



Borrego Springs Watermaster

Technical Advisory Committee Meeting

June 10, 2026

Today's Agenda

1. Public Comment
2. Presentation by Trey Driscoll: “High-Level Borrego Valley Hydrologic Model (BVHM) Review”
3. Technical Analysis for Water Rights Transfers
4. Public Comment



High-Level Borrego Valley Hydrologic Model Review

Presented to Borrego Water District

June 10, 2026

Presented by Yara Pasner, PhD
Trey Driscoll, PG, CHG
Marisa Earll





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Subsurface Exchanges Between Management Areas / GDE

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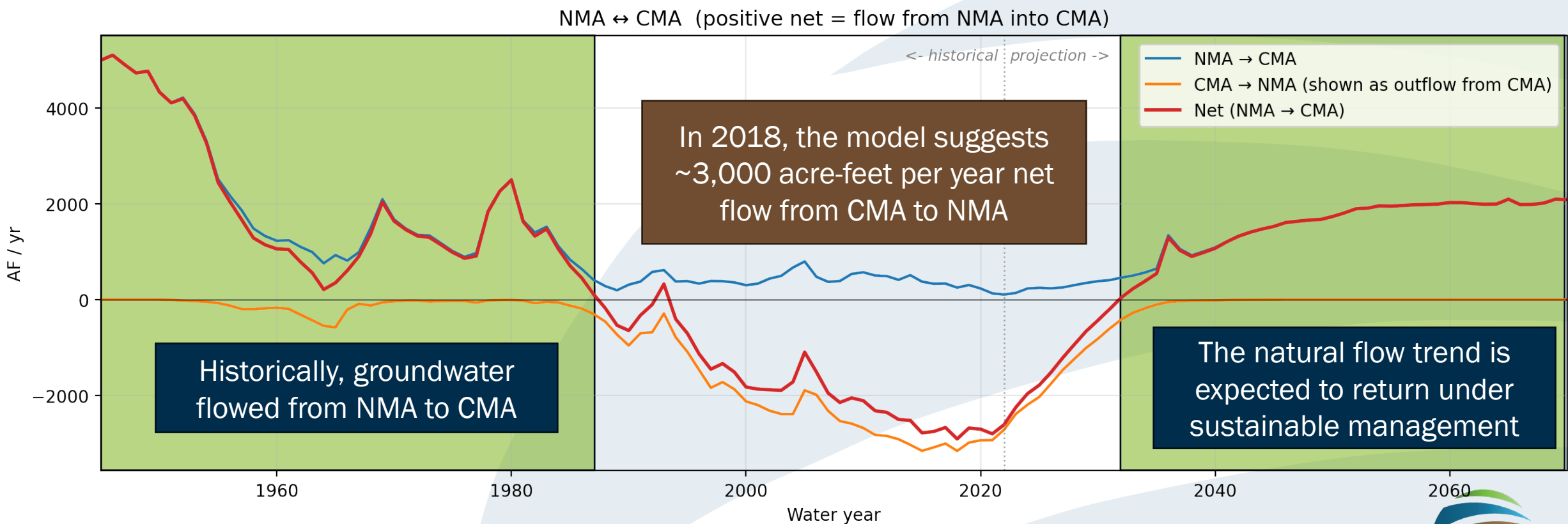
Recommendations

Key Takeaways

- Updating BVHM **hydrogeologic conceptual representation** would likely improve simulation of subsurface flow exchanges & pumping impacts
- The model may **underestimate water demands from GDEs** (groundwater dependent ecosystems)

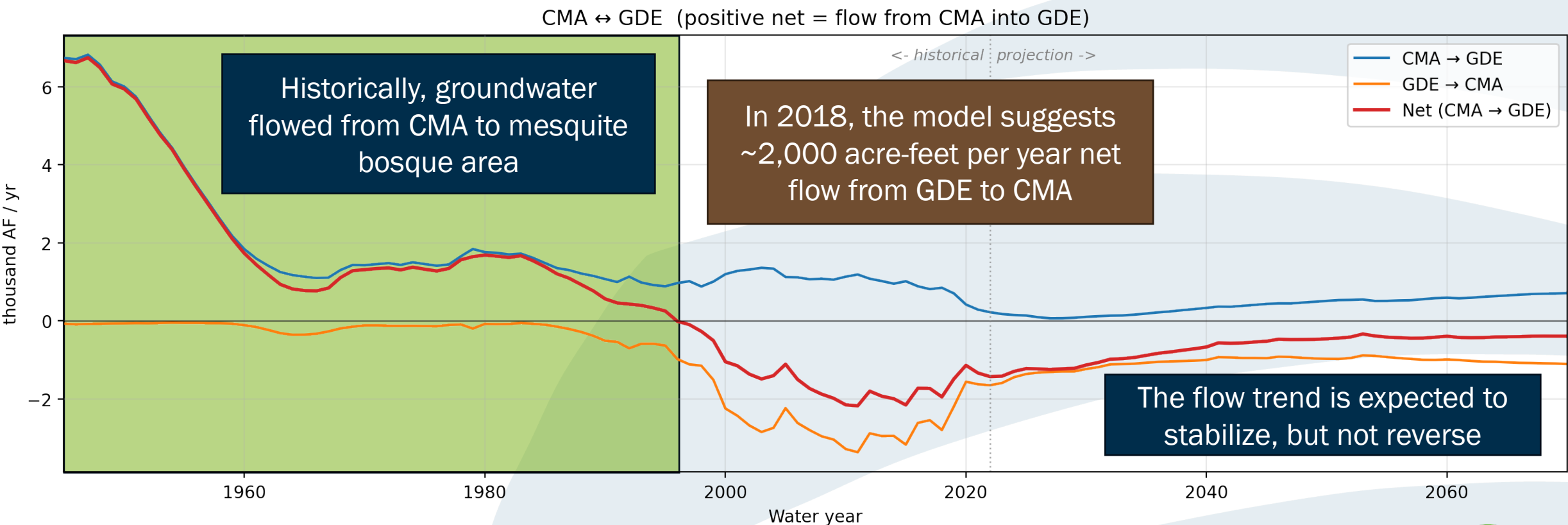
Subsurface Groundwater Exchanges

Flow from NMA into CMA may be a **key component** of future groundwater availability



Subsurface Groundwater Exchanges

Flow from CMA into mesquite bosque region may be a **key component** to supporting GDE



Subsurface Groundwater Exchanges

Consequence

- If pumping moved northward, that might slow recovery of natural flow conditions & reduce groundwater availability in CMA and GDEs

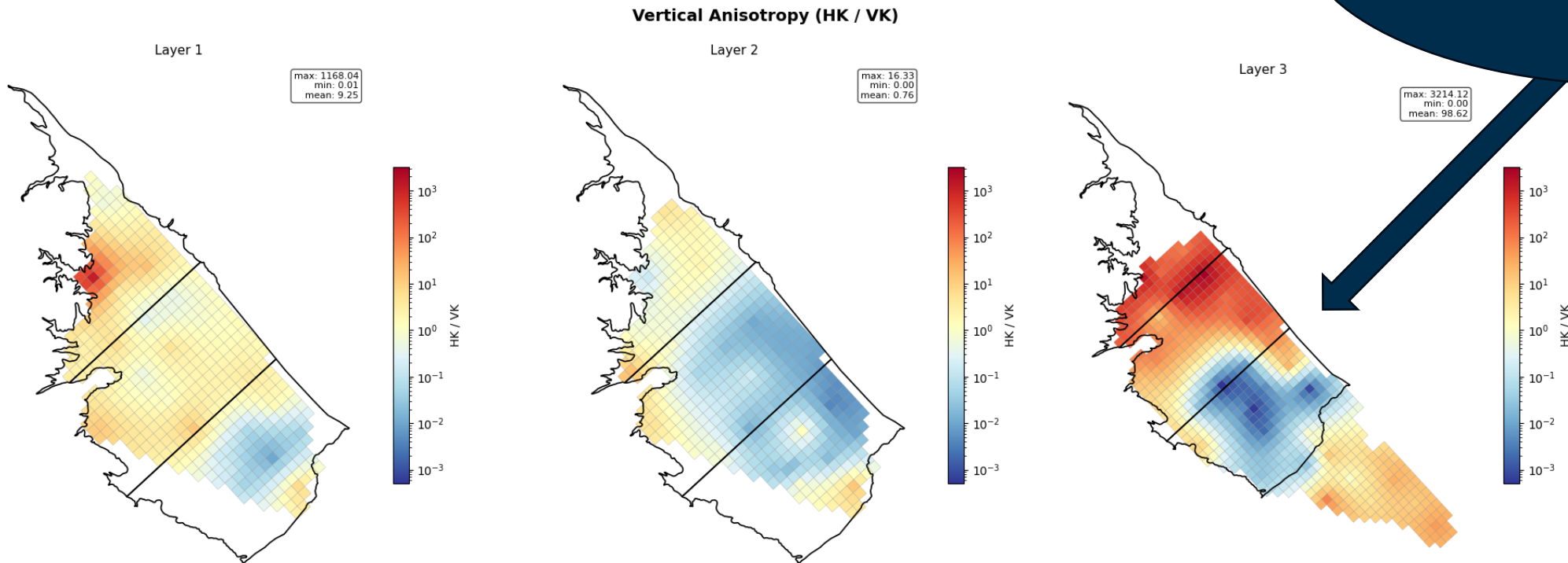
Hydrogeologic Model Evaluation

BVHM simulates unrealistic aquifer parameters, particularly in CMA & SMA

Groundwater has propensity to flow vertically instead of laterally

- Unrealistic since clay impedes vertical flow

Areas in blue show where the model indicates groundwater has freedom to move *vertically* more than is feasible



Hydrogeologic Model Evaluation

BVHM simulates unrealistic aquifer parameters, particularly in CMA & SMA

Groundwater has propensity to flow vertically instead of laterally

- Unrealistic since clay impedes vertical flow

Consequences

- Subsurface groundwater exchange in CMA & SMA is uncertain
- May underestimate how far away pumping impacts reach

Hydrogeologic Model Evaluation

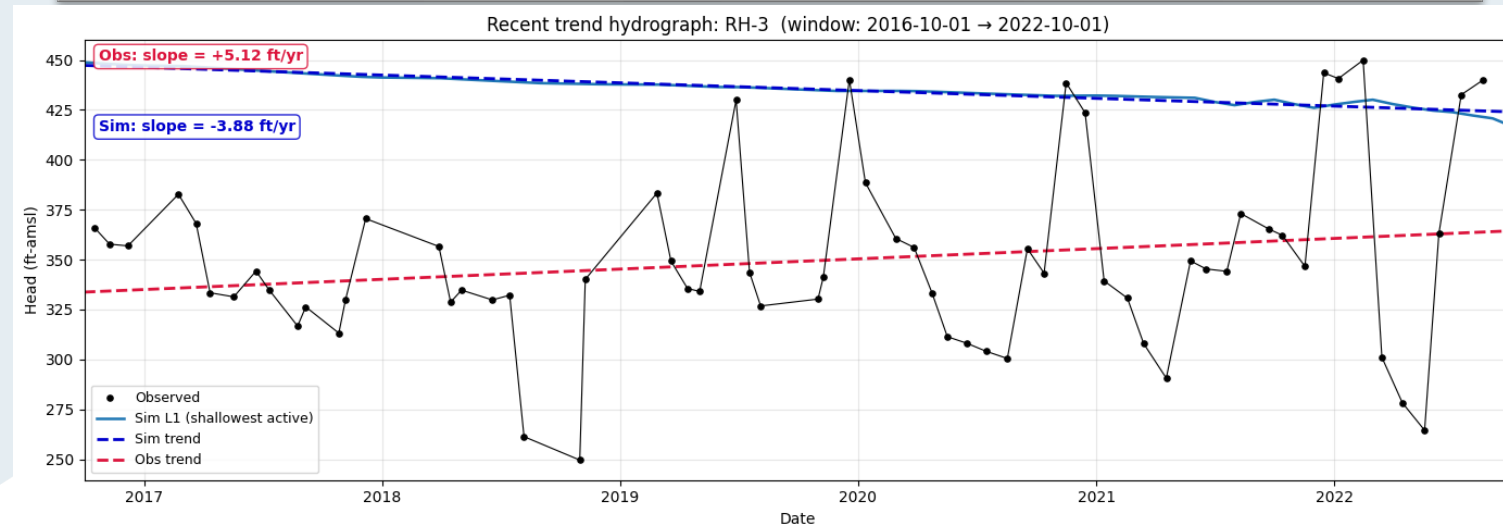
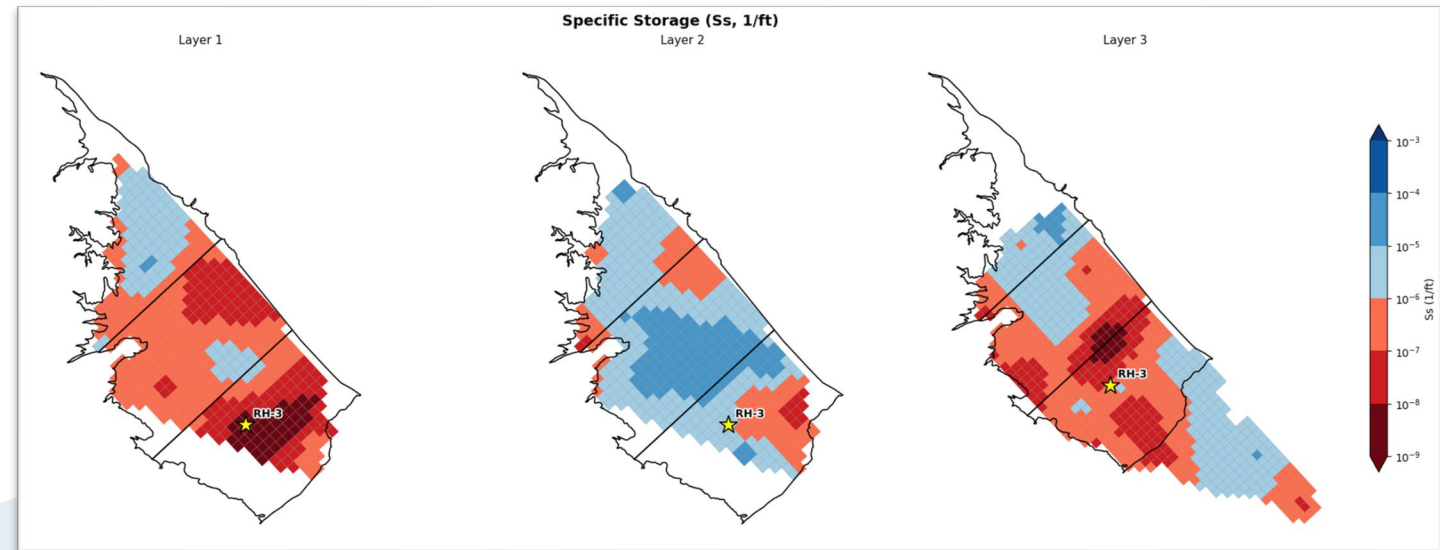
BVHM simulates unrealistic aquifer parameters, particularly in CMA & SMA

Storage values are too low:

- We expect values on the order of 10^{-6} 1/ft
- We see values approaching 10^{-9} 1/ft in some areas

Consequences:

- Large model errors in SMA
- Overestimated long-term decline in water levels
- Model may not be able to pump specified water



Groundwater Dependent Ecosystems

BVHM may underestimate
GDE water use

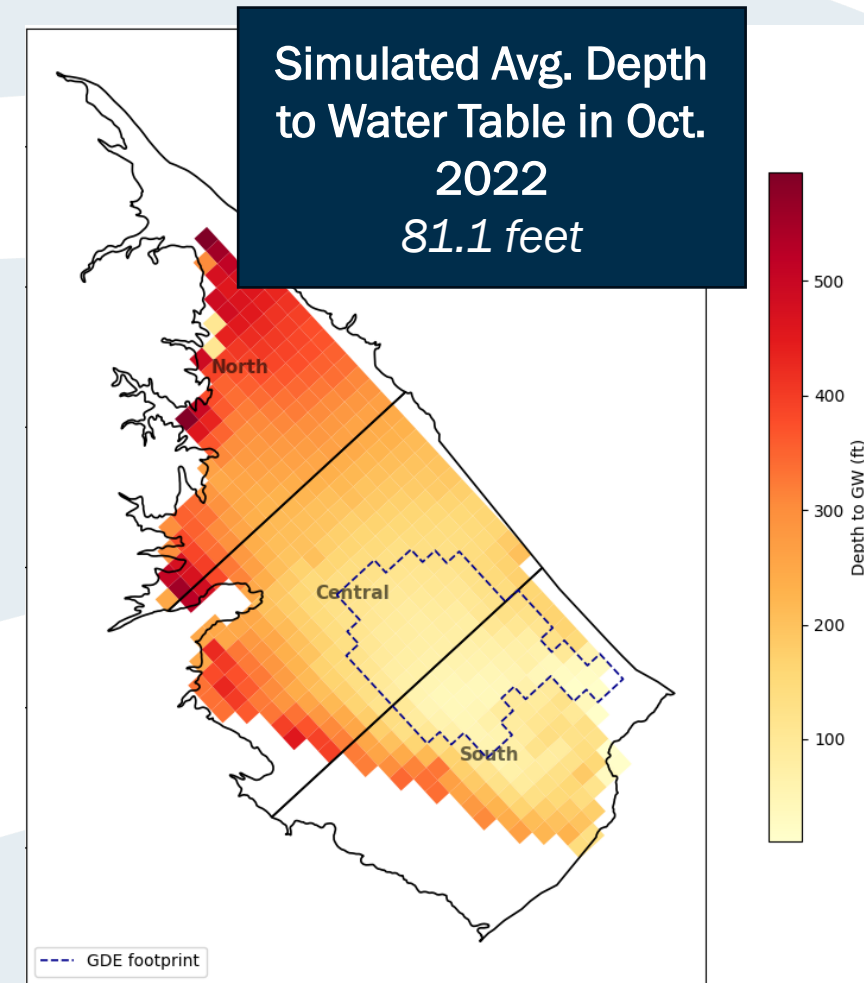
Documented rooting depths for mesquite species:
39 to 175 feet

BVHM simulated rooting depth:
22.9 feet

Consequence

- Model simulates minimal water use in mesquite bosque region because the simulated water table is deeper than the simulated rooting depth

But more is going on than shallow rooting depths...



Groundwater Dependent Ecosystems

BVHM may underestimate
GDE water use

Baseline simulated mesquite bosque water use:

WY 1950: ~8,000 acre-feet per year

WY 2022: 26 acre-feet per year

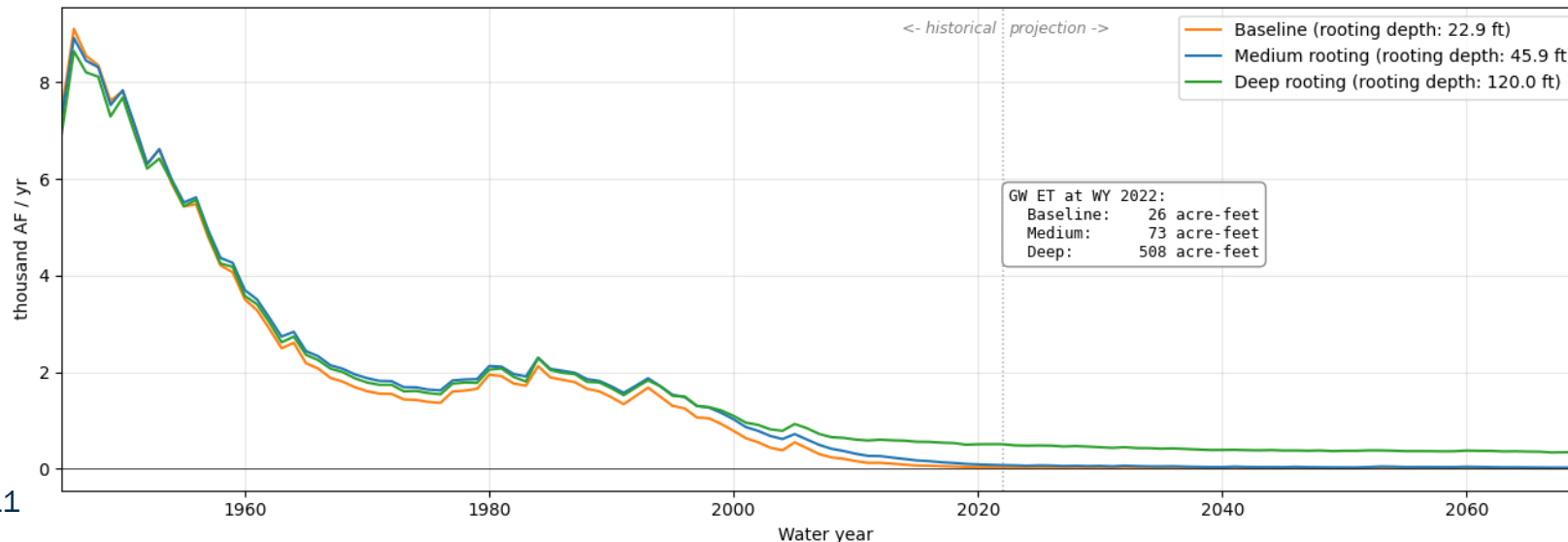
Deeper simulated rooting depths (120 ft deep)

WY 2022: 508 acre-feet per year

Take-away

- Simulating deeper rooting depths didn't make as much of a difference as expected
- Further exploration & comparison against UC Irvine study of estimated GDE transpiration is needed

Net GW outflux from Farm Package (processed using ZoneBudget)
for the GDE zone, comparing three scenarios with different rooting depths



Groundwater Dependent Ecosystems

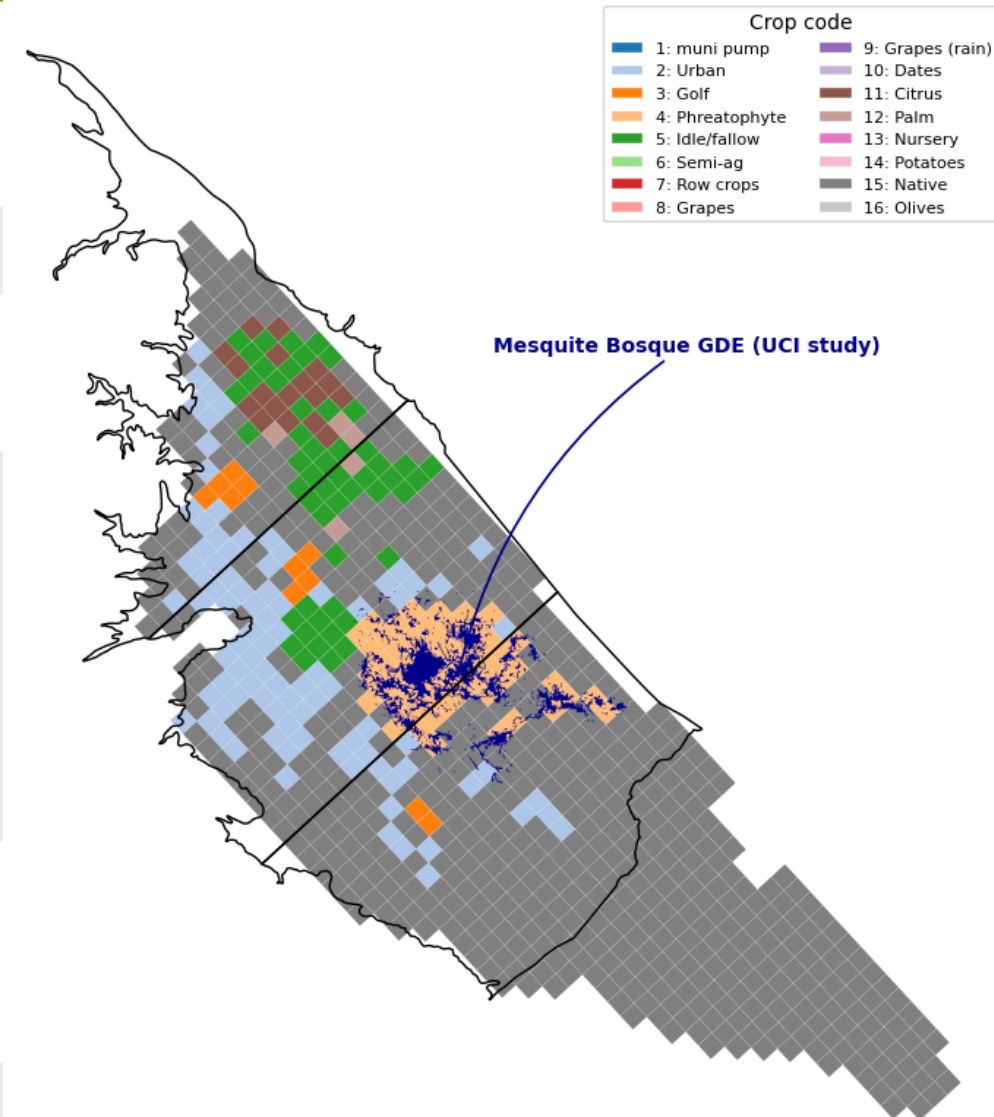
BVHM may underestimate
GDE water use

Key GDE simulated in model appears to be
mesquite bosque

- Phreatophyte land use class in BVHM corresponds with UC Irvine study

What about tamarisk?

- Often used as a windbreak
- Expected to be more distributed throughout the basin



Model Engine Update

Recommend we update to the new MODFLOW OWHM (v2.2.0)

What is a model engine?

- The tool we dump our data into!
- Presently we use the first version of MODFLOW One-Water Hydrologic Flow Model

Why should we update it?

- Can represent multiple land uses in the same cell
 - May make it easier to incorporate tamarisk into the model as explicit land use class
- Continued support & development
 - Dr. Scott Boyce at UC Davis (previously USGS)



Recommendations

- Update hydrogeologic conceptual model to better represent the effect of pumping and subsurface flow exchanges
- Compare simulated mesquite bosque transpiration to UC Irvine study
- Explicitly simulate tamarisk groundwater use
- Update model engine to the new MODFLOW OWHM v2.2.0

Today's Agenda

1. Public Comment
2. Presentation by Trey Driscoll: "High-Level Borrego Valley Hydrologic Model Review"
- 3. Technical Analysis for Water Rights Transfers**
4. Public Comment

Technical Analysis for Transfers Framework

Objectives

- The purpose of this agenda item is to obtain TAC input on the technical sufficiency of Watermaster Staff's analysis supporting an initial framework for evaluating and restricting transfers of water rights

Board Direction

- The Board has directed Staff to continue developing an approach for reviewing transfers that is grounded in the Judgment, supported by available technical information, and capable of being implemented in the near term
- Staff has completed additional analysis using the existing BVHM projection scenarios, available pumping information, BPA parcel locations, and projected groundwater-level outcomes to evaluate and propose a framework for locational restrictions on transfers

Requested TAC Input

- Requested input is limited to whether the technical analysis supports the physical conclusions used to develop the proposed framework, the TAC is not being asked to evaluate the legal or policy merits of transfer restrictions

Technical Analysis for Transfers Framework

Board input in response to TAC comments/questions from May 9 TAC meeting

- **Undesirable Results:**
 - Projected chronic lowering of groundwater levels after 2040 is inconsistent with the Basin's sustainability goal and is an undesirable result
 - An exceedance of an MT is not needed to conclude that a transfer could contribute to an undesirable result
- **Additional BVHM Simulations (Judgment Scenario):**
 - Given cost and planned efforts to update/improve model over the next three years, Board requested Staff first compare the pumping volumes and locations in the existing BVHM projection scenarios to the distribution of Judgment-allowed pumping to determine whether the existing model scenarios provide enough information to support an initial transfer evaluation framework
- **How to think about equitable treatment of Parties:**
 - A useful way to frame the issue is to consider the physical pumping capacity of different portions of the Basin - if an area of the Basin has limited capacity to support additional pumping, that capacity should not be made available on a first-come, first-served basis, rather it should be allocated to affected pumpers in proportion to their rights

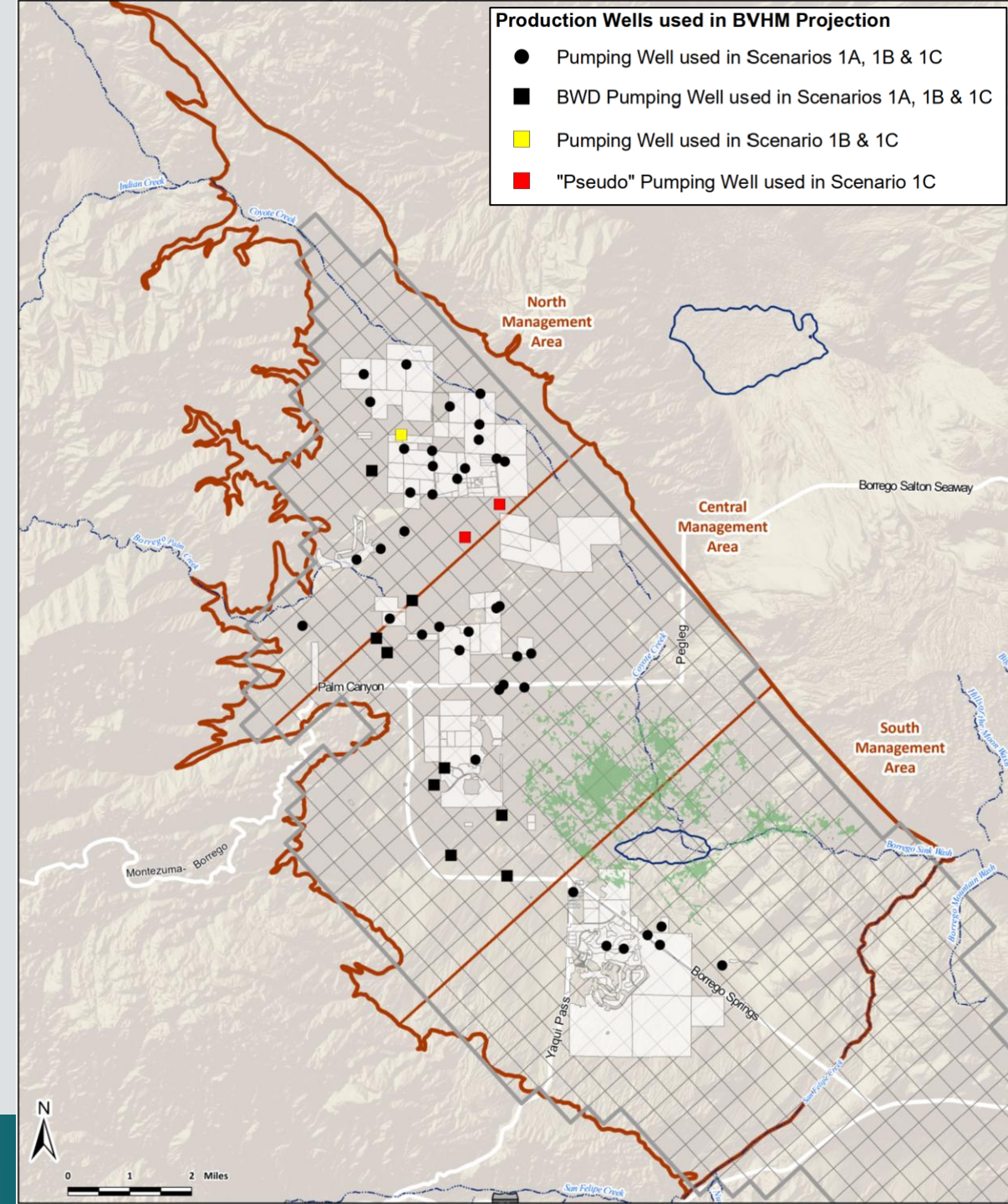
Proposed Transfer Areas

Methods

- Reviewed the distribution of pumping in BVHM Scenarios 1A-1C relative to Judgment Scenario
- Evaluated future changes in GW levels in 1A-1C

Key Conclusions

- GWLs are projected to decline in the CMA/SMA after 2040 in Scenarios 1A/1B, but increase in the NMA
- GWLs are most stable across the Basin after 2040 in Scenario 1C
- Pumping under the Judgment rights is similar to Scenario 1B, which does not result in a sustainable outcome in CMA/SMA
- Therefore, no demonstrated capacity to increase BPA in CMA/SMA through transfers
- NMA appears to have capacity to support additional pumping, but it may need to be reserved for pumpers who cannot sustainably access their water rights in CMA/SMA



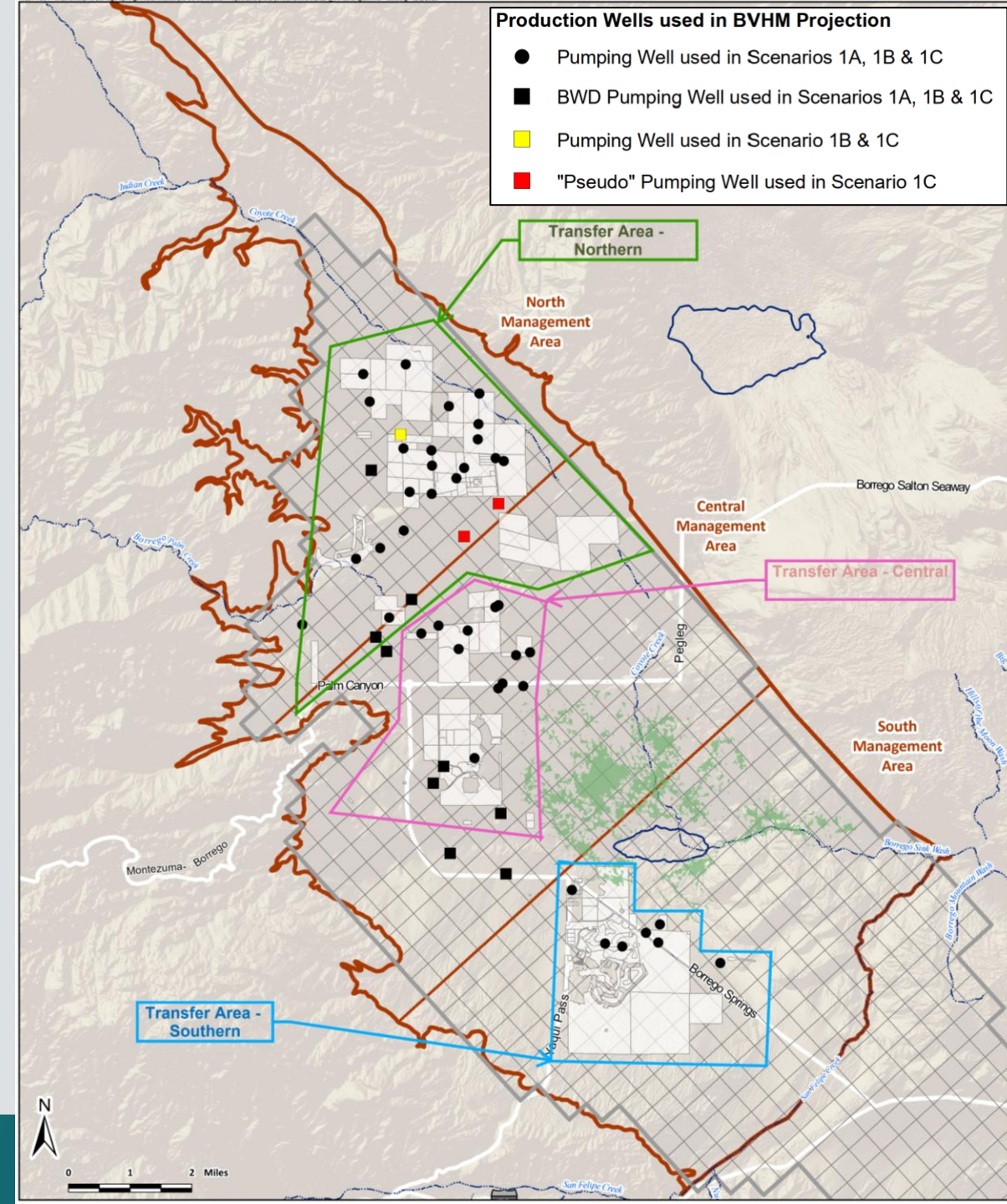
Proposed Transfer Areas

Recommendations

- Delineate Transfer Areas for purposes of applying transfer restrictions based on best available information at this time
- Transfer Areas are BPA parcel-based and generally correspond to the northern, central, and southern portions of the Basin, but they do not exactly match the CMA/SMA/NMA

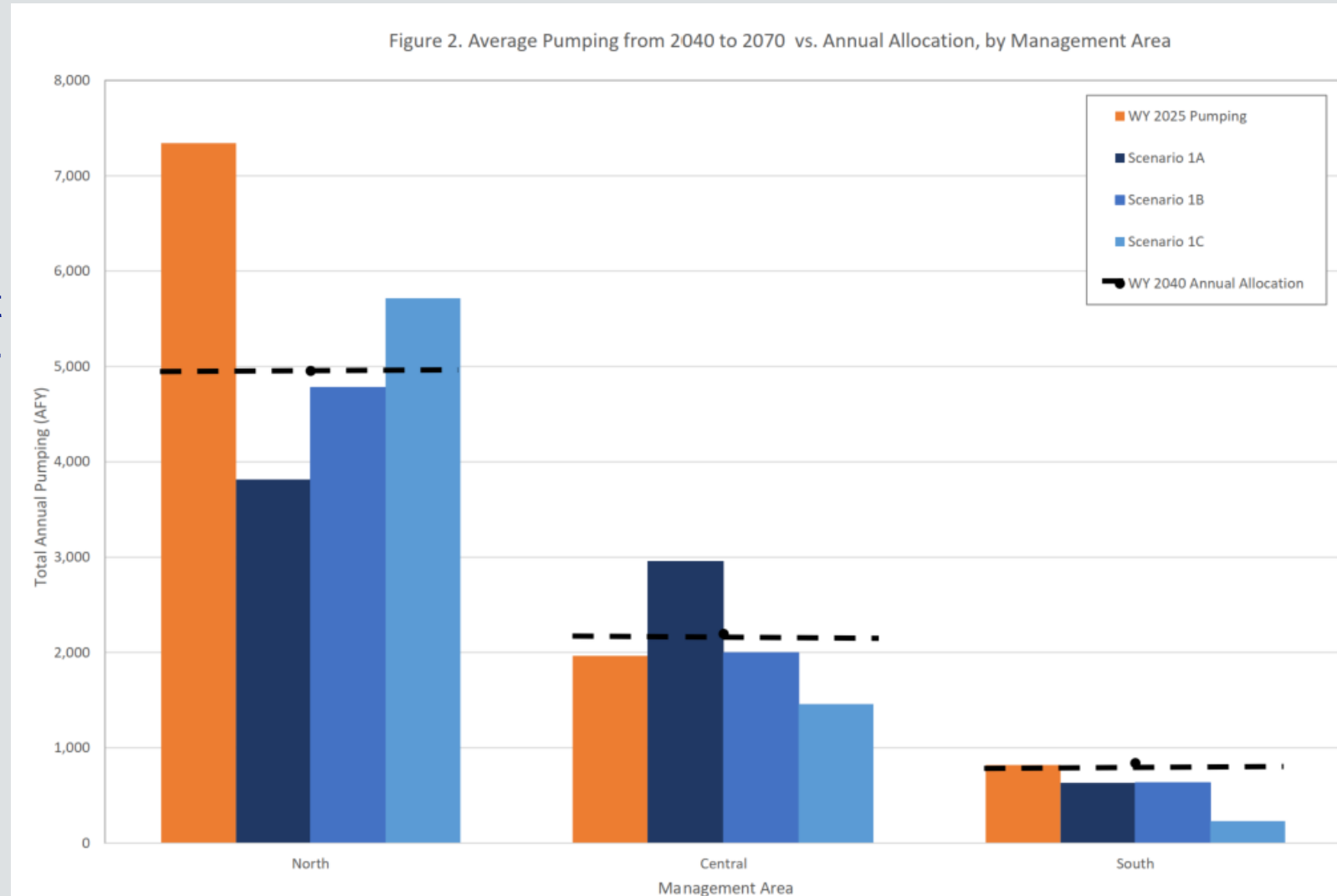
Transfer Framework (for all types – Permanent, CO):

- No transfers into the Southern Transfer Area from Central or Northern Area
- No transfers into the Central Transfer Area from Southern or Northern Area
- No transfers into the Northern Transfer Area
- Allow transfers among parcels within the same Transfer Area
 - subject to Judgment requirements and review for new well impacts



Distribution of Water Rights by Management Area

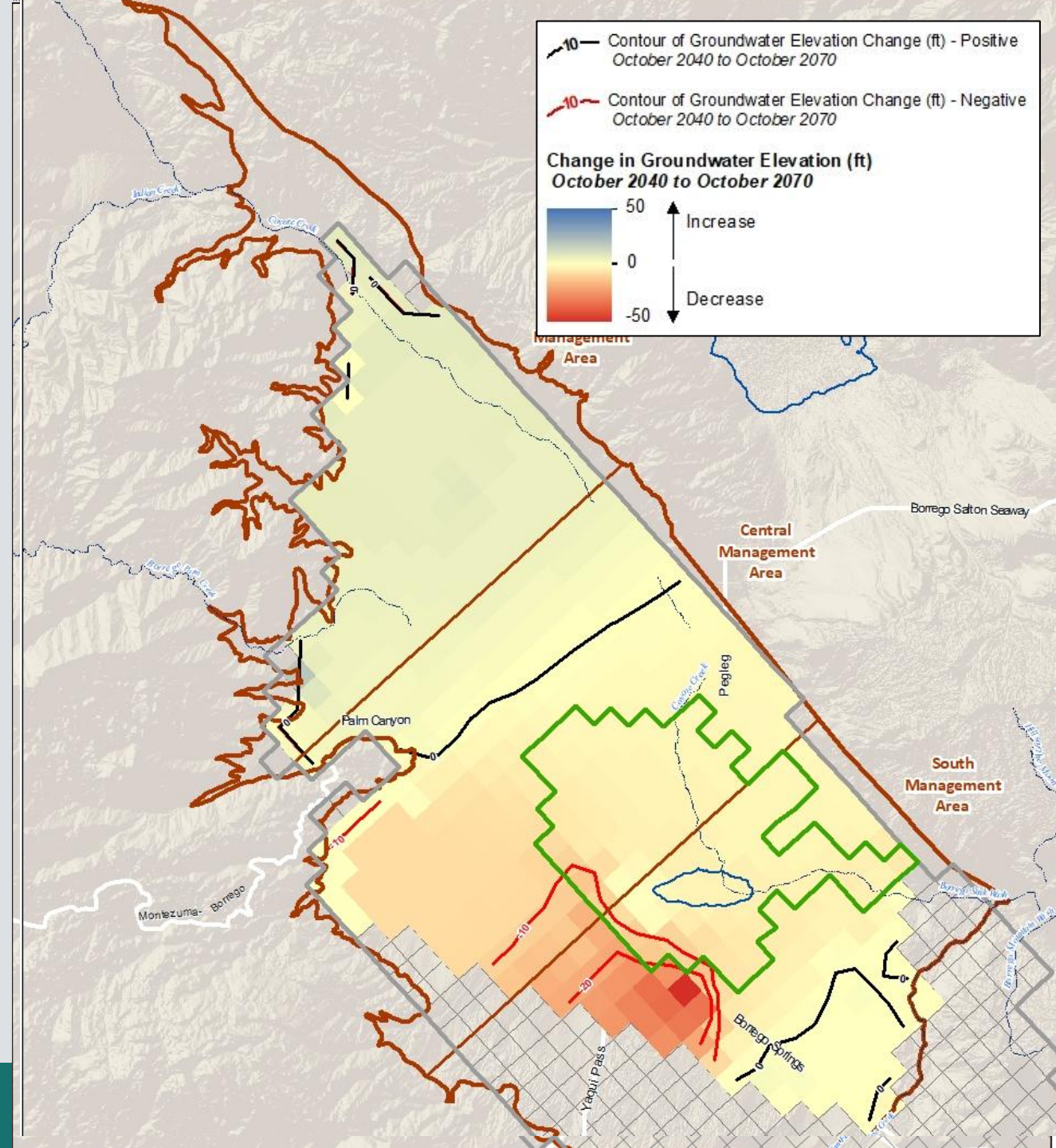
- **Scenario 1A** includes 766 afy more pumping in CMA than a Judgment Scenario distribution
- **Scenario 1B** has a distribution of pumping across the Basin that is most similar to the distribution of Judgment-allowed pumping
 - within 200 afy in each MA
- **Scenario 1C** includes 762 afy more pumping in the NMA than a Judgment Scenario distribution



Change in Groundwater Elevation Scenario 1A

WY 2040 to 2070

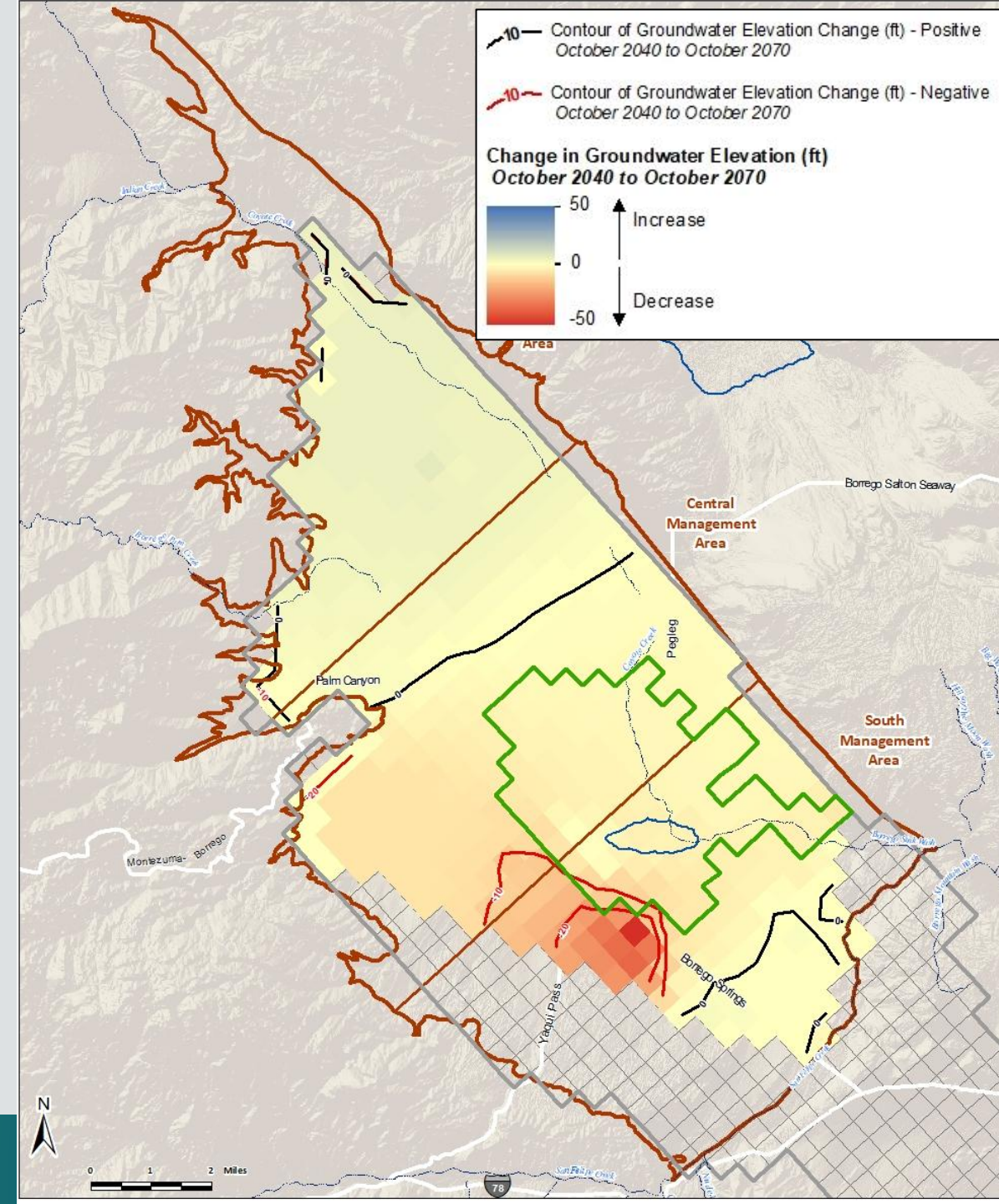
- In the CMA/SMA, groundwater levels are projected to continue to decline after 2040
- Groundwater level increase in the northern area of the basin by 10+ ft
- Broad areas of decline in the southwestern area of the Basin, where most pumping in the central and southern areas occurs
 - CMA → 5-20 ft of decline
 - SMA → 20-35+ ft of decline
- Eastern portion of the southern Basin (including underlying the Mesquite Bosque), is generally closer to the stable range (<5 ft of decline)



Change in Groundwater Elevation Scenario 1B

WY 2040 to 2070

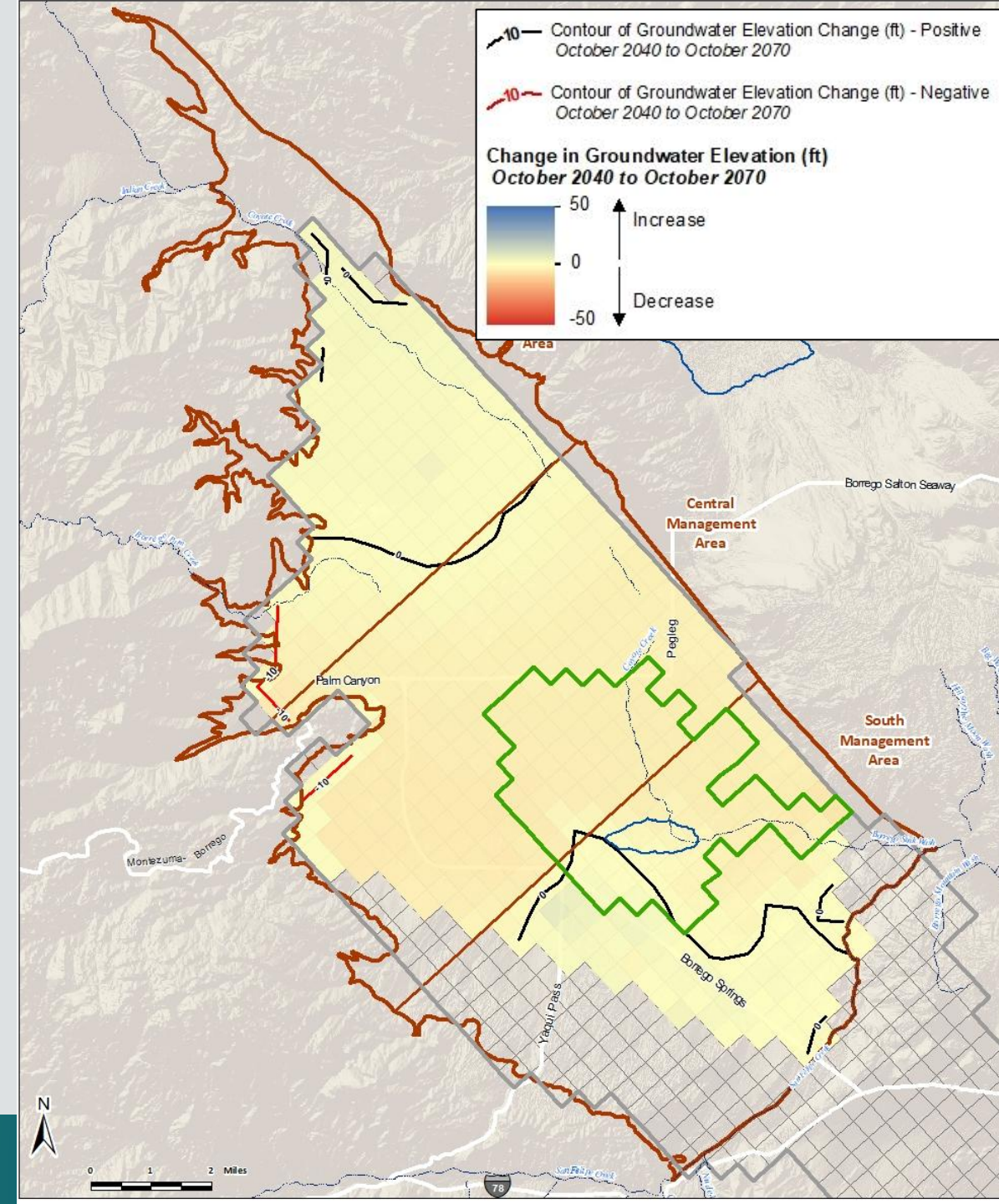
- Similar spatial pattern to outcomes of Scenario 1A, but with reduced magnitudes of change
 - NMA → increase 10+ ft
 - CMA → 5-20 ft of decline
 - SMA → 20-35 ft of decline
- Eastern portion of the southern Basin (including underlying the Mesquite Bosque), still generally closer to the stable range (< 5ft of decline)
- Reminder: Most similar to Judgment Scenario distribution of pumping
 - Potential unsustainable outcome → consider PMA No. 6



Change in Groundwater Elevation Scenario 1C

WY 2040 to 2070

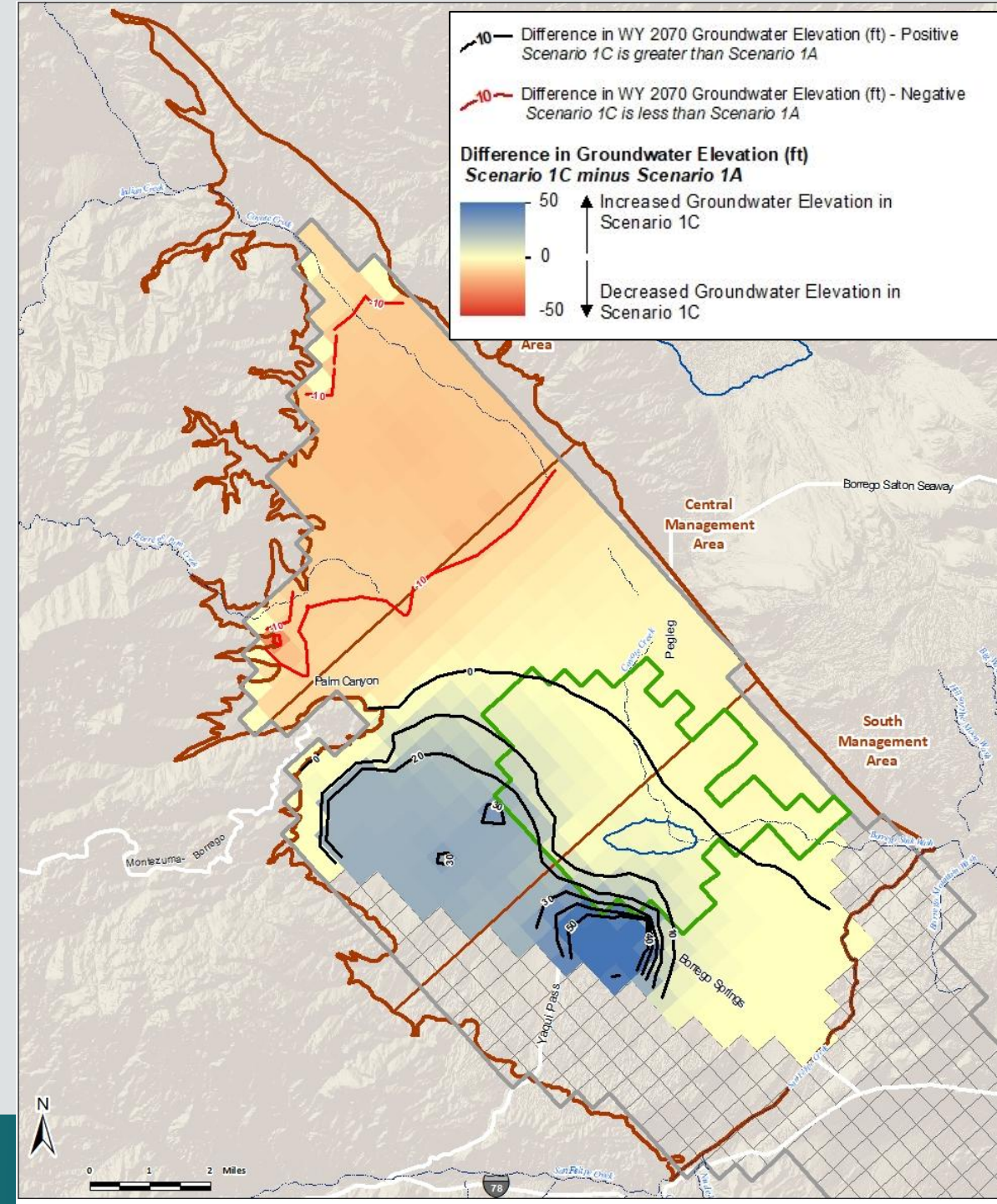
- Most sustainable outcome - most stable groundwater-levels of the three BVHM scenarios
- Most wells show groundwater-level changes within the approximate stable range of +/-5 feet
- One localized area of decline in CMA
 - the declines are much more limited in spatial extent and magnitude and do not resemble the broad pattern of continued groundwater-level declines in Scenarios 1A and 1B
- Pumping would need to occur in a distribution that is different than that of the Judgment rights to achieve sustainability



Scenario 1C minus Scenario 1A
(WY 2070)

- Groundwater levels are projected to be higher under Scenario 1C across broad areas of southwestern area of the Basin, with improvements of 30 to 50 feet in some locations
- Groundwater levels are lower in the northern portion of the Basin under Scenario 1C than under Scenario 1A, generally on the order of 10 feet (less than the increase in levels in Scenario 1A)
- Little to no change in southeastern portion of the basin

WEST YOST



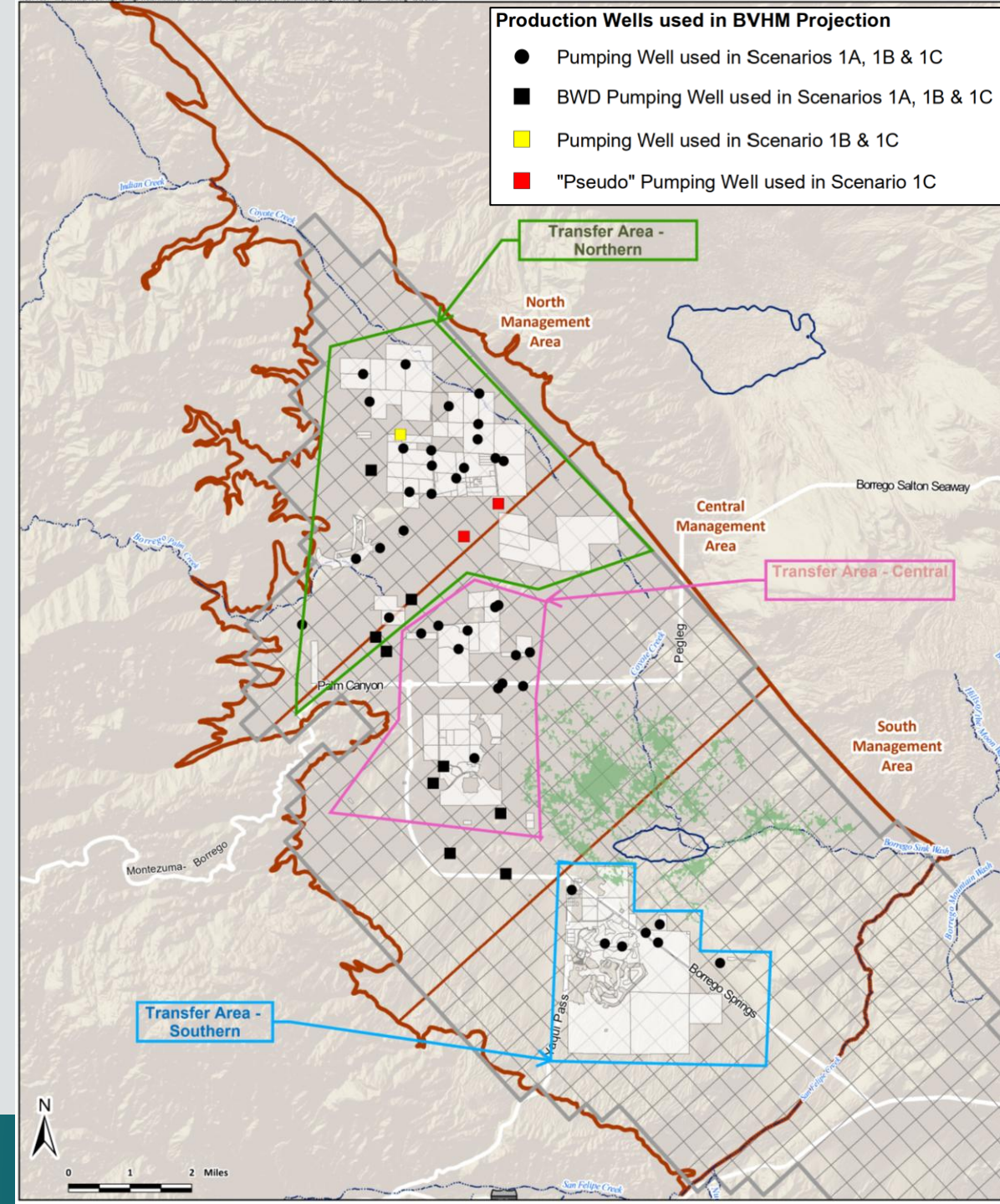
Proposed Transfer Areas

Recommendations

- Delineate Transfer Areas for purposes of applying transfer restrictions based on best available information at this time
- Update framework after model improvements or new pumping projections

Transfer Framework (for all types – Permanent, CO):

- No transfers into the Southern Transfer Area from Central or Northern Area
- No transfers into the Central Transfer Area from Southern or Northern Area
- No transfers into the Northern Transfer Area
- Allow transfers among parcels within the same Transfer Area
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Input Requested

1. Do BVHM projection results provide sufficient technical basis to conclude that pumping location materially affects whether groundwater levels will stabilize after 2040?
2. Is it technically reasonable to use Scenario 1B as an approximation of Judgement Scenario for purposes of this analysis?
3. Do the BVHM results support conclusion that increasing the pumping capacity beyond the current BPA rights within the Central and Southern Transfer Areas could cause or exacerbate projected chronic lowering of groundwater levels after 2040?
4. Do the BVHM results support conclusion that the northern portion of the Basin has greater physical capacity to support pumping than the central and southern portions?
5. Is the proposed use of parcel-based Transfer Areas technically reasonable, given the location of BPA parcels, modeled pumping wells, and projected groundwater-level responses?
6. Are there technical flaws in the analysis that would impact Staff's conclusion that transfers be limited to within each of the three Transfer Areas?
7. Are there additional analyses that are recommended before the Board could rely on the proposed transfer restriction framework?

Next Steps

- TAC will be given two weeks to review proposed basis for transfer restriction framework and provide written comments to Watermaster Staff **by June 19th at 12 pm**
- Staff will summarize TAC input and present the proposed framework to the Board for discussion and direction at its June 24th Board meeting
- Late comments will not be included in the summary to the Board

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Next TAC Meetings

- No future meetings scheduled in WY 2026
- Only two meetings planned for WY 2027, details and timing TBD