, precipitation, ET)
     - This involves no model improvements, just adding data to run the model through WY 2028
  2. Use historical water budget from BVHM to calculate Sustainable Yield (natural inflows – natural outflows)
- **This is the minimum scope of work that could be implemented to redetermine the 2030 Sustainable Yield**
- **Limitation:** This scope may not be considered relying on Best Available Science

Additional/Optional Tasks

- These are optional tasks that *could be* implemented to improve the BVHM and its ability to estimate the water budget
- **Tasks are sometimes inter-dependent**→ results of one task may require performing another task
- Tasks can be recommended *only if* outside funding is available (*i.e.,* grants)
- Costs are reported as a range because exact scope is not yet determined

Workflow for Additional/Optional Tasks

- There are several potential optional tasks
- The proposed workflow allows the work to be performed in logical steps, with offramps



Review New Information

- Optional tasks that *could* improve the BVHM and its ability to estimate the water budget
- **Tasks are inter-dependent**→ results of one task may require performing another
- Tasks can be recommended *only if* outside funding is available (*i.e.* grants)
- Costs are reported as a range because exact scope is not yet determined

Step 1. Review New Information and Compare

- AEM survey
- Metered vs. FMP-estimated pumping
- Methods to estimate natural inflows
- GDE study results
- Other model platforms

Step 2. Develop Methods

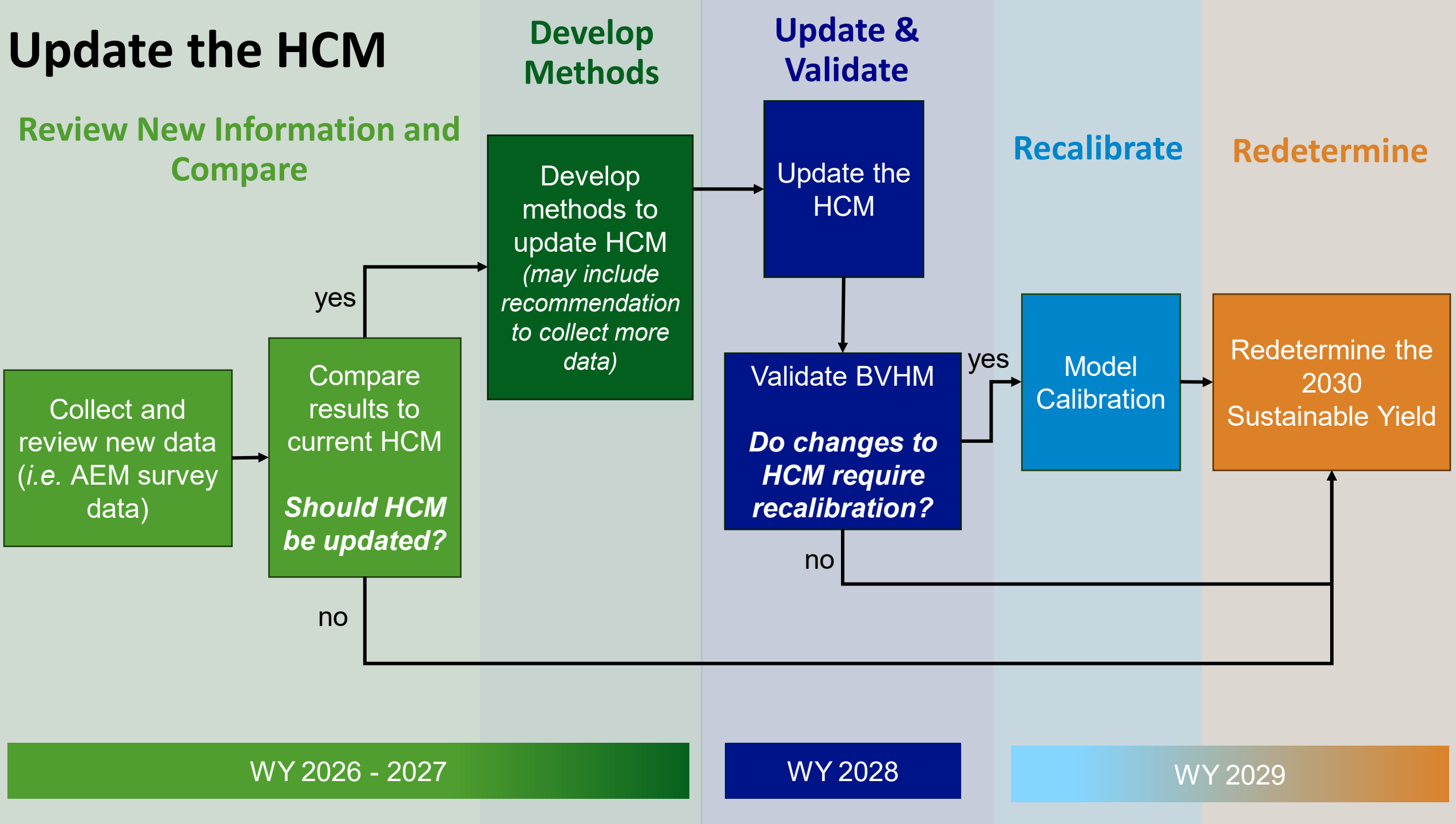
Step 3. Update & Validate BVHM

Step 4. Perform Model Recalibration

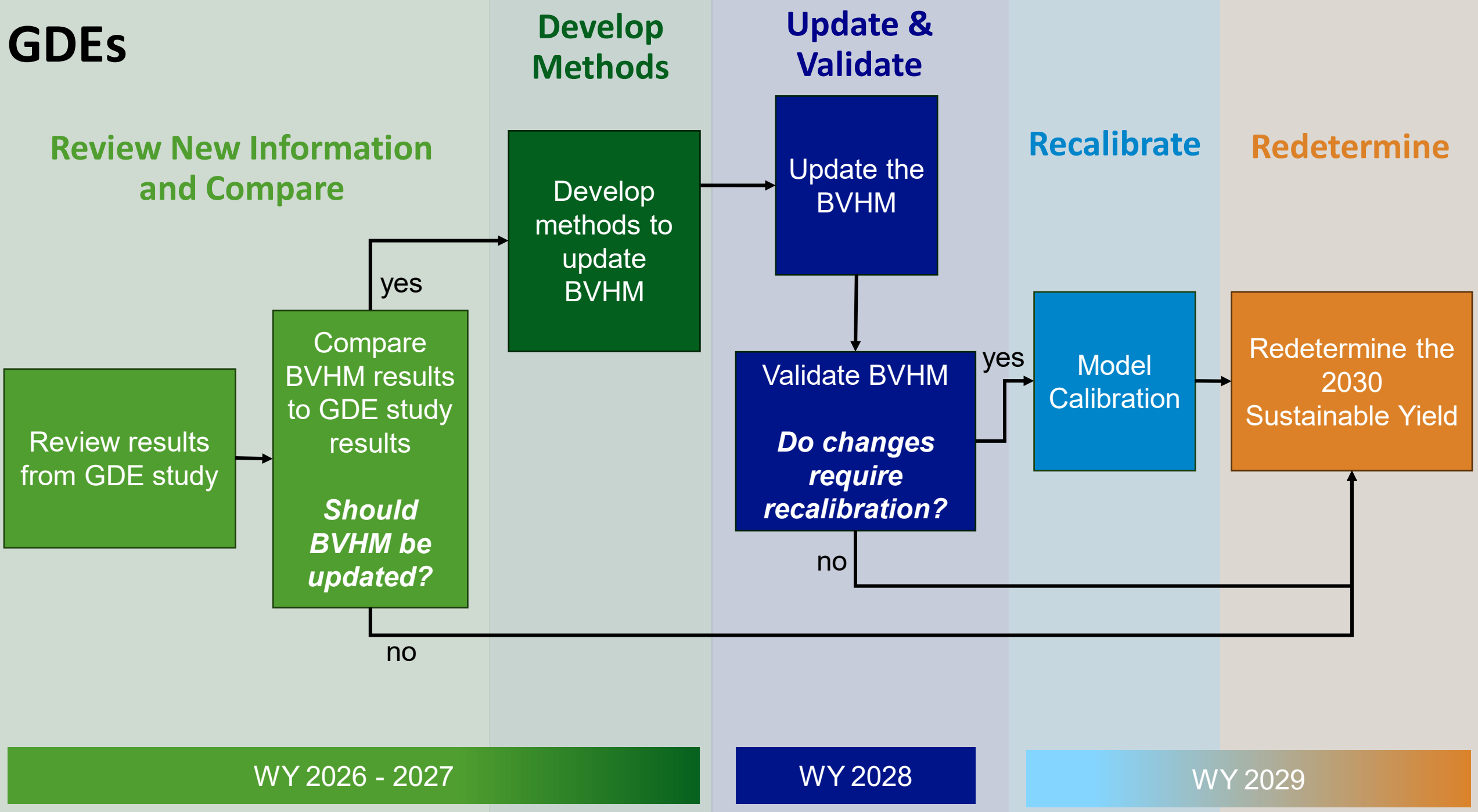
Step 5. Redetermine the 2030 Sustainable Yield

Level of effort for Steps 2-5 are dependent on outcomes of Step 1

Update the HCM



GDEs


Review New Information and Compare
Develop Methods
Update & Validate
Recalibrate
Redetermine
Review results from GDE study
Compare BVHM results to GDE study results
Should BVHM be updated?
yes
no
Develop methods to update BVHM
Update the BVHM
Validate BVHM
Do changes require recalibration?
yes
no
Model Calibration
Redetermine the 2030 Sustainable Yield
WY 2026 - 2027
WY 2028
WY 2029

Improve the FMP

Review New Information and Compare

Extend BVHM through WY 2026

Collect metered pumping data for WY 2023-26

Compare FMP-estimated pumping to actual pumping

Should the FMP be improved?

yes

no

Develop Methods

Develop methods to improve FMP

Potential tasks:

- Determine actual ET
- Confirm OFE or KC values
- Confirm return flows

Update & Validate

Update the FMP

Validate FMP

Do changes to FMP require recalibration?

yes

no

Recalibrate

Model Calibration

Redetermine

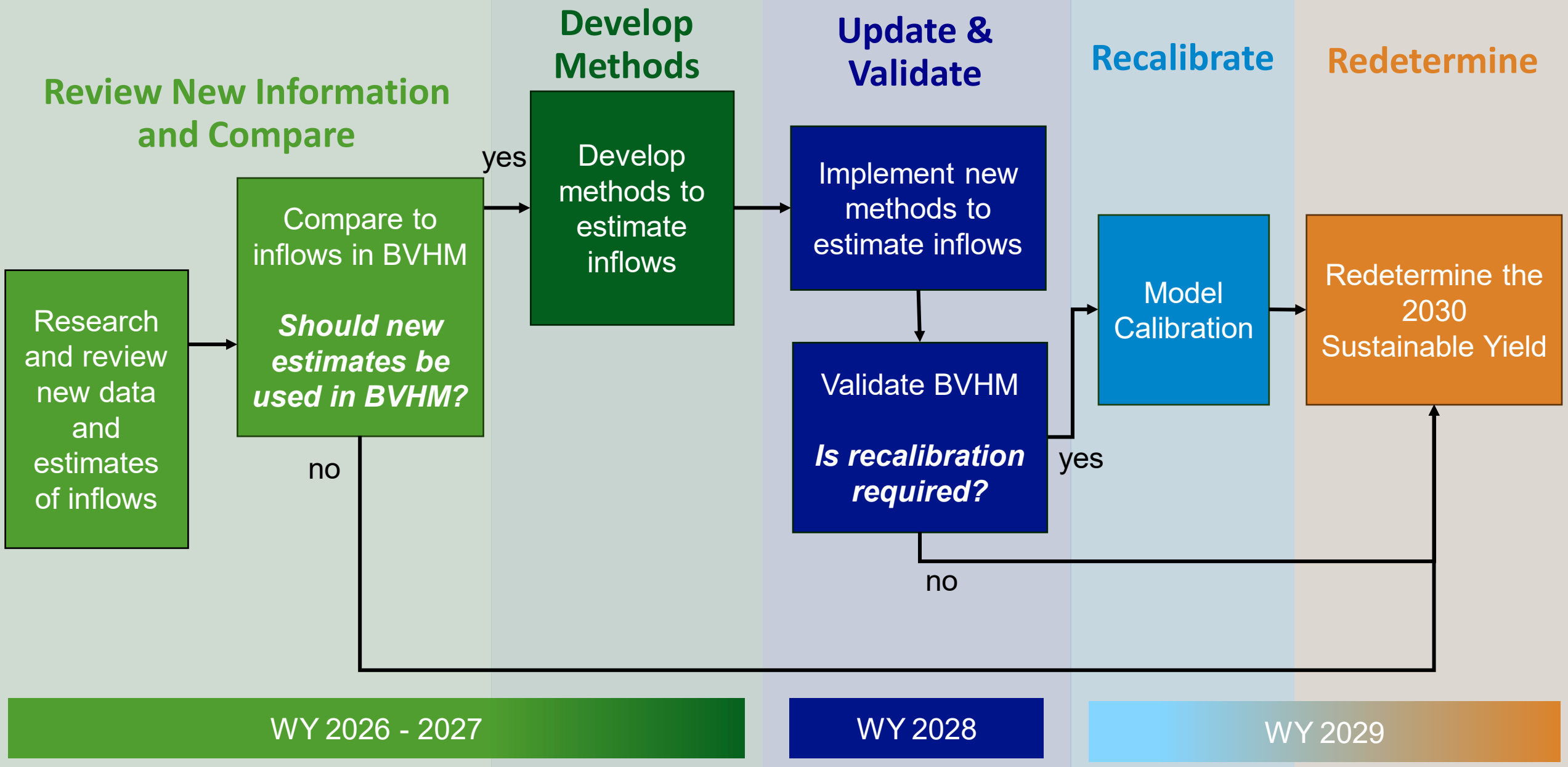
Redetermine the 2030 Sustainable Yield

WY 2027

WY 2028

WY 2029

Develop Methods to Estimate Inflows



Upgrade the BVHM

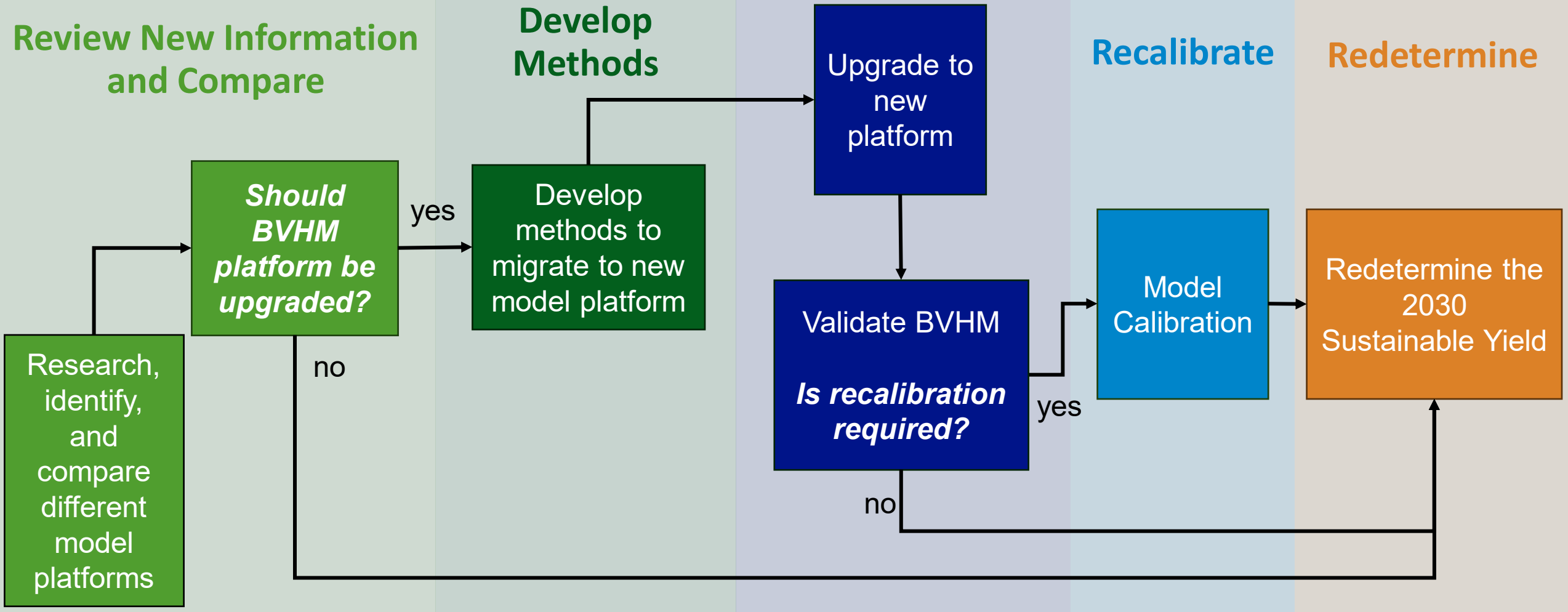
Review New Information and Compare

Develop Methods

Update & Validate

Recalibrate

Redetermine



WY 2026 - 2027

WY 2028

WY 2029

Technical Consultant Recommendation:

Scope of Work that relies on Best Available Science

1. **Review new information and compare to BVHM:**
   - AEM data (WY 2026)
   - GDE study results (WY 2026)
   - Compare FMP-estimated pumping to Actual Pumping WY 2023 – 2026 (WY 2027)
2. **Develop methods and improve/validate BVHM (WY 2028)** (*only if needed, based on outcomes of step #1)*
3. **Recalibrate (WY 2029)** (*only if needed, based on outcomes of step #2)*
4. **Redetermine the 2030 Sustainable Yield (WY 2029)**

*All other tasks should **only** be considered if grant funding is available*

Next Steps

- **November 19, 2024 TAC meeting**: TAC verbal comments on recommended tasks and rankings
- **November 22, 2024**: TAC written comments on recommended tasks and rankings
- **November 27, 2024**: *Draft* TAC Recommendation Report distributed for TAC review
- **December 5, 2024:** Watermaster Board meeting to discuss the Scope of Work
- **December 6, 2024:** TAC comments due on the *draft* TAC Recommendation Report
- **December 9, 2024:** TAC meeting to discuss TAC and Board comments on the Scope of Work
    - The TAC may decide to revise the TAC Recommendation Report based on discussion and feedback from the December 5th meeting.
- **December 16, 2024:** *Final* TAC and Technical Consultant Recommendation Reports published
- **December 19, 2024:** Watermaster Board meeting to discuss and consider approval of the Scope of Work

For Discussion

- **Does any TAC member disagree with the workflow concept?** (e.g. that later steps are dependent on the outcome of evaluating new data and information and comparing it to the existing model)
  - Peterson – agrees with workflow concept

For Discussion

- **What new data and information should be prioritized for analysis in WYs 2026 and 2027, if any?**

New Data or Information	Bennett	Detweiler	Driscoll	Peterson	Wagner	Watson
Metered data/FMP	Yes		Yes	Yes		Yes
DWR AEM data	Low priority		Low priority			Low priority
GDE study results			Yes	Yes	Yes	Yes
Natural inflows:						
- Direct measurements	Difficult to do			Difficult to do	Difficult to do	Difficult to do
- Evaluate/update BCM			#1			
Other model platforms	Low priority		Low priority	Low priority	Yes – if funding	Yes – if funding
Groundwater-level data collection (GWMP)	Yes		Yes – 2 more yrs of collection	Yes - SMA	Yes	Yes

Questions

- Should we look at new data to determine if we should update the HCM data, including at a minimum the DWR AEM data – **YES or NO**
  - If yes, what year should this be done?
- Should we look at new information from the GDE Study to determine if we need to change the model to better account for shallow groundwater ET – **YES or NO**
  - If yes, what year should this be done?
- Should we check if the FMP needs to be updated by comparing new metered data to FMP estimated pumping – **YES or NO**
- Should we scope out an effort to analyze and update the BCM? – **YES or NO**
- Should we scope out an effort to update the BVHM model platform? – **YES or NO**

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Carryover Rules (Judgment Section)

- **Carryover Definition.** Any portion of a Party's Annual Allocation not Pumped in the Water Year in which it is allowed, which may be accrued and produced in future Water Years, provided that the Party complies with the provisions of Section III.B (I.A)
- **Carryover Limits:** A Party can accrue Carryover up to two times their current Baseline Pumping Allocation (BPA) (III.B)
- **Carryover Elections.** During the water rights accounting process, each Party is given the opportunity to purchase unused Annual Allocation as Carryover. Carryover is paid for in the Annul Pumping Assessment as thought is was pumped in the prior year. Parties not in good standing are not eligible to purchase Carryover (IV.E.3)
- **Accounting of Carryover towards Pumping and Overproduction.** The first water pumped each year is Carryover. When calculating a Party's annual water use, any Carryover is applied first, followed by any leased Annual Allocation, and then the Party's current Annual Allocation. If Overproduction occurs, Carryover is applied first to offset the Overproduction (Section III.G)

Carryover Rules (Judgment Section)

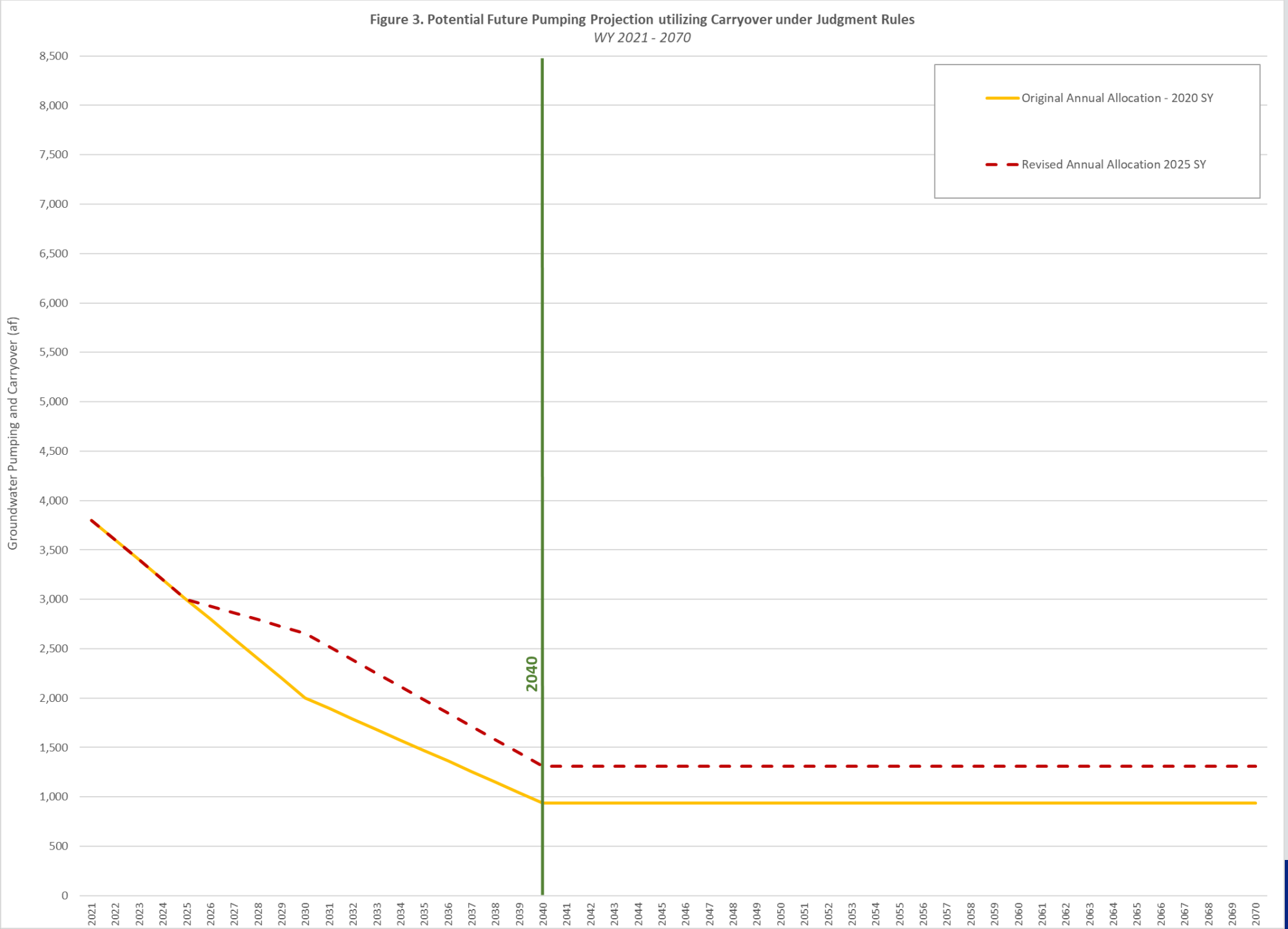
- **Duration of Carryover.** The Judgment does not specify an expiration date on accrued Carryover, other than to require that Carryover be accounted as the first water pumped each year
- **Accounting of Accrued Carryover:**
  - If Basin-wide reductions in pumping are required, the reductions will be achieved through additional Rampdown of BPA, not reductions to accrued Carryover (III.B)
  - Once Carryover has been accrued under the existing rules, those rules cannot be retroactively changed in a way that affects previously accumulated Carryover (III.B)
- **Evaluation of Carryover:** Carryover will be re-evaluated by January 1, 2025, by Watermaster, with consultation of the TAC (III.B)

Questions to Consider in Evaluating Carryover Rules

OBJECTIVE: Perform a ***simple analysis*** of the Carryover rules to make a recommendation to the Board, and obtain Board approval, by January 1, 2025.

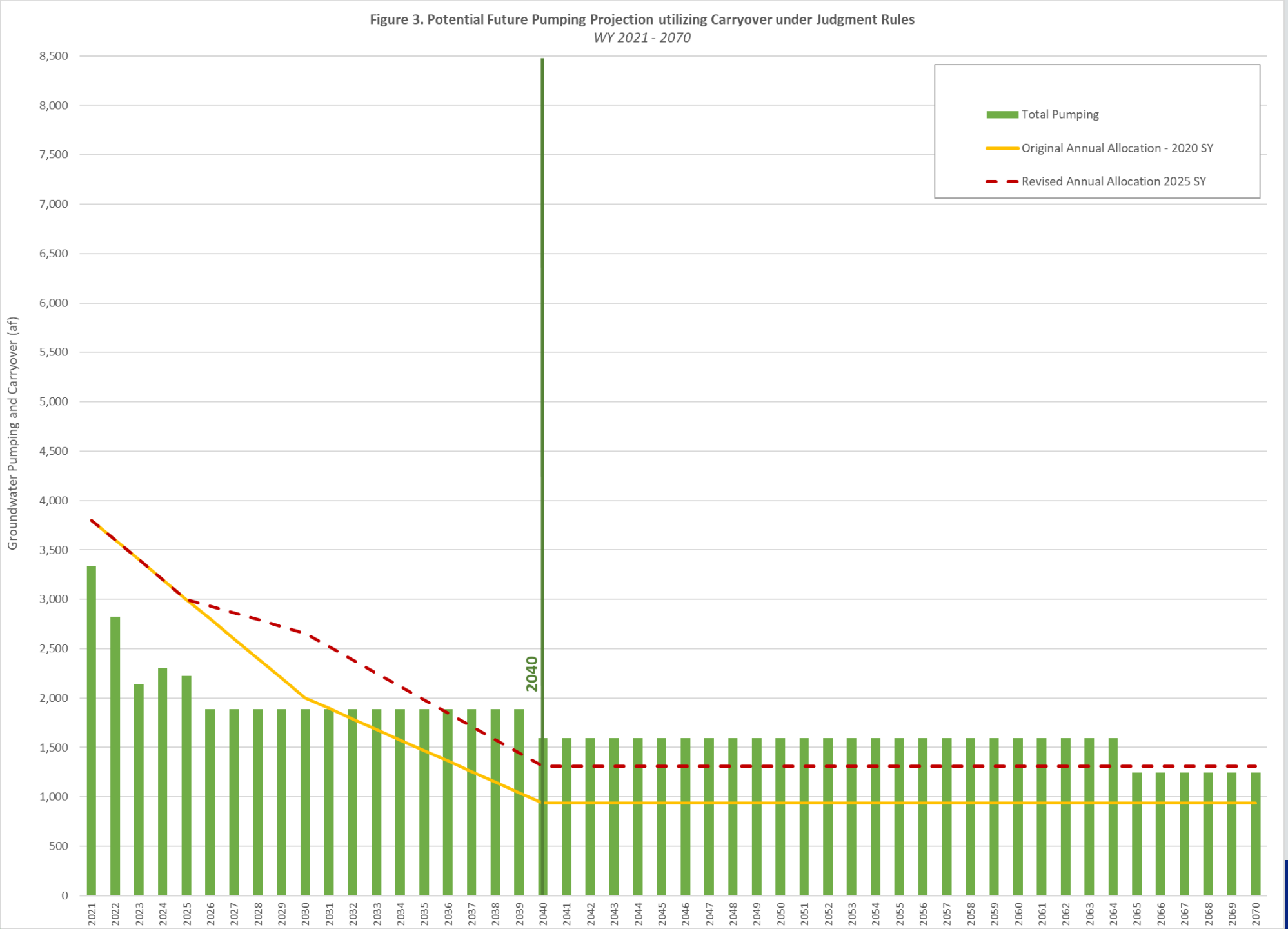
Proposed Question to Answer:

- Could Carryover rules enable Parties to pump in excess of the Sustainable Yield beyond 2040?
- If yes, will this lead to Undesirable Results?



Could Carryover rules enable Parties to pump in excess of the Sustainable Yield beyond 2040?

- Example Projection based on a subset of BPA rights equal to 4,000 acre-feet
  - Approximates aggregate plans of several Parties who have provided details
- Rampdown Schedule
  - 2020 SY
  - 2025 SY

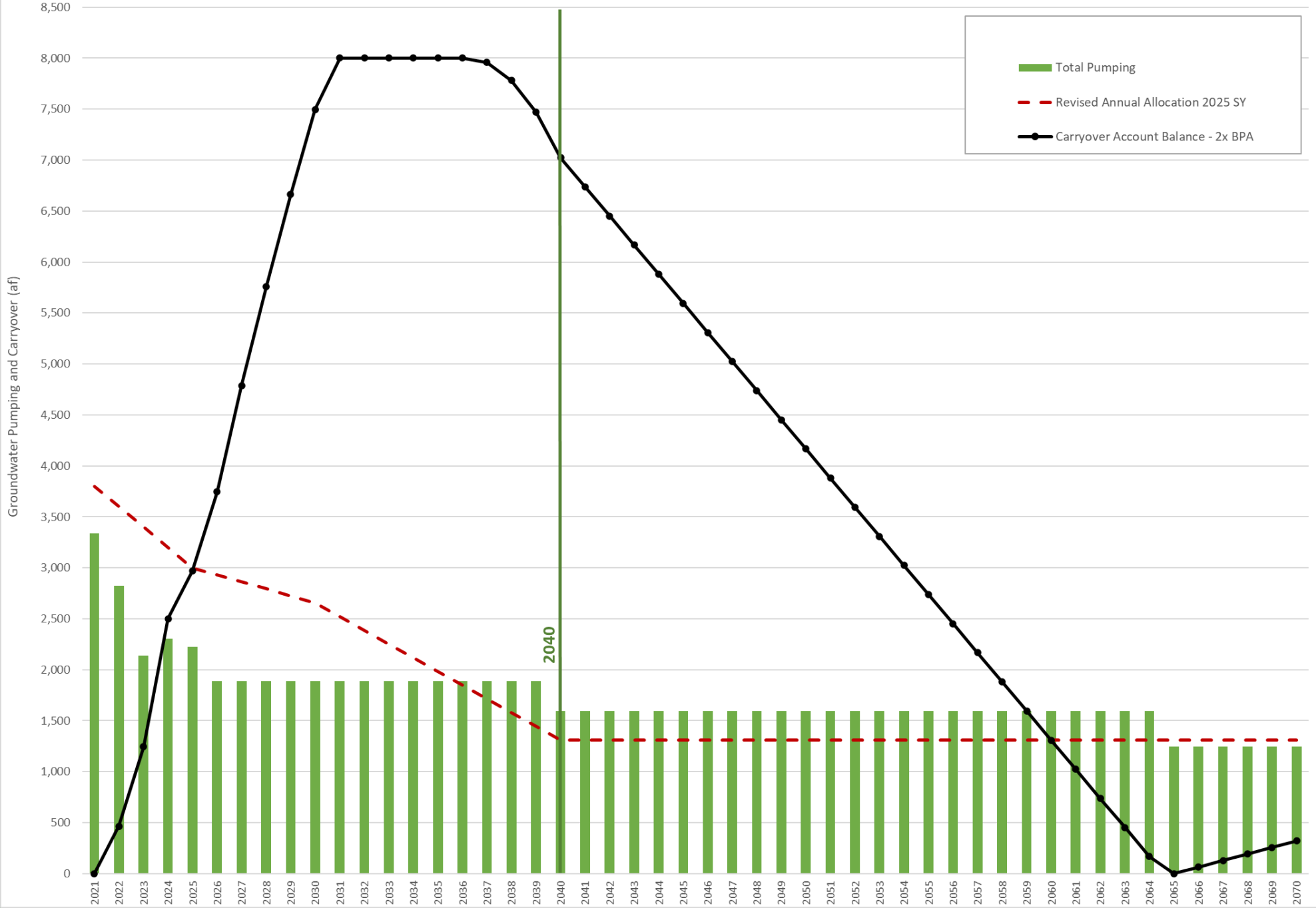


Could Carryover rules enable Parties to pump in excess of the Sustainable Yield beyond 2040?

- Example Projection based on a generalized subset of BPA rights equal to 4,000 acre-feet
- Rampdown Schedule
  - 2020 SY
  - 2025 SY
- Projected Pumping
  - Ahead of schedule
  - Step-wise Rampdown consistent with pumper plans

Figure 3. Potential Future Pumping Projection utilizing Carryover under Judgment Rules

WY 2021 - 2070



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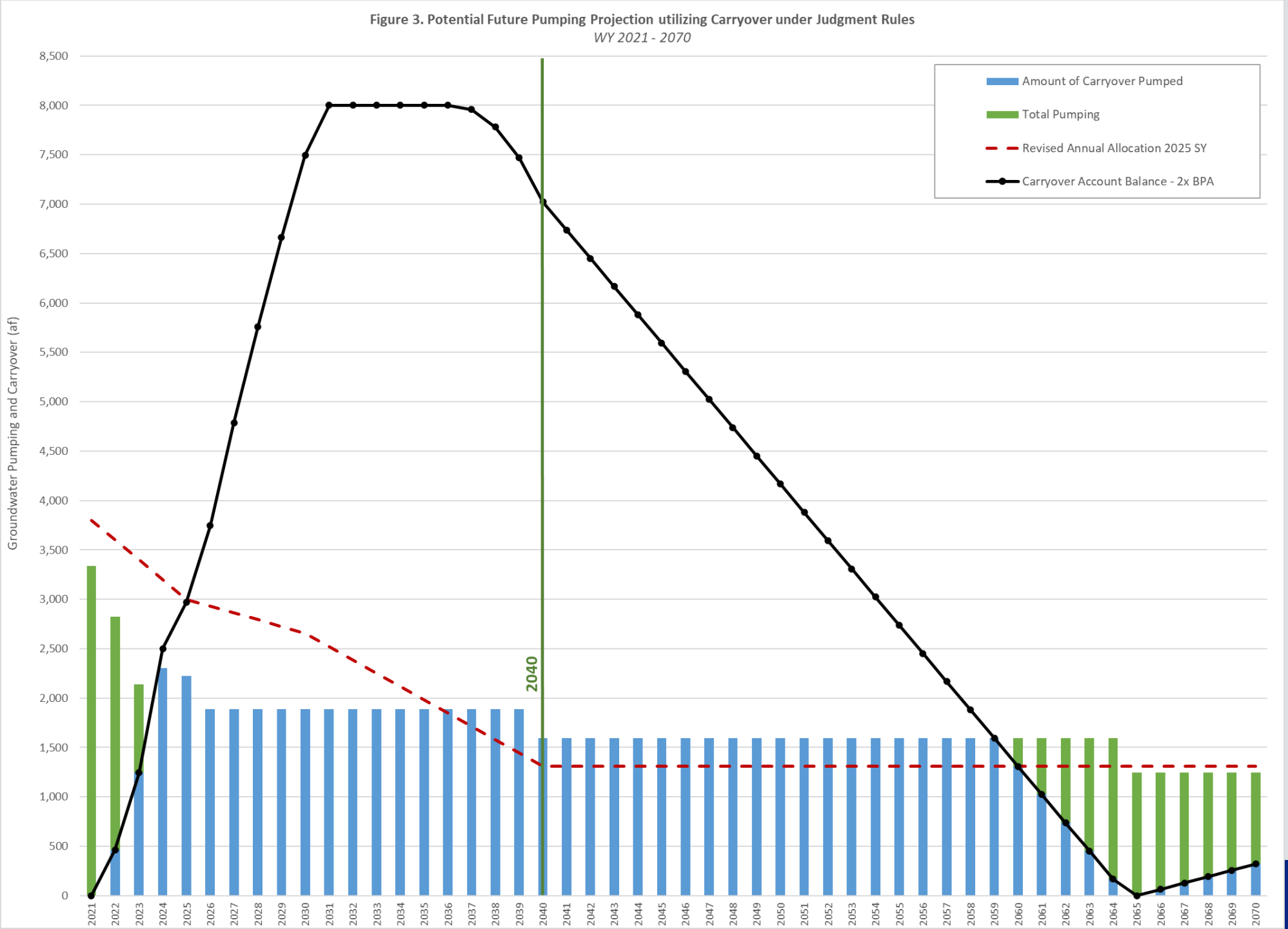
- Rampdown Schedule
  - 2020 SY
  - 2025 SY
- Projected Pumping
  - Ahead of schedule
  - Step-wise Rampdown
- Carryover Accounting
  - Account Balance



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- Example Projection based on a generalized subset of BPA rights equal to 4,000 acre-feet
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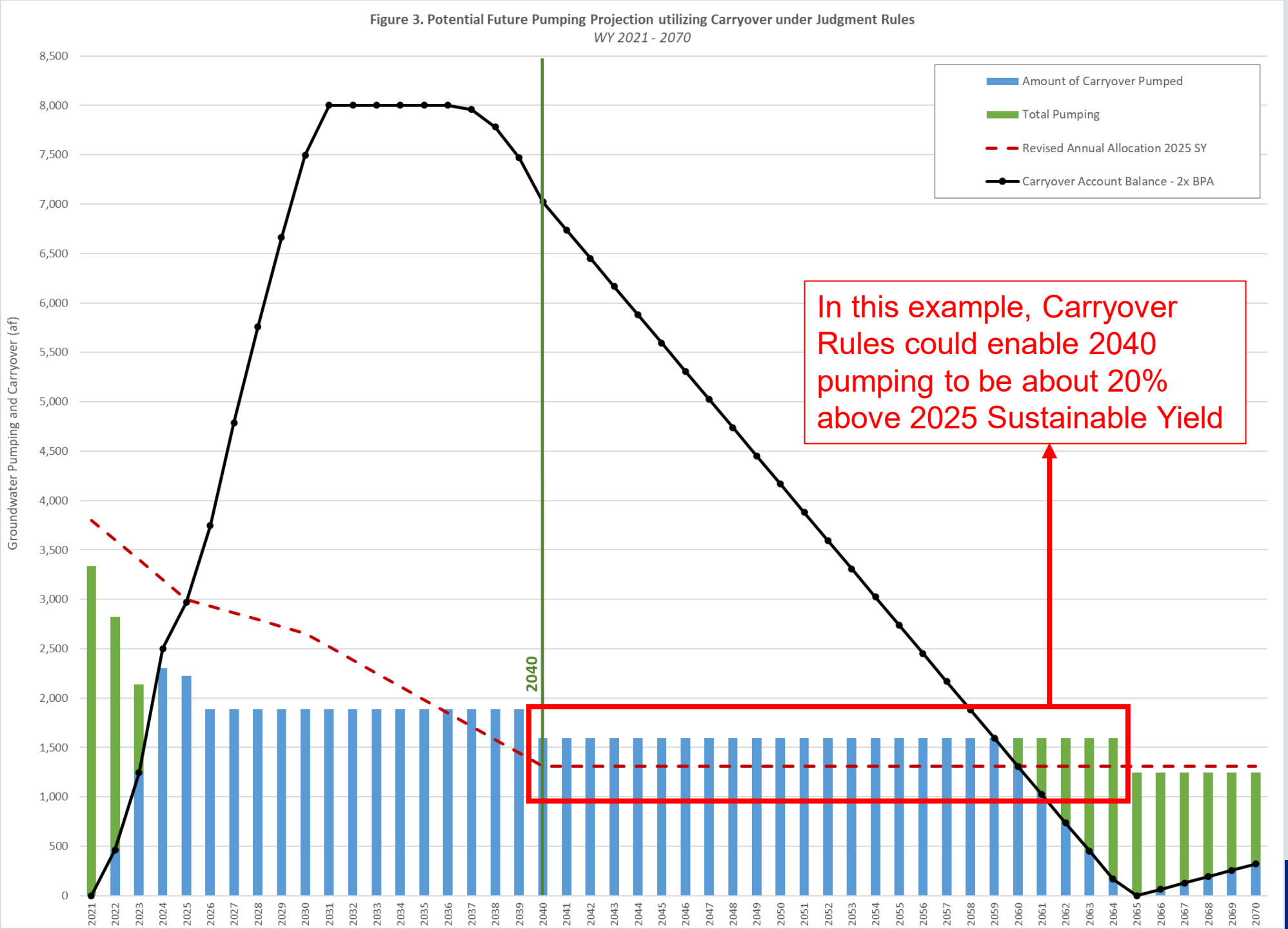
  - 2025 SY
- Projected Pumping
  - Ahead of schedule
  - Step-wise Rampdown
- Carryover Accounting
  - Account Balance
  - Carryover Pumped

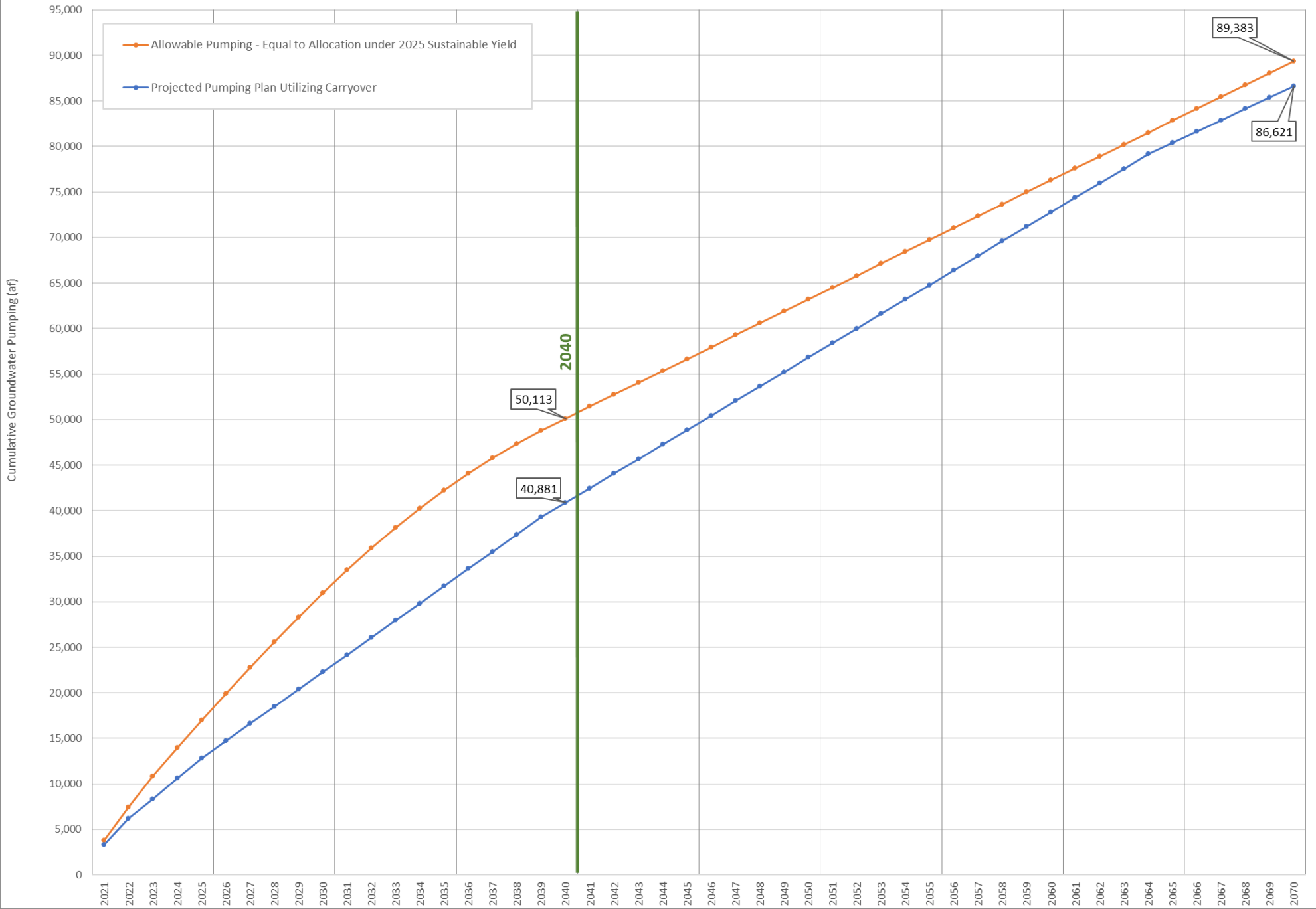


Could Carryover rules enable Parties to pump in excess of the Sustainable Yield beyond 2040?

- Example Projection based on a generalized subset of BPA rights equal to 4,000 acre-feet
- Rampdown Schedule
  - 2020 SY
  - 2025 SY
- Projected Pumping
  - Ahead of schedule
  - Step-wise Rampdown
- Carryover Accounting
  - Account Balance
  - Carryover Pumped

Figure 4. Comparison of Cumulative Pumping: Allowable under Annual Allocation vs. Projected Pumping Using Carryover

WY 2021 - 2070



Will pumping in excess of SY lead to Undesirable Results (UR)?

- Example Projection based on a generalized subset of BPA rights equal to 4,000 acre-feet
- Through 2070, pumping is less than allowable rights under Rampdown allocations, even if greater than SY beyond 2024
- Through 2040, pumping is significantly less than allowable under Rampdown
- Modeling is necessary to assess long-term potential for URs

Questions to Consider in Evaluating Carryover Rules

- Could Carryover rules enable Parties to pump in excess of the Sustainable Yield beyond 2040? If yes, will this lead to Undesirable Results?
  - Yes, there is a potential for pumping to exceed the Sustainable Yield for some Parties based on current pumping plans of the Parties under existing Carryover Rules
  - In the short term (through 2040), there are unlikely to be Undesirable Results as Parties are ahead of schedule on the required Rampdown
  - Modeling is needed to assess potential for long-term Undesirable Results – this will be done as part of pumping projections analysis (to be completed by March 2025)

Limitations and Recommendations

- Limitations of Analysis (including pending modeling analysis):
  - Although there is a demonstrated potential for pumping to exceed Annual Allocations of WY post 2040, it is still early in the Rampdown implementation and Parties are uncertain as to exactly how things will change in the next 5-10 years
- Draft Recommendation to the Board
  - It is too soon to make a definitive finding that existing Carryover rules could lead to Undesirable Results beyond 2040
  - Use model to assess the long-term sustainability of the current Carryover rules under Parties' current best guess of future pumping:
    - What are the water level and storage outcomes if parties pump in excess of the Sustainable Yield as enabled by the Carryover rules?
  - Carryover Rules should be revisited in 2030 as part of the 2030 Sustainable Yield update process when there is more certainty of future pumping plans

Next Steps

- **November 18, 2024 TAC meeting**: Receive input from TAC on draft analysis – will accept feedback through Tuesday November 26th
- **November 25, 2024:** Publish draft analysis and recommendation from Technical Consultant
- **December 5, 2024:** Watermaster Board meeting to discuss and receive feedback
- **December 9, 2024:** TAC meeting to discuss Board comments on draft analysis
  - Deadline for TAC to provide feedback on draft analysis published on November 25th – specifically to determine if any TAC member disagrees with Technical Consultant recommendation.
- **December 10, 2024:** Publish draft final analysis with TAC input documented.
  - TAC to review and confirm their feedback by December 16th
- **December 17, 2024:** Publish final analysis and recommendation in December Special Board agenda package
- **December 19, 2024:** Watermaster Board meeting to discuss and consider approval of the Carryover Rules analysis

Open Discussion

- Seeking input and feedback from TAC on draft analysis so far
- What concerns do you have with the draft recommendation, if any?
- What else should we look at, if anything, in this analysis?

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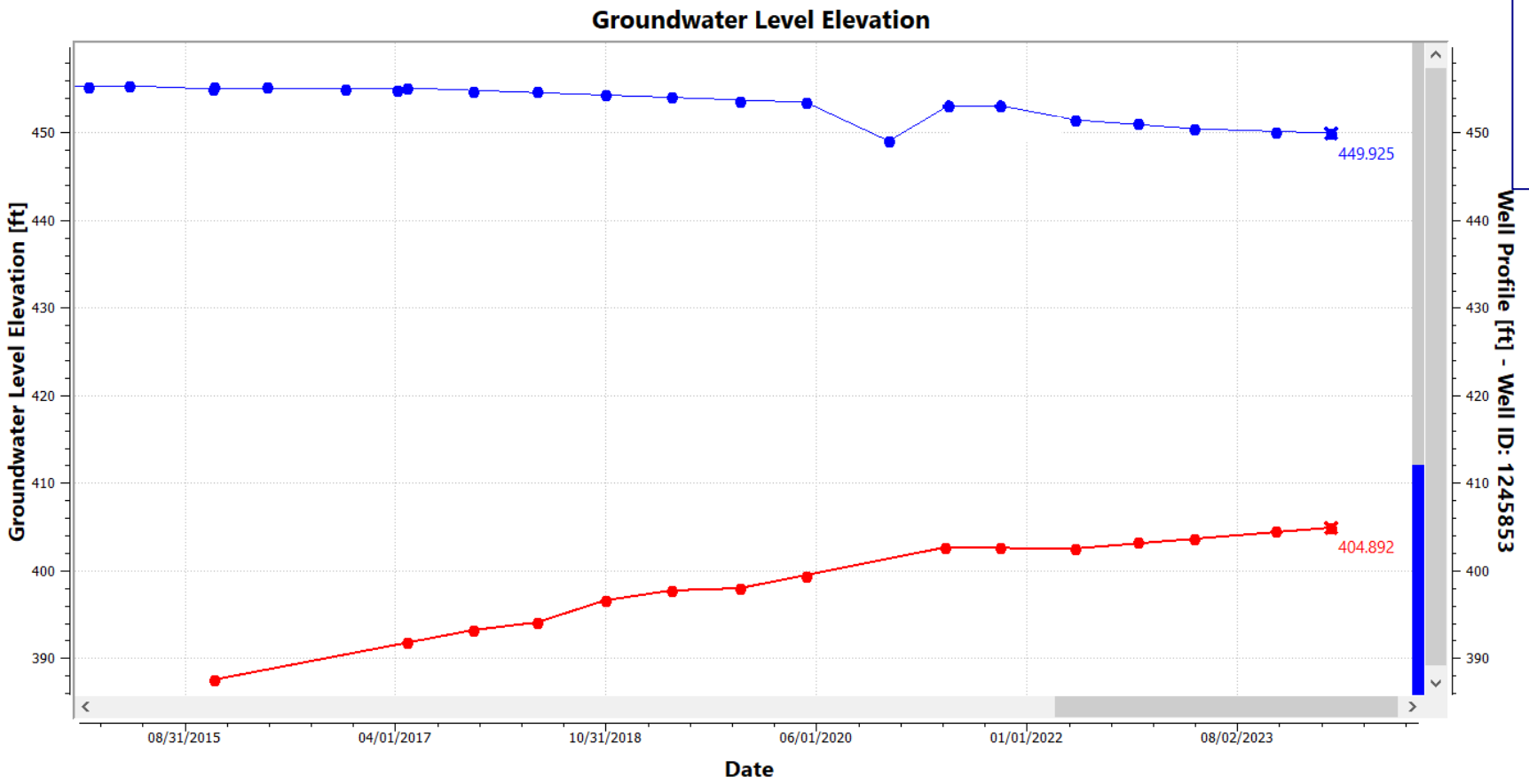
Choosing static groundwater-elevation data for Spring 2024

Groundwater Level Time Series [Well Collection #1]

Chart



Wells

Data

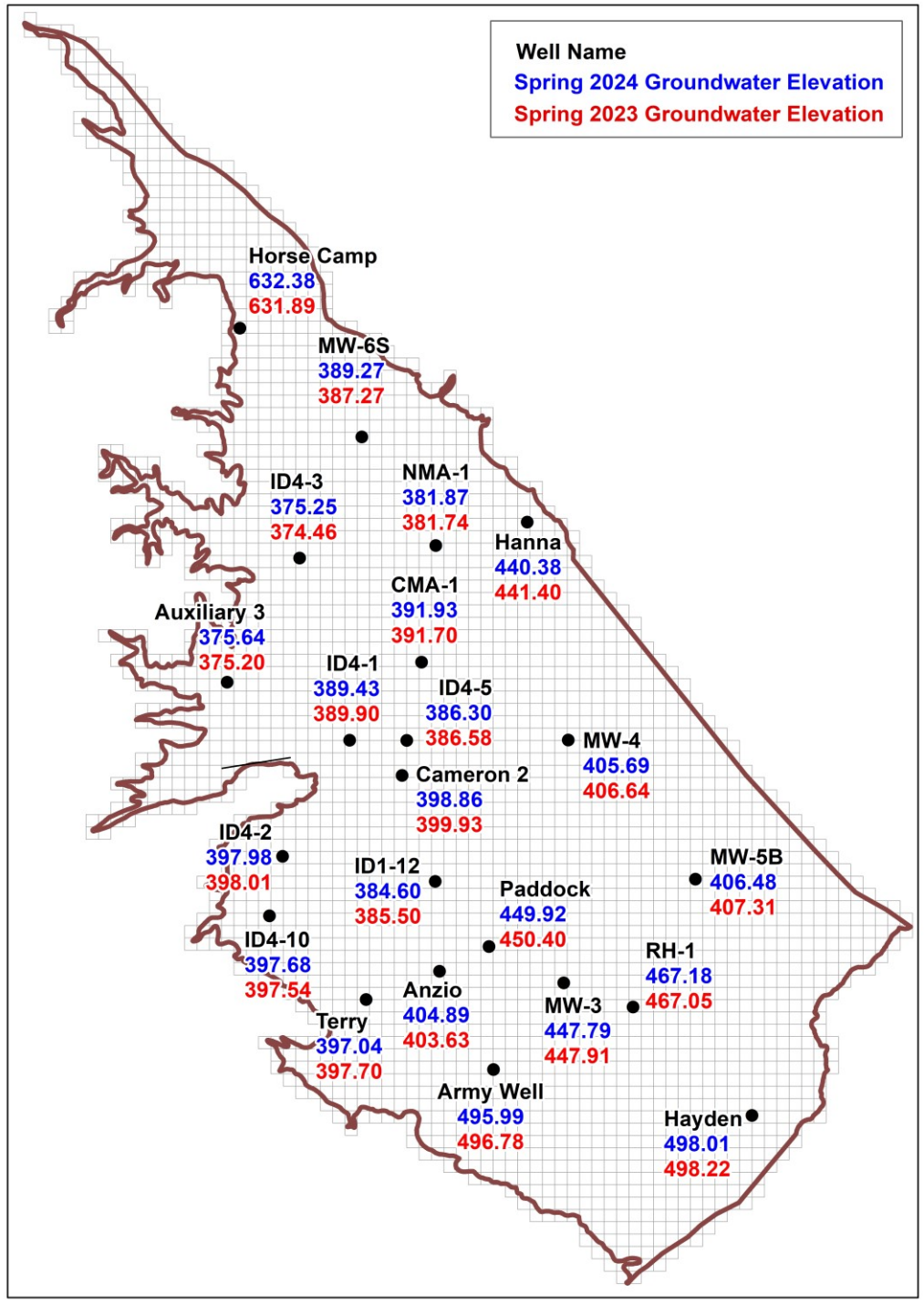
Line Color	Symbol	Symbol Color	Well ID	State Well ID	Well Name	Longitude	Latitude	WL Measurement Frequency	Owner	Ground Surface Elevation [ft]	Reference Point Elevation [ft]	Well Depth [ft]	
	Circle		1245853	011S006E2...	Anzio/Yaqui Pass	-116.347150	33.206040	Semi_Annual	Borrego Water District	662.00	663.63	500.00	250.(
	Circle		1245903	011S006E2...	Paddock	-116.334036	33.211593	Semi_Annual	Unknown	536.47	537.10	430.00	185.(

Dubious Data | Dynamic WL | EDD Marks

Pan To | Zoom To | Options | More Actions | Close

Monitoring wells and groundwater-elevation data that were used to compute annual change in storage

Spring 2023 to Spring 2024



Method to Estimate Annual Storage Change in the Subbasin

1. Change in storage is calculated at the grid-cell level using the following equation:

$$Change\ in\ Storage_i = \left(GWE_i^{t1} - GWE_i^{t0}\right) \times S_{y_i} \times A$$

i represents a unique cell within the storage change calculation grid

GWE is the interpolated groundwater elevation at cell i

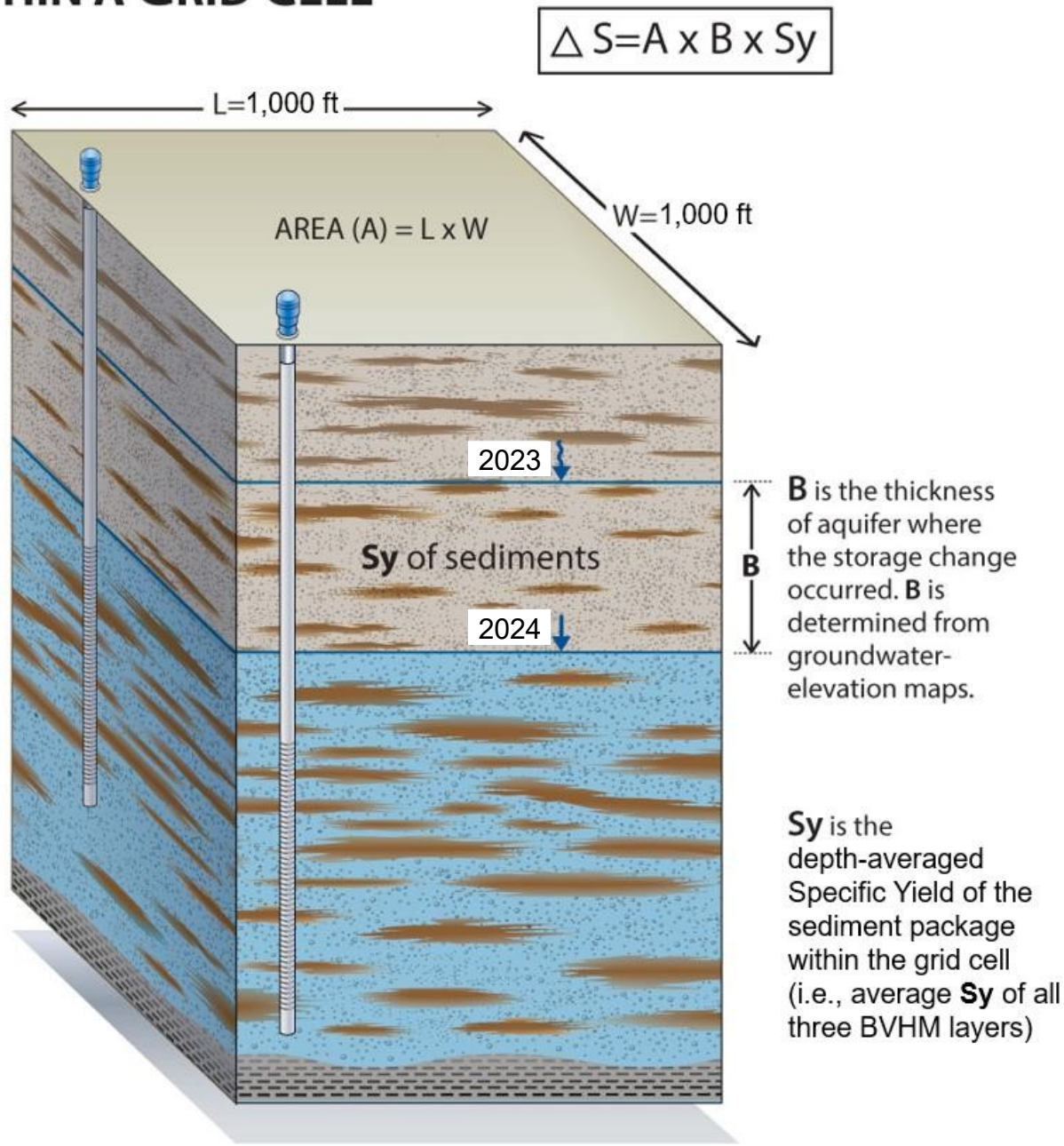
Sy is the specific yield defined at cell i *(from the BVHM)*

A is the area of each cell

$t1$ and $t0$ are the two years between which storage change is calculated

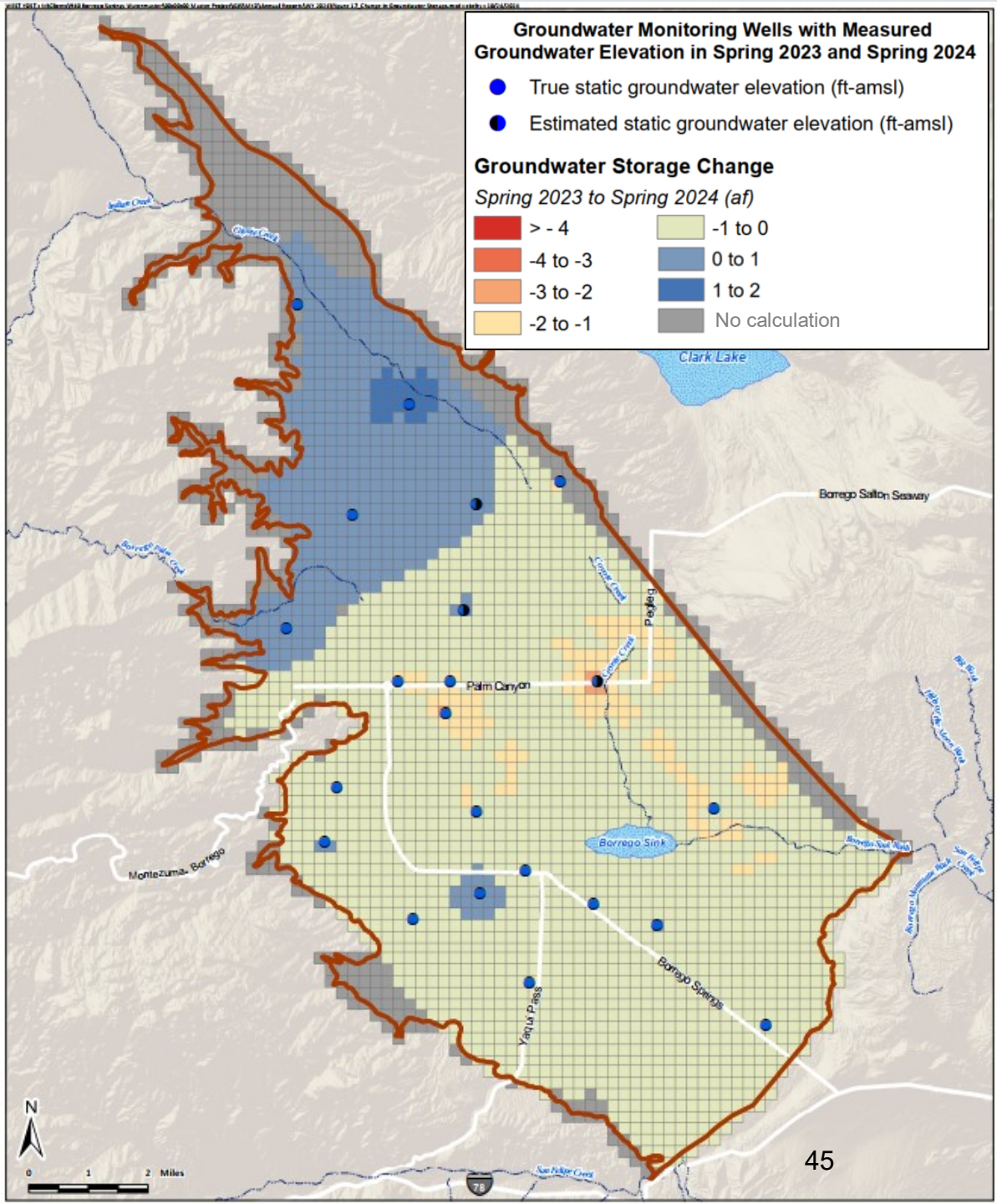
2. The sum of the change in storage values by grid cell provide an estimate of the total annual change in storage in the Subbasin.

ESTIMATION of STORAGE CHANGE WITHIN A GRID CELL

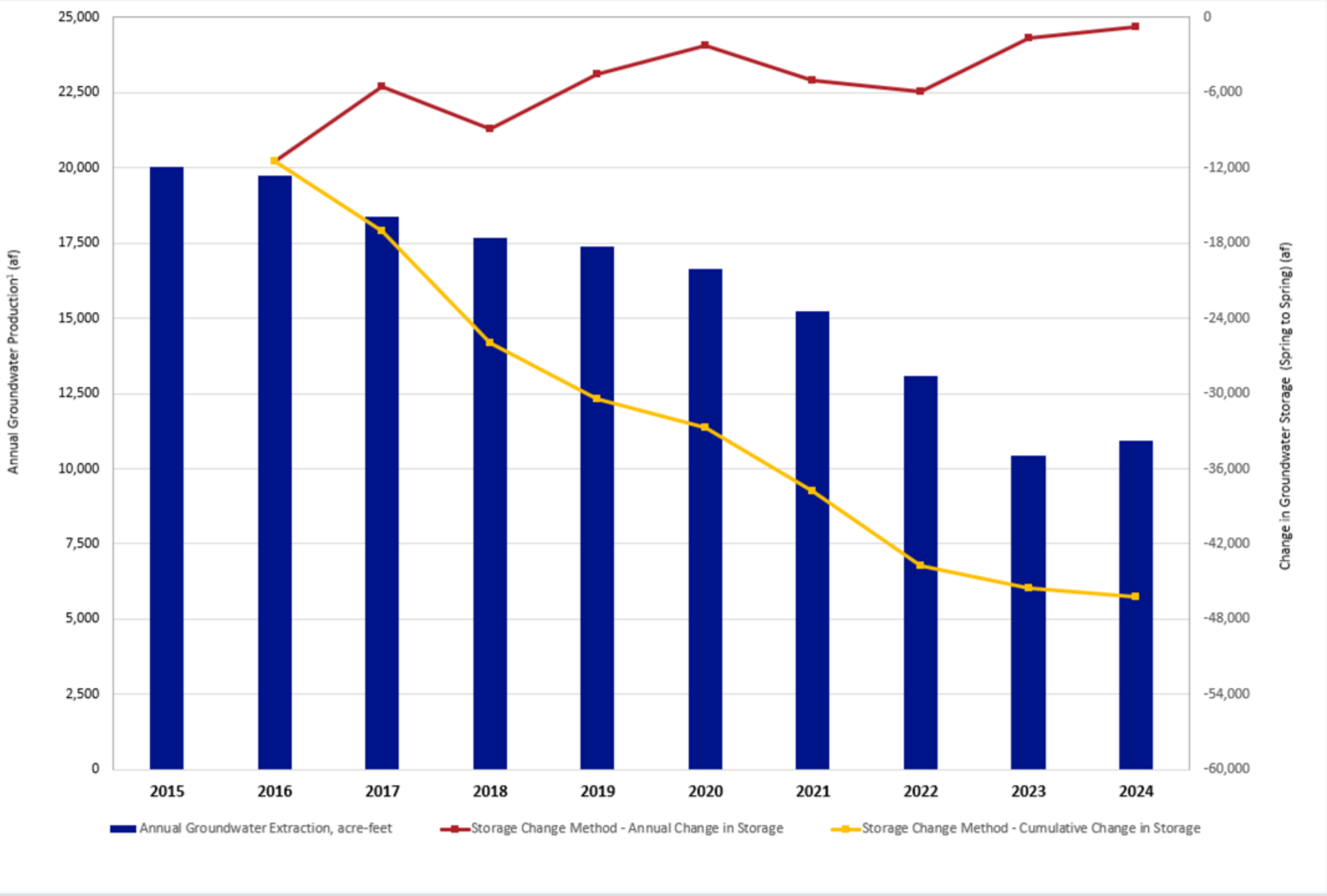


Storage Change Results
Spring 2023 to Spring 2024

The change in groundwater storage from Spring 2023 to Spring 2024 was a ***decrease*** of approximately ***789 af***.



Change in Storage vs. Groundwater Production



Conclusions

This Year (Spring 2023 to Spring 2024):

- Storage increased in the North Management Area
  - Due to relatively wet conditions → increased recharge
- Storage declined most in the Central and South Management Areas

Since Monitoring Began (2015 to 2024):

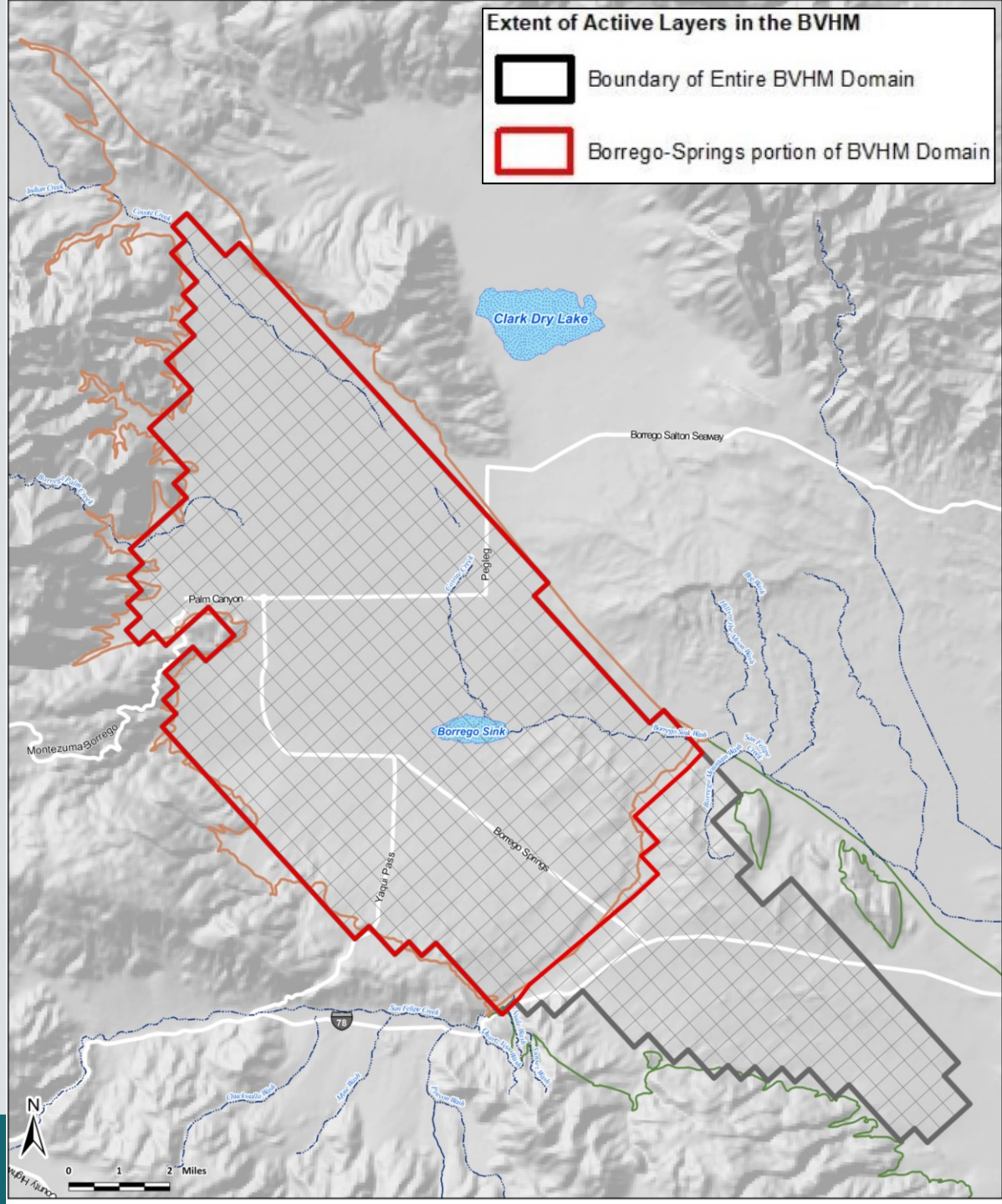
- Storage has continuously declined. Total loss = 46,300 af
- Rate of storage decline has gradually decreased → mainly due to declines in pumping

Other Ways to Estimate Storage Change

- TAC and Board have discussed revisiting method used to estimate storage change
  - Results from *Calibrated BVHM* are now available
- When should we revisit changes to the method?
  - WY 2024 Annual Report?
  - Future Annual Report?
  - 5-year GMP update?

BVHM-Estimated Change in Storage

- BVHM estimates change in storage → part of water budget
- Calculates change in storage for each model cell (and by model layer)
- Total change in storage = sum of storage change of all model cells and layers

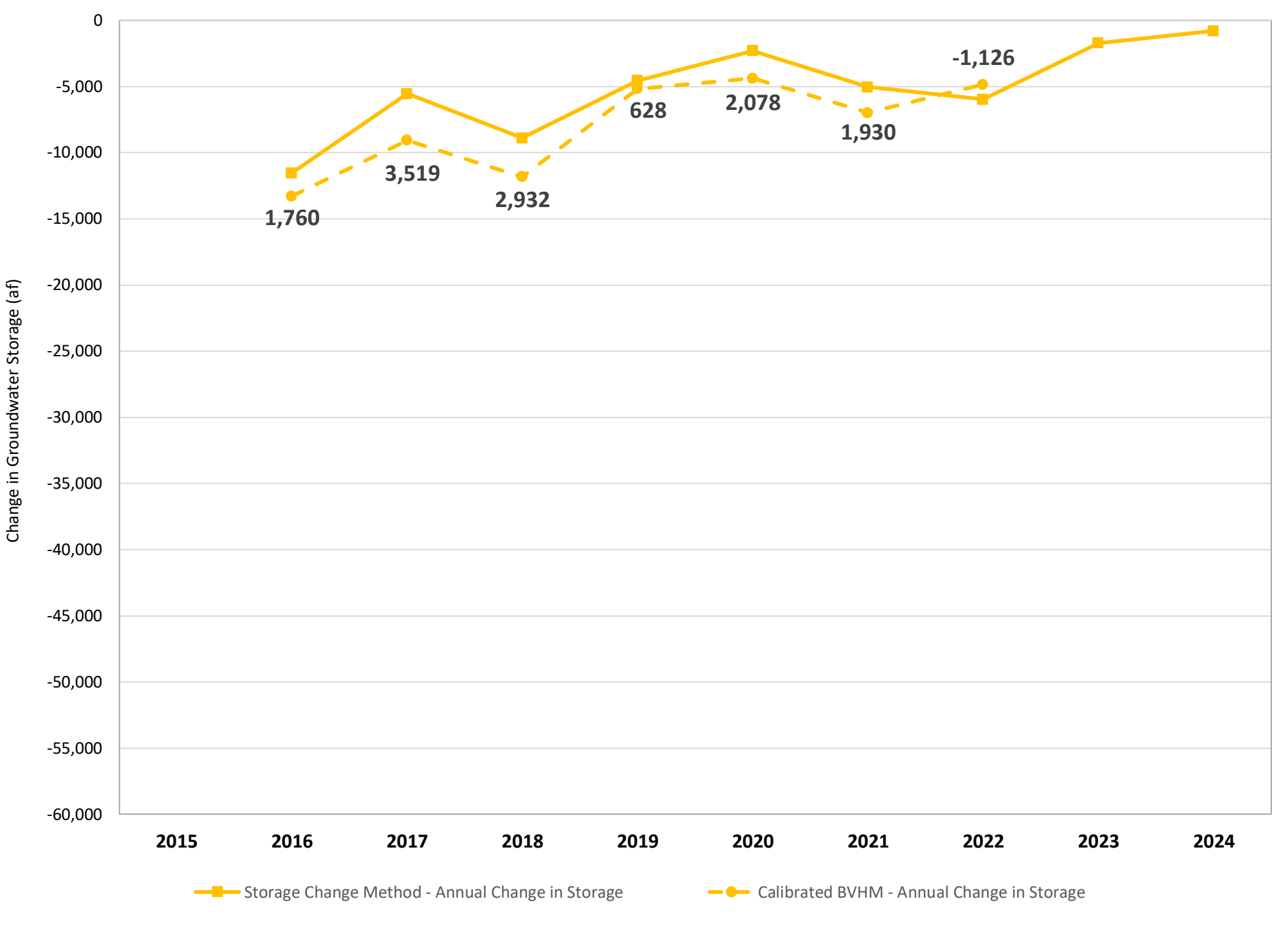


BVHM-Estimated Change in Storage

- 2016 BVHM estimated storage changes for WY 1945–2016
  - Results from projection scenarios were used to set Sustainable Management Criteria in GMP
  - Model aquifer properties used in storage change estimates
- *Calibrated BVHM* estimated storage changes for WY 1945–2022
  - No estimates for WY 2023 and 2024
  - NEW aquifer properties were produced during model calibration

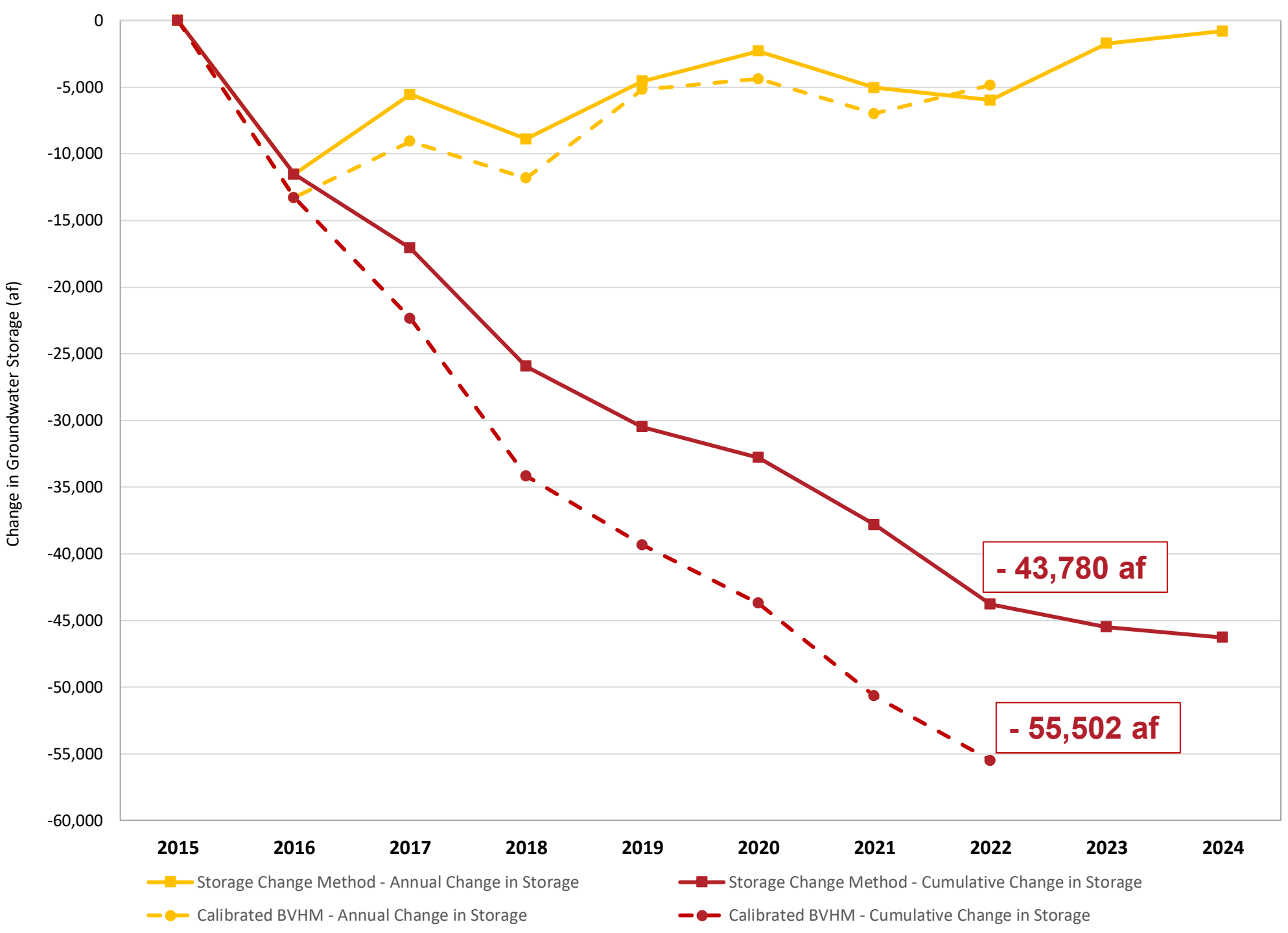
Annual Change in Storage:

Storage Change Method vs. *Calibrated BVHM*



Cumulative Change in Storage:

Storage Change Method vs. *Calibrated BVHM*



Storage Change Method vs. BVHM-Estimate

Cumulative Change in Storage (2015 to 2022):

- Storage Change Method = **-43,780 af**
- *Calibrated* BVHM = **- 55,502 af**
- 25% more total storage loss is estimated by *Calibrated BVHM* vs. Storage Change Method

- Total storage in the Basin = 5,500,000 af
  - Difference in calculation by two methods is small compared to total Basin storage (< 1%)

Reasons for Differences in Estimates

- Storage properties
  - Depth-averaged specific yield values from the 2016 BVHM (Storage Change Method)
  - New, recalibrated storage properties and layer-specific values *(Calibrated BVHM*)
- Time periods
  - Spring to spring (Storage Change Method)
  - Water year (*Calibrated BVHM*)
- Aquifer layer(s)
  - Shallow aquifer (Storage Change Method)
  - All 3 aquifer layers are used in the estimation (*Calibrated BVHM*)

Reporting Considerations

WY 2024 Annual Report

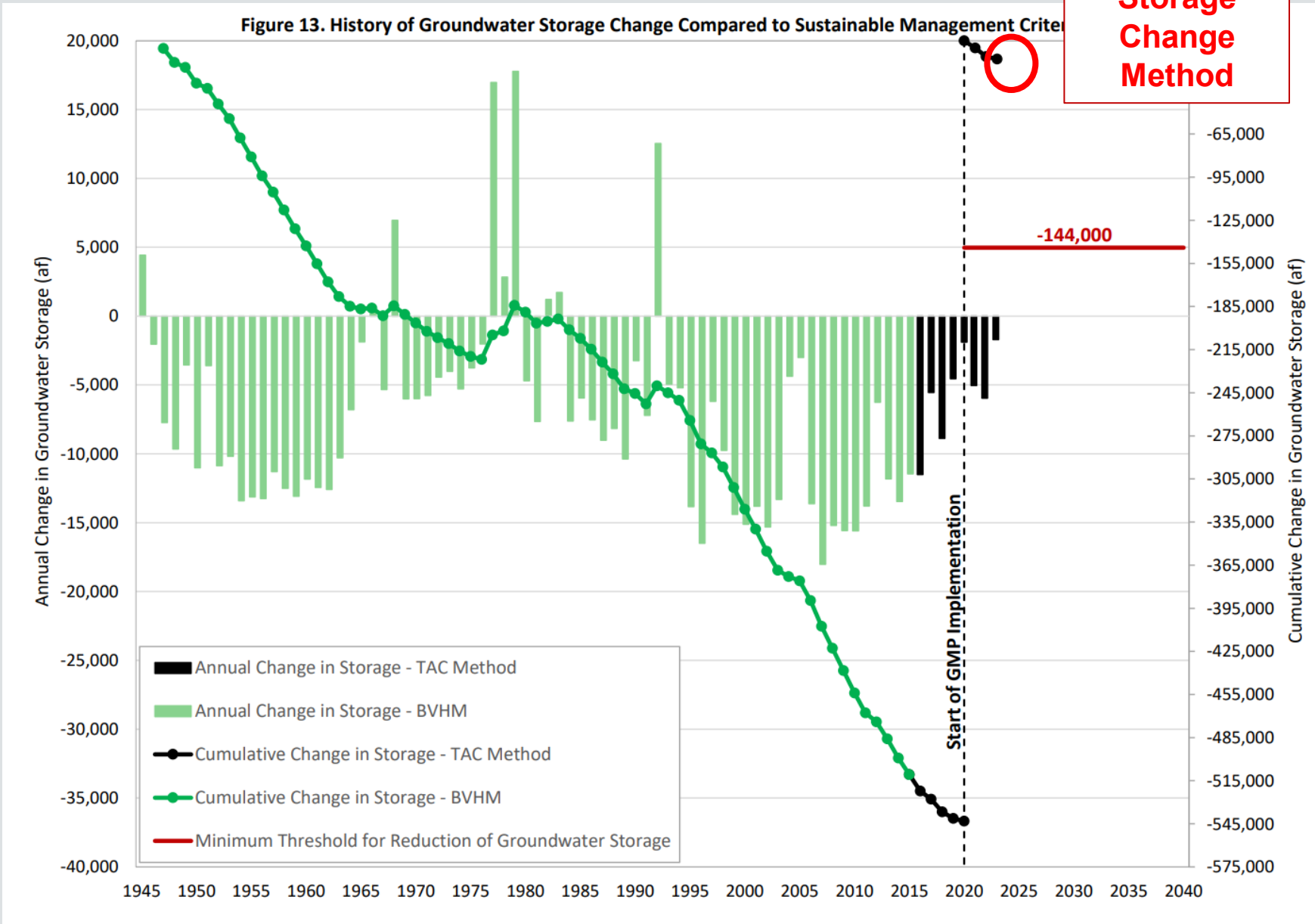
- *Purpose*: Report annual changes to the Basin to DWR
- Due to Board by January 23, 2025 (draft)
  - Due to DWR by April 1, 2024 (final)

GMP

- *Purpose*: Evaluate new information and update methods used in 5-year update
- Due June 30, 2026
  - Majority of work will be completed by March 30, 2025 (end of SGM grant)

WY 2024 Annual Report

- Use results Storage Change Method for WY 2024
  - Change in storage = -786 af
  - Report will include a footnote that method is being re-evaluated
- No update to historical estimates
- All updates to storage change estimates will be performed for the 5-year GMP assessment



Recommendations

WY 2024 Annual Report

- Report a decline in storage of 786 af in WY 2024 (result from Storage Change Method)
- No update to historical estimates of storage change
- In future annual reports, recast historical estimates using:
  - Results from *Calibrated* BVHM
  - Results from Storage Change Method with updated storage properties for years that model results aren't available

GMP

- Update historical estimates using *Calibrated* BVHM (WY 1945-2022)
- Update Storage Change Method to use specific yield values from *Calibrated* BVHM
  - Use method to estimate change in storage for years that model results aren't available (WY 2023 and 2024)

Next Steps

1. Incorporate TAC recommendations and feedback, if any, into the current and historical storage-change calculations
2. Present the storage-change calculation to the Watermaster Board at the December 5, 2024 Board Meeting
3. Compare methods to estimate the change in storage for the 5-year GMP Assessment
4. Report the storage-change calculation in the 2024 Annual Report and submit to the DWR by April 1, 2025

Today's Agenda

1. Public Comment
2. Review of Board and Public Comments on the draft Redetermination of the 2025 Sustainable Yield
3. Draft Scope of Work for the 2030 Redetermination of the Sustainable Yield
4. Analysis of Carryover Rules
5. Draft Results of the Storage Change Calculation for Spring 2023 to Spring 2024
6. **Public Comment**

Next TAC Meeting – December 9, 2024

Agenda:

1. Review comments on the 2025 Sustainable Yield *(if applicable)*
2. Review comments on the Scope of Work to redetermine the 2030 Sustainable Yield *(if applicable)*
3. Analysis of Carryover Rules
4. Pumping Projections to Support the GMP Assessment Report