

Meeting Minutes

**Engineering/Minerals
Tonto National Forest
Phoenix, AZ**

To: Project Record

From: Sondra Johnson, SWCA

Re: Resolution - All Things Water Working Group Meeting 2/20/2020

Attendees:

USFS: Mary Rasmussen, Lee Ann Atkinson, Judd Sampson, Edward Gazzetti,

SWCA: Chris Garrett, Sondra Johnson

RCM: Jim Bulter, Greg Ghidotti, Hale Barter, Cameo Flood, Gustavo Meza-Cuadra, Tim Bayley, Chris Pantano, Janeen Duarte, Jason B.

USACE: None

San Carlos Tribe: None

ADWR: Bret Esslin

EPA: Hugo Hoffman, Hannah Daily

AGFD: Jim Ruff

ADEQ: Wayne Harrison

BGC: Nick Enos, Gabi Walser, Mark Williamson, Hamish Weatherly, Kate Patterson, Derek Groenendyk

Handouts:

Agenda (1pg)

Discussion:

ROLL CALL

INTRODUCTIONS

LOGISTICS

- No problems reported accessing SharePoint site
- Meeting notes from January workgroup yet to be distributed

RECAP OF ACTION ITEMS

WR-6 (updated water-related data since 2016) – In progress

WR-7 (updated water quality data for Skunk Camp groundwater and Gila River) - In progress

WR-9 (springs inventory 3.0) – In progress

WR-10 (closure and reclamation design, cover) – In progress. Applicability to the water workgroup may be limited but will bring forward when appropriate.

WR-12 (Queen Valley hydrologic framework) – In progress

WR-13 (Prucha responses) – In progress

RECAP OF JANUARY CONCLUSIONS

1. There is no analysis benefit to expanding the groundwater model domains or merging the three groundwater models (Mine Site; Desert Wellfield; new Skunk Camp). However, we want to make sure Queen Valley is analyzed appropriately (see action item WR-12)
2. We need to modify the language we use to describe the potential for a crater lake (“remote and speculative”); however, the analysis of the impacts of a subsidence lake <1000 years in the future remains inappropriate

WHITEPAPERS

- Discussion of three whitepapers that have been written in the background. “White paper” is an internal tool being used to capture rough thoughts, not quite yet ready for review or decision.
- Decision to circulate those whitepapers will be made later.

EAST SALT RIVER VALLEY DESERT WELLFIELD MODEL

- Presentation from H. Barter (Montgomery & Associates), focused on an analysis of the cumulative impacts of known future water users in the East Salt River Valley. Original work presented to ASLD in September 2019.
- Key scenario additions:
 - o Two runs: No Action = No Desert Wellfield; Proposed Action = Desert Wellfield starting in 2021
 - o All committed 100-year Assured Water Supply demands included
 - o Withdrawal of all long-term storage credits included. In the No Action, the Resolution-owned LTSCs are all withdrawn from the aquifer by somebody else; in the Proposed Action, these are withdrawn at Desert Wellfield
 - o Cessation of CAP storage after 2030
- Basic results show the aquifer at 687 feet below land surface at maximum impact; 1,000 feet below land surface is the threshold of interest, based on AMA regulations. This modeling basically supersedes our estimate of cumulative impacts on p. 342 of DEIS.
- Discussion of depth to bedrock
- Discussion of Superstition Vistas, and whether it is reasonably foreseeable and can be quantified.
 - o Clarified that yes, Superstition Vistas was considered reasonably foreseeable by the Forest Service.
 - o Specific developments in the area were also reasonably foreseeable, but not generic population change.
 - o However, cannot quantify the water use of Superstition Vistas at this time. There was substantial discussion of this issue with a clear position stated by the groundwater modelers that they do not feel it is appropriate to try to guess how Superstition Vistas might develop, based on the limited information available.

SUBSIDENCE IMPACTS IN THE EAST SALT RIVER VALLEY

- This discussion stemmed from the modeling discussion. There was consensus that because groundwater levels have rebounded since lows in 1983, the mechanisms that cause subsidence

(compression of aquifer sediments) have already taken place. Further subsidence would not be anticipated until water levels drop below those levels again, which would not take place until about 2058.

- There was discussion about public comments submitted that suggest we could use the MODFLOW subsidence package. There was consensus that a modeling approach was not appropriate here, because of the unknowns and complexities involved, and the overall impossibility of attributing subsidence in a heavily used basin to a single pumping source.
- However, there was agreement that there may be other approaches, drawing on regional analogs, that could estimate the potential impact. RCM agreed to investigate some options for how to do this, including recent publications for Apache Junction (WR-15)
- At the very least, it was suggested that more context could be provided in the EIS comparing Desert Wellfield wells to other wells over the same time period.
- W. Harrison also made a specific suggestion for a subsidence mitigation measure, to contribute to the ADWR INSAR subsidence monitoring program.

SCARCITY DISCUSSIONS IN EIS

- Clarified that we will have an expanded writeup in the EIS to respond to comments. After discussion, the main tenets of this writeup will include:
 - o The focus of the write up should not necessarily be “scarcity”, but rather “competing uses of water”
 - o We won’t be making a judgment call on whose competing uses are appropriate, but disclosing the impacts and conflicts anticipated
 - o CAP is not assumed to make up any part of RCM’s water supply, for the purposes of disclosure. There are other details available, but the general consensus was to not pursue these details, but assume non-availability. B. Esslin provided some sourcing for information on future scenarios.
 - o There was consensus that there is a distinction to be made between water use over a discrete period like RCM’s water use, versus continuous future water use like residential developments
 - o There was consensus that the appropriate comparisons were: a) put RCM’s water use in context of regional scarcity (drought, climate change), and b) put RCM’s water use in context of regional water use, as a percentage (WR-16)

VETTING OF EAST SALT RIVER VALLEY MODEL

- Discussion of whether a specific review needs to be made of a regulatory model
- Specific suggestions from J. Butler and H. Hoffman about being careful with language, about the intent of the model and how it was used in this context.
- Discussions of the difference between a “model” and a “scenario”
- Decision for G. Walser to take on task of reviewing SRV model documentation and preparing a memo to determine whether it was appropriately used (WR-18)
- Decision for TNF to request from ADWR any documentation on acceptability of model or scenario changes (WR-17)

STORMWATER APPROACH TO WATER QUALITY

- Discussion of whether assumption that stormwater would never be released is the appropriate approach
- General consensus that releases could happen, either from a failure or in the course of operations from a greater than 200-year, 24-hour event. In this event, the seepage collection pond would fill and the spillway would release water downstream. The contact water for this release would solely be from the embankment, not from the tailings storage facility interior. During operations all stormwater within the facility is captured with an extremely large capacity (as discussed in detail at FMEA workshop), and after closure the cover would prevent contact with tailings.
- Agreement by RCM to estimate the quality of this release, based on the mass of chemical load from the embankment, combined with flows that would release (WR-20)
- Discussion of persistent long-term impacts (seepage) versus transient impacts (stormwater release)

DISCUSSION OF TOPICS FOR MARCH MEETING AND NEXT STEPS

- Sampling update
- Seeps and springs
- Maest report
- SWCA to circulate comments, action items, and meeting notes

Action Items:

1. WR-15 (M&A): Will investigate possible analytical tools or an approach to evaluate the local subsidence issue in or near the desert wellfield.
2. WR-16 (RCM): Provide usage numbers for ESRV for comparison to RCM pumping
3. WR-17 (TNF): Follow up with ADWR on ESRV model update approval.
4. WR-18 (BGC): Review SRV model and purpose memo on M&A extension and appropriateness of model
5. WR-19 (RCM): Resend September 2019 PowerPoint
6. WR-20 (RCM): Provide input on potential for stormwater release and estimate of quality. Focus on operations. Follow up on in Mar/Apr.
7. WR-21 (M&A): Estimate remaining water in aquifer at several snapshots in time.

Agenda

To: Attendees, Project File
From: Donna Morey, SWCA
CC:
Date: 2/20/2020

Re: Resolution Copper Mine – Water Resources Workgroup – 2/20/2020

1. Welcome and introductions
2. Logistics
 - a. Any problems accessing workgroup folder?
 - b. Review of items posted to date
3. Recap of action items
4. Recap of solid conclusions reached in January
 - a. There is no analysis benefit to expanding the groundwater model domains or merge the three groundwater models (Mine Site; Desert Wellfield; new Skunk Camp)
 - b. Modifications are needed for how we disclose the potential for a subsidence lake to develop; however, analysis of the impacts of a subsidence lake (>1000 years in the future) is not appropriate
5. Update on topics not on agenda
 - a. White paper: Water use by mine (Emerman)
 - b. White paper: Geothermal water in Shaft 10 (Emerman)
 - c. White paper: Power requirements (Emerman)
6. East Salt River Valley Desert Wellfield Model
 - a. Presentation of report (M&A)
 - b. Review and discussion of comments
 - i. Subsidence modeling
 - ii. Estimate of available groundwater in ESRV from RCM
7. Scarcity
 - a. Review and discussion of comments
 - b. Approach and pertinent topics for writeup
 - c. Data sources to consider
 - d. Scope of discussion
 - i. Colorado River?
 - ii. Pinal County?
8. Water Quality – Stormwater Analysis

- a. Review and discussion of comments
- b. Approach for considering stormwater controls

9. Planning for March meeting and water quality issues

10. Open discussion

11. Next Steps

100-Year Drawdown Analysis for Desert Wellfield Pumping, Resolution Copper EIS



Resolution Copper | September 30, 2019

Summary of Results

- Projected depth to water at Desert Wellfield does not draw down below 1,000 feet below land surface for the Alternative 2 maximum Resolution pumping
- Minimal layer 3 dry cells at or near basin margins with and without Desert Wellfield pumping



Presentation Overview

Part 1: Flow Model Results

Part 2: Flow Model Construction

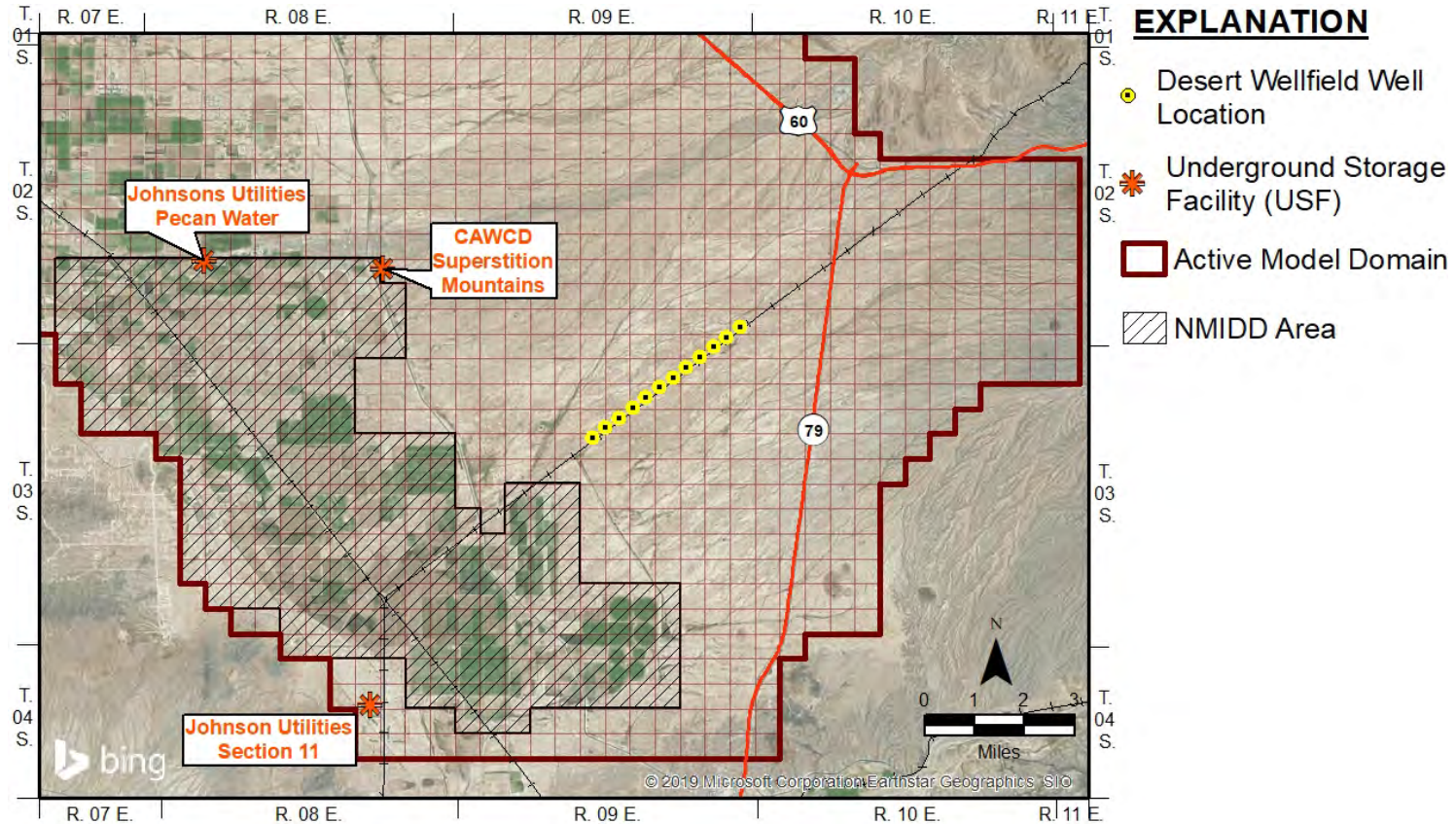


Part 1: Projected Drawdown for 100-Year Predictive Period with Desert Wellfield Pumping



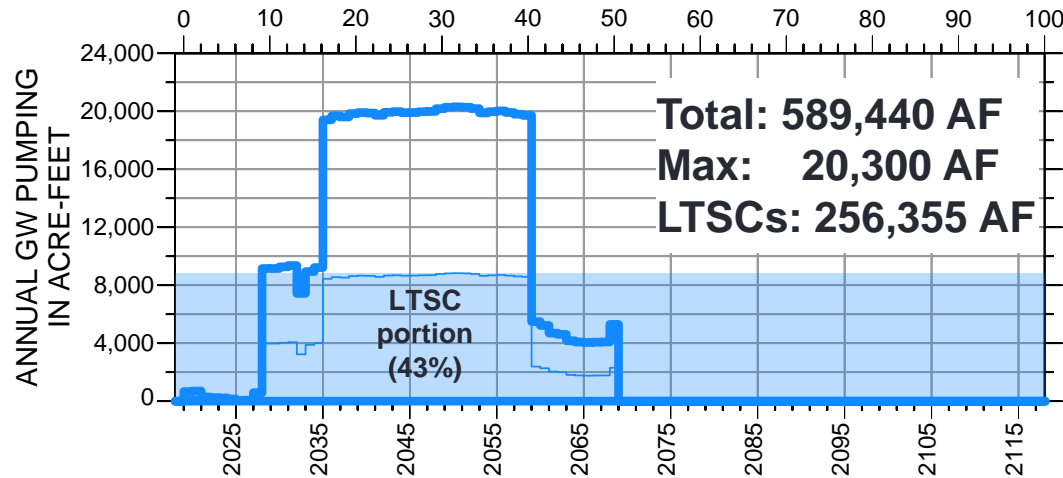
Desert Wellfield Location

- Simulated 12 wells along MARCo corridor



Desert Wellfield Pumping for Alternatives 1 & 2

Alternative 2



Alternative 1: Base Case

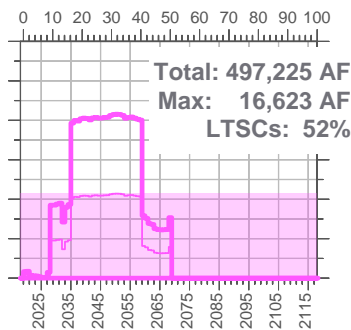
- No pumping at Desert Wellfield
- Resolution's LTSCs are included with the total pumping of SRV LTSCs using the Hipke model distribution

Alternative 2: Maximum Pumping

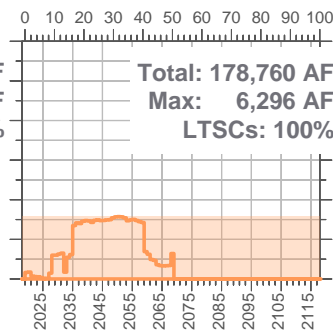
- 50-year duration
- Peak pumping for 24 years
- Resolution's LTSCs withdrawn at DW

- Note: 4 additional alternatives (Alt 3-6) in the EIS report are not simulated

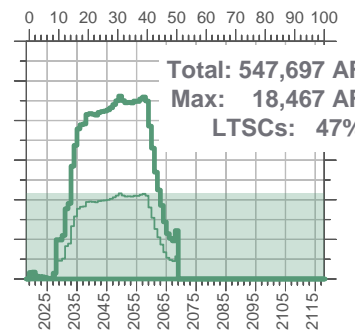
Alternative 3



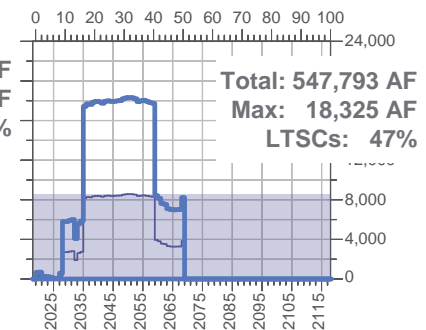
Alternative 4



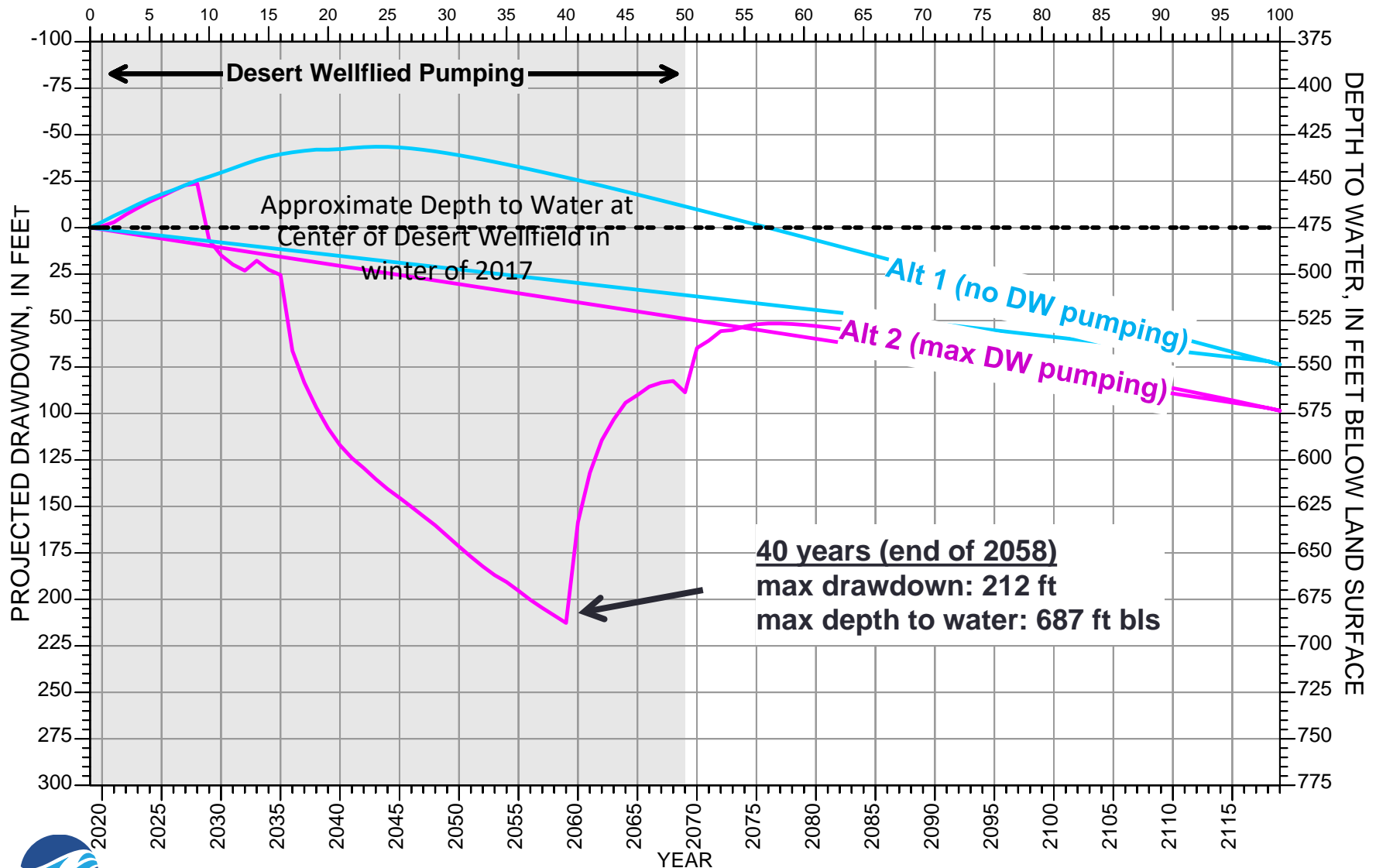
Alternative 5



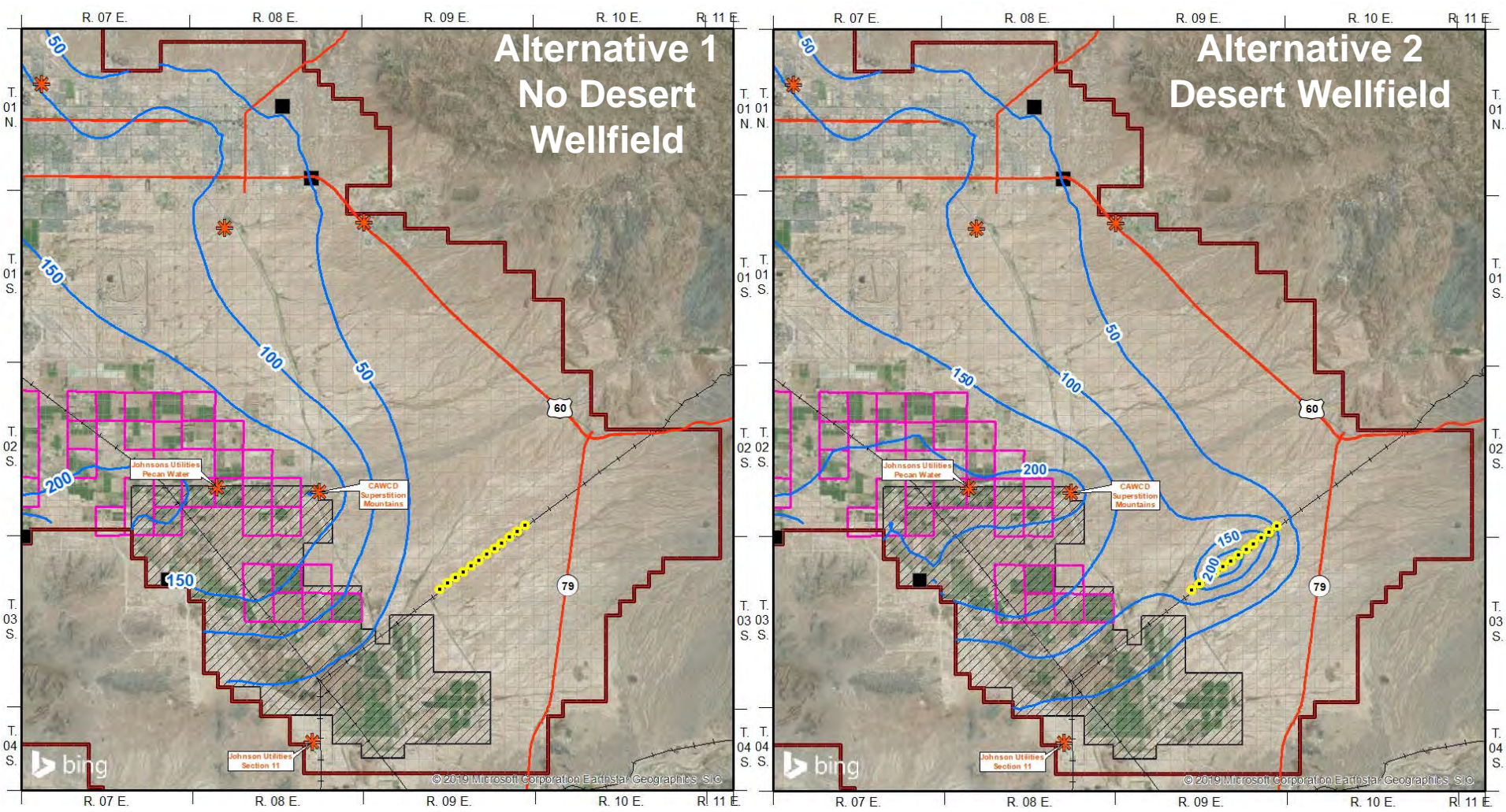
Alternative 6



Results: Projected Drawdown at Center of DW



Results: Projected Drawdown in East SRV after 40 years (2058)



EXPLANATION

Desert Wellfield Well Location

Underground Storage Facility

Projected Drawdown, in feet

Active Model Domain

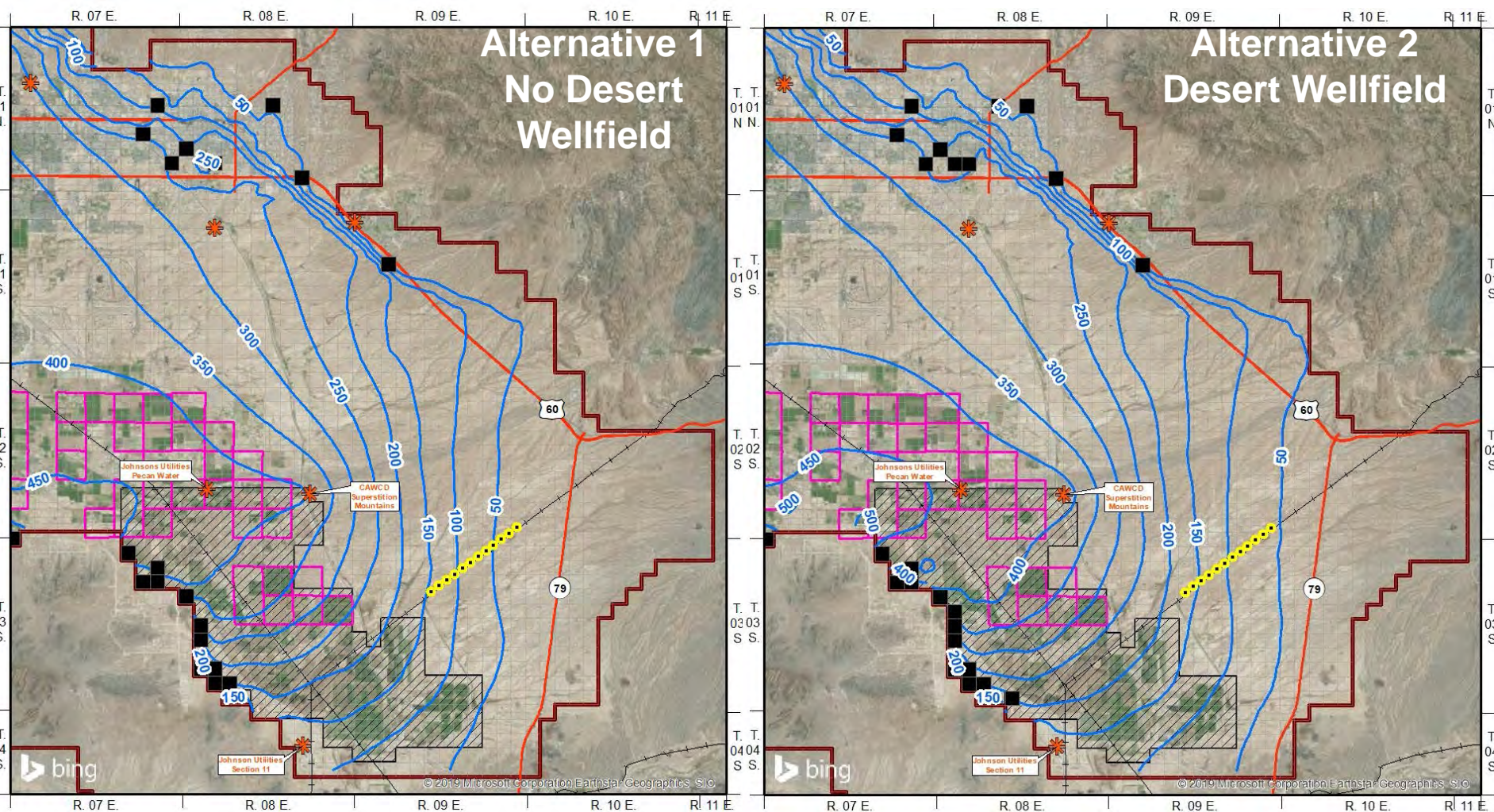
NMIDD Area

Areas with AWS Analysis Permits

Layer 3 Dry Cells



Results: Projected Drawdown in East SRV after 100 years (2118)



EXPLANATION

- Desert Wellfield Well Location
- Underground Storage Facility
- Projected Drawdown, in feet
- Active Model Domain
- NMIDD Area
- Areas with AWS Analysis Permits
- Layer 3 Dry Cells

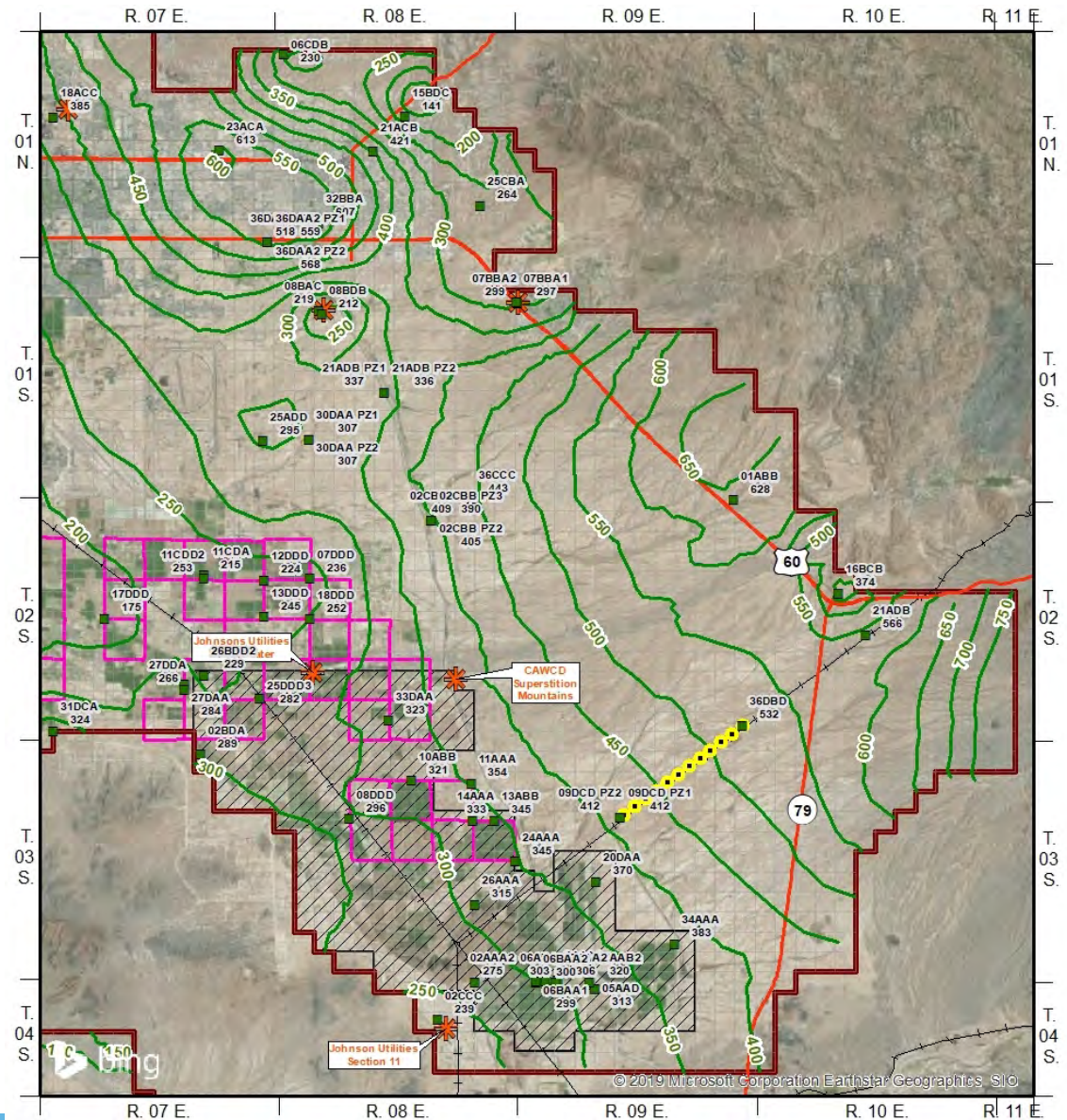


Measured Depth to Water in 2017

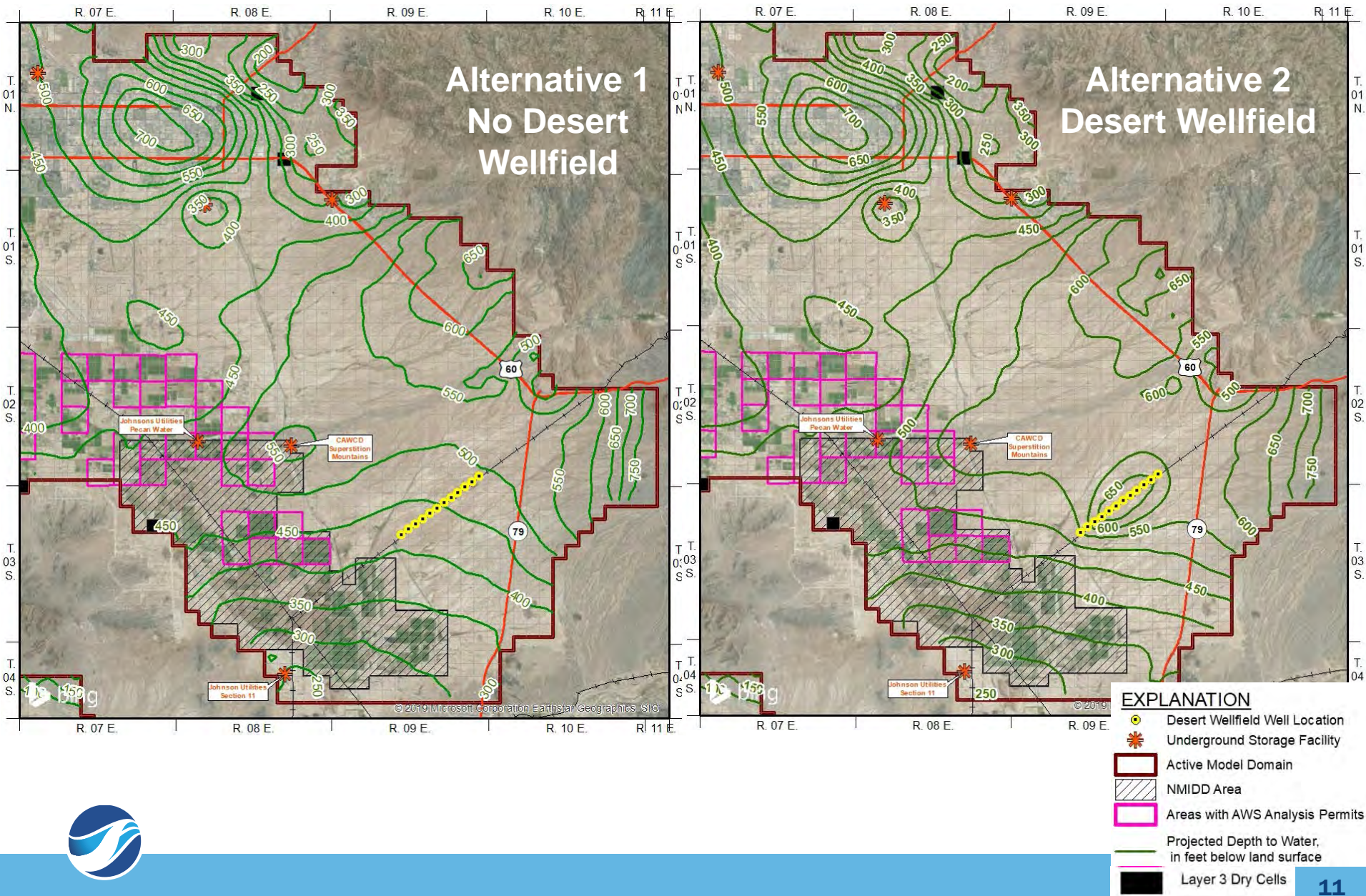
EXPLANATION

-  Desert Wellfield Well Location
-  Underground Storage Facility
-  GWSI Well, and Measured Depth to Water in Winter of 2017, in ft bls
-  Active Model Domain
-  NMIDD Area
-  Areas with AWS Analysis Permits
-  Depth to Water for 2017 Winter, in feet below land surface

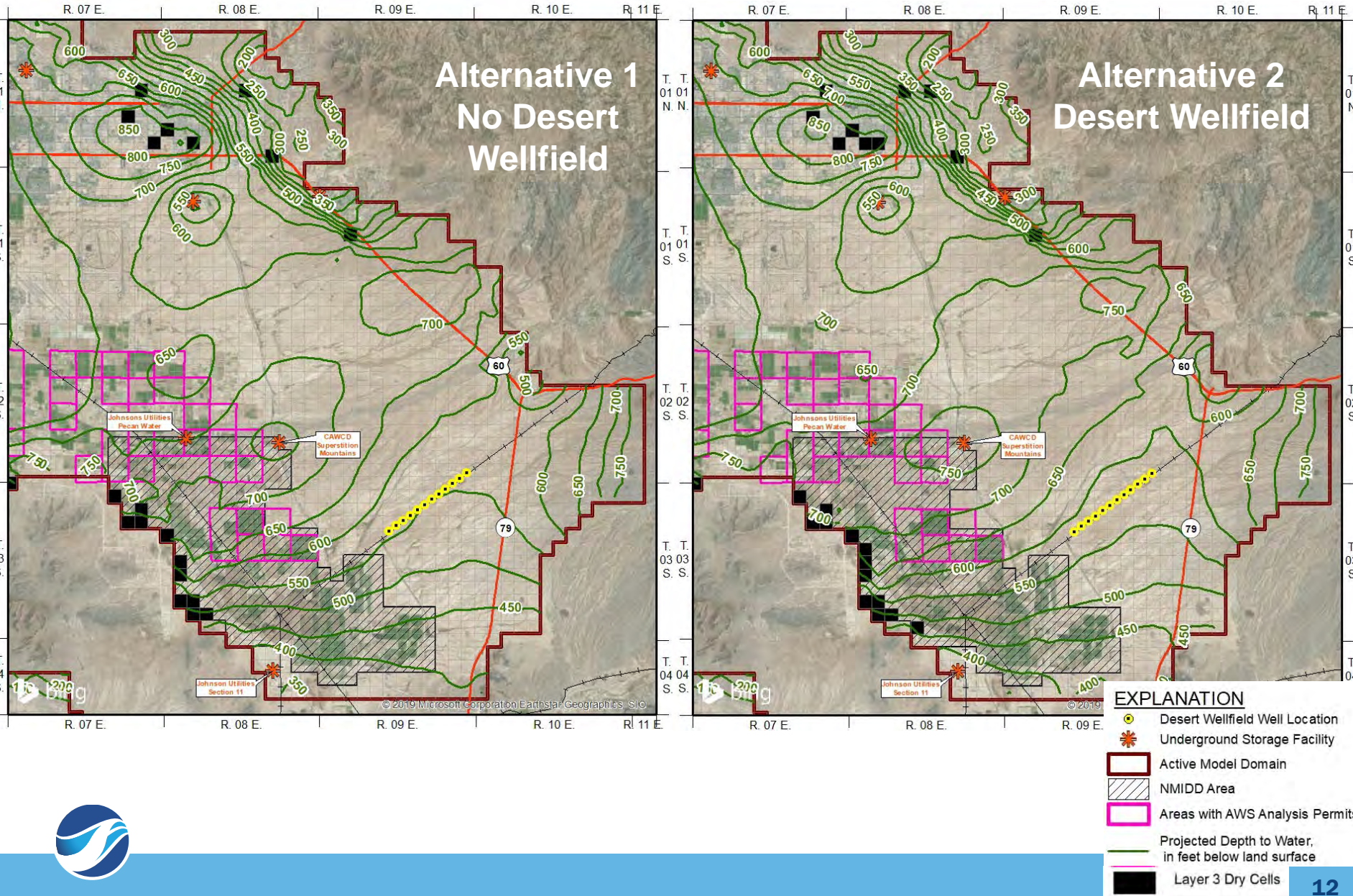
- Depth to water calculated using measured 2017 depth to water



Results: Projected Depth to Water after 40 years (2058)



Results: Projected Depth to Water after 100 years (2118)



Part 2: ADWR SRV Flow Model Update for 100-Year Predictive Simulation for the Desert Wellfield

2.1 Recharge

2.2 Pumping

2.3 LTSC Accounting



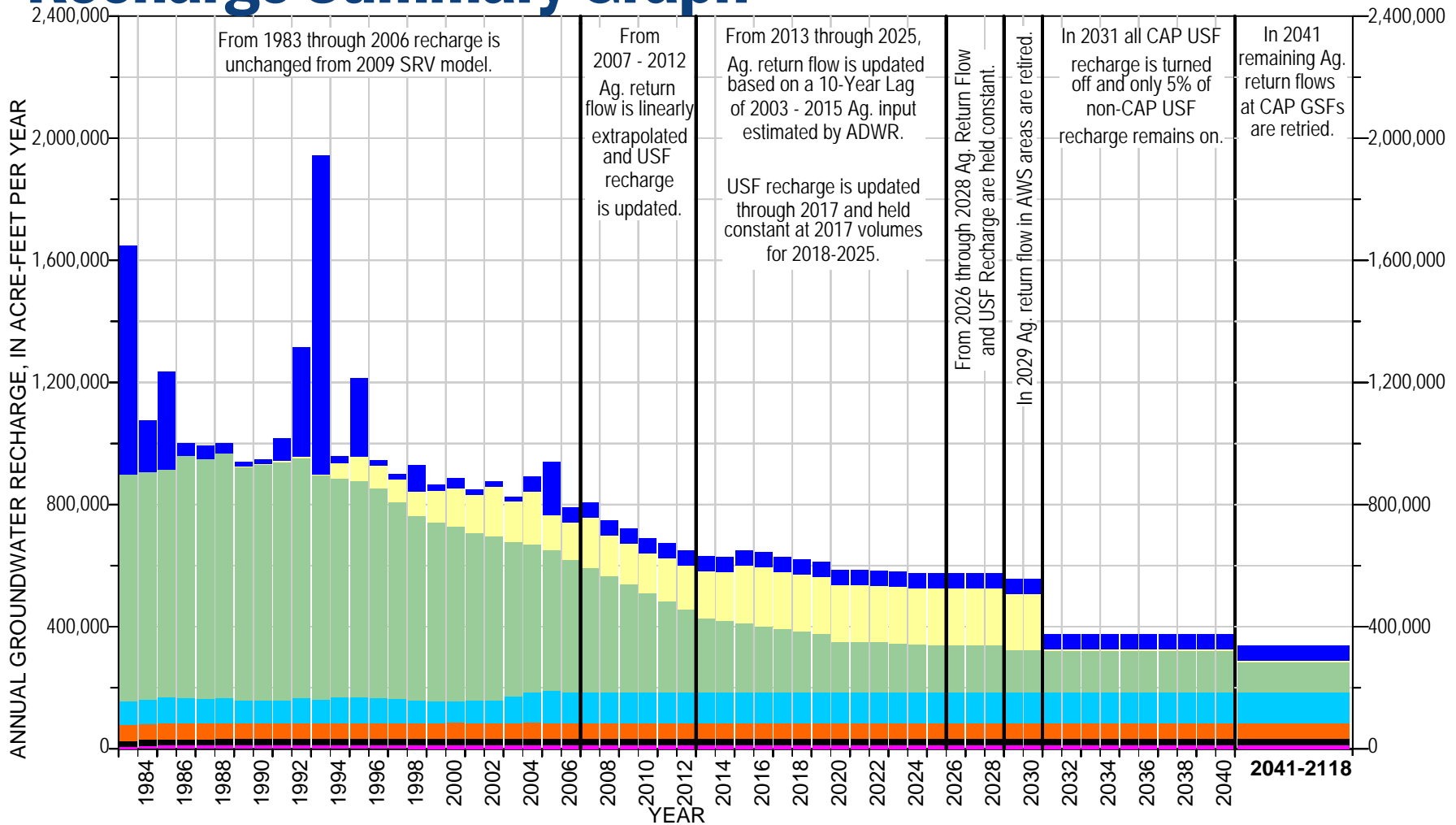
Resolution Long Term Storage Credits to Date

Facility Name	Total (AF)	Total after 5% Deduction (AF)
Phoenix Active Management Area		
New Magma Irrigation Drainage District (NMIDD) GSF	195,630	187,575
Long-Term Storage Credits purchased from Gila River Water Storage LLC stored at NMIDD	---	36,936
Roosevelt Water Conservation District (RWCD) GSF	14,000	13,300
Tonopah USF	19,637	18,544
Phoenix AMA Total	---	256,355
Pinal Active Management Area		
Hohokam Irrigation Drainage District GSF	60,390	56,780
Pinal AMA Total	60,390	56,780
Phoenix and Pinal AMA Total	---	313,135

AF = acre-feet; Data from annual reports submitted to ADWR accessed through ADWR imaged records



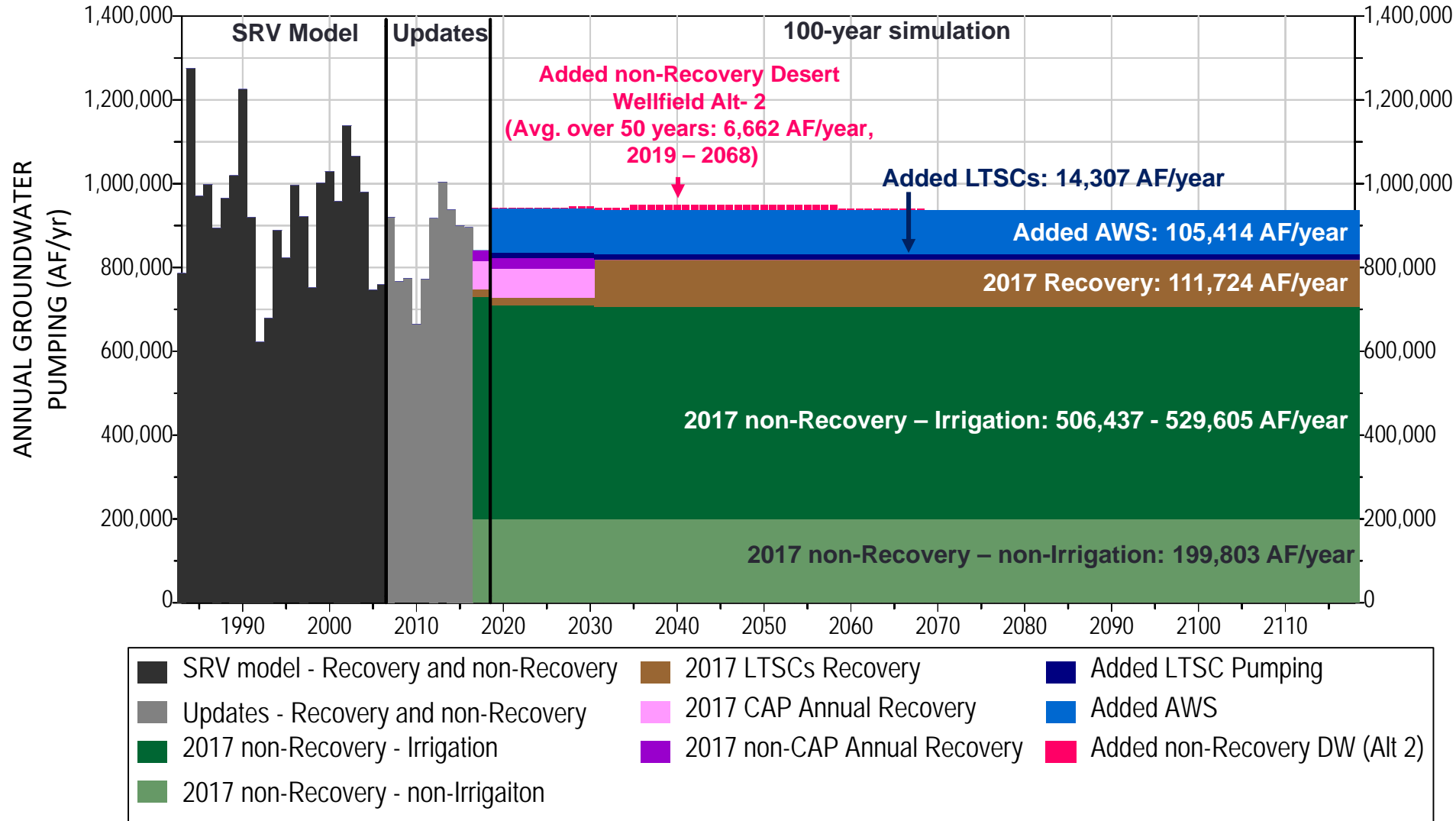
Recharge Summary Graph



EXPLANATION



Simulated Pumping Summary






Modeling Summary

- Model Construction
 - Extended SRV model simulation through 2118
 - Updated using available 2017 pumping and recharge data
 - Added future pumping for AWS permits, and retired agricultural pumping and irrigation recharge due to urbanization
 - Removed CAP sources of recharge after 2030
 - Recovered 100% of LTSCs
- Results
 - Projected depth to water at Desert Wellfield does not draw down below 1,000 feet below land surface for the Alternative 2 maximum Resolution pumping
 - Minimal layer 3 dry cells at or near basin margins with and without Desert Wellfield pumping






1983 & 2058 Alt 2 GW Levels Comparison

EXPLANATION

-  Desert Wellfield Well Location
-  Underground Storage Facility
-  Active Model Domain
-  NMIDD Area

Simulated 1983 Water Level minus
Alt-2 Projected 2058 Water Levels

-  negative values indicate rise
-  zero indicates no change
-  positive values indicate drawdown

