

A MUNICIPAL PERSPECTIVE OF ENHANCED AQUIFER MANAGEMENT

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WHY DO WE NEED ENHANCED AQUIFER MANAGEMENT?

- What is the problem?
- What is Enhanced Aquifer Management (EAM) trying to fix?
- Concepts of Arizona Municipal Water Users Association's (AMWUA) EAM



AMWUA CONCEPTS APPLY TO ONLY TO THE PHOENIX AMA



Picture source: http://en.wikipedia.org/wiki/File:Phoenix_AZ_Downtown_from_airplane.jpg

FUTURE PHOENIX AMA AQUIFER CONDITIONS

- Aquifer is slowly declining
- Future “Hot Spots” will occur
- “Hot Spots” need active management

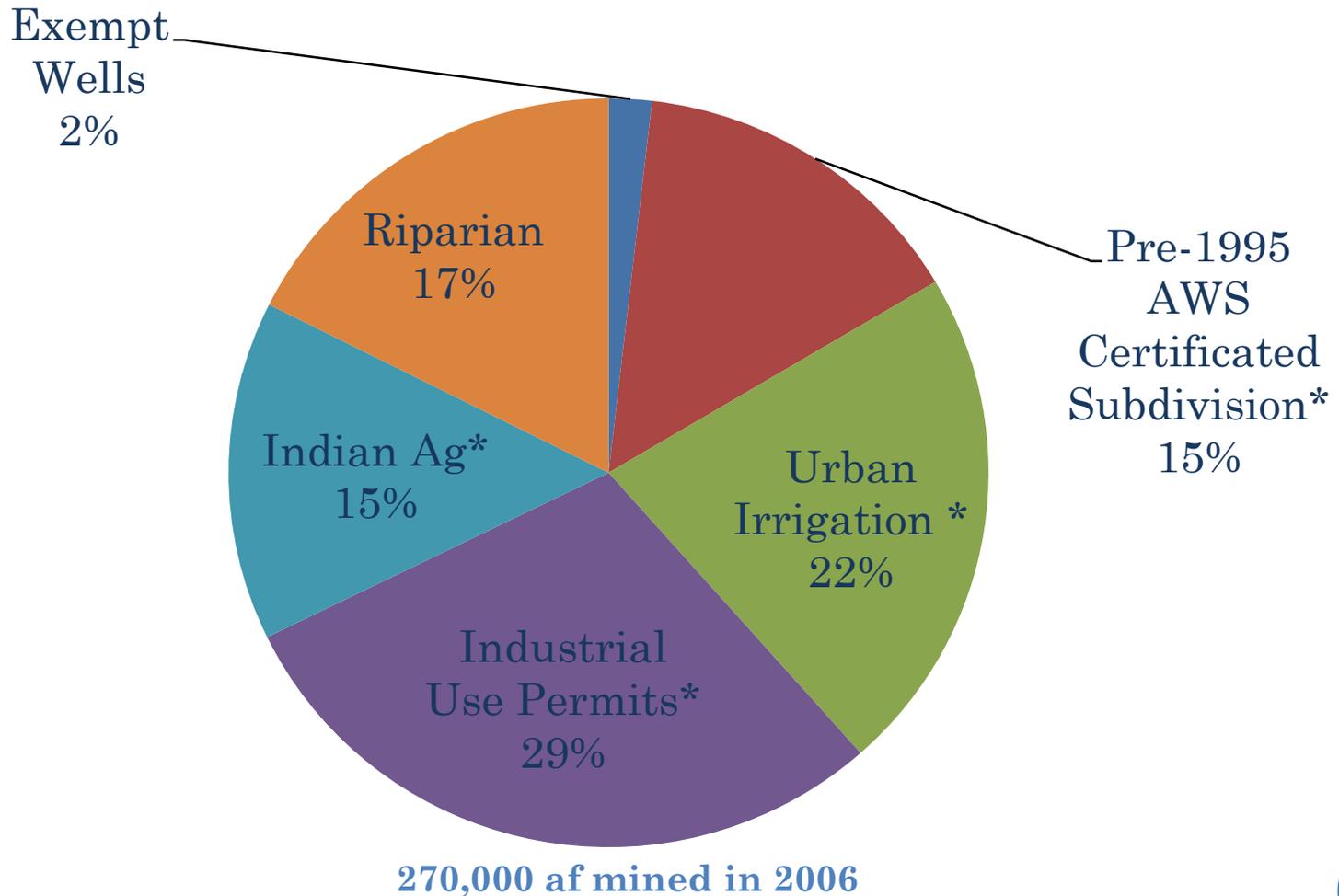


Picture source: <http://www.marinebio.net/marinescience/02ocean/hwgeo.htm>

FUTURE DEVELOPMENT DOES NOT MINE GROUNDWATER

- ADWR prohibits mined groundwater for future developments
- All mined groundwater must be replaced:
 - before pumping (recharge) or
 - after pumping (replenish)

PHOENIX AMA GROUNDWATER MINING FOR YEAR 2006



*adjusted for Incidental Recharge



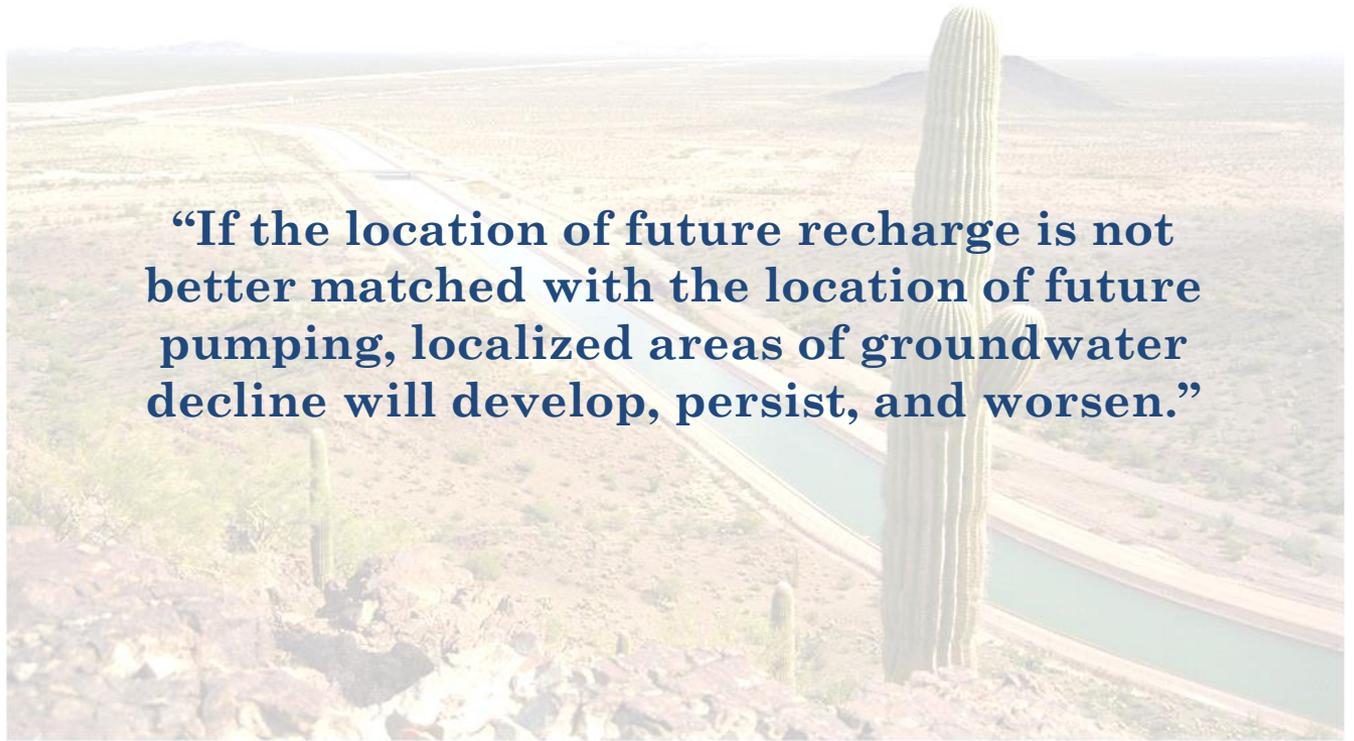
EAST VALLEY WATER FORUM MANAGEMENT PLAN (EVWF)

Study Results

- Recharge is important
- Need to match future recharge to future pumping
- A balanced aquifer (safe yield) is attainable by 2025
- Groundwater in some sub-basins is limited
- Areas with surface water supplies are in good condition

EVWF 2ND KEY FINDING

“If the location of future recharge is not better matched with the location of future pumping, localized areas of groundwater decline will develop, persist, and worsen.”



2007 EVWF Management Plan AWS D Base Case Scenario (“Business as Usual”)

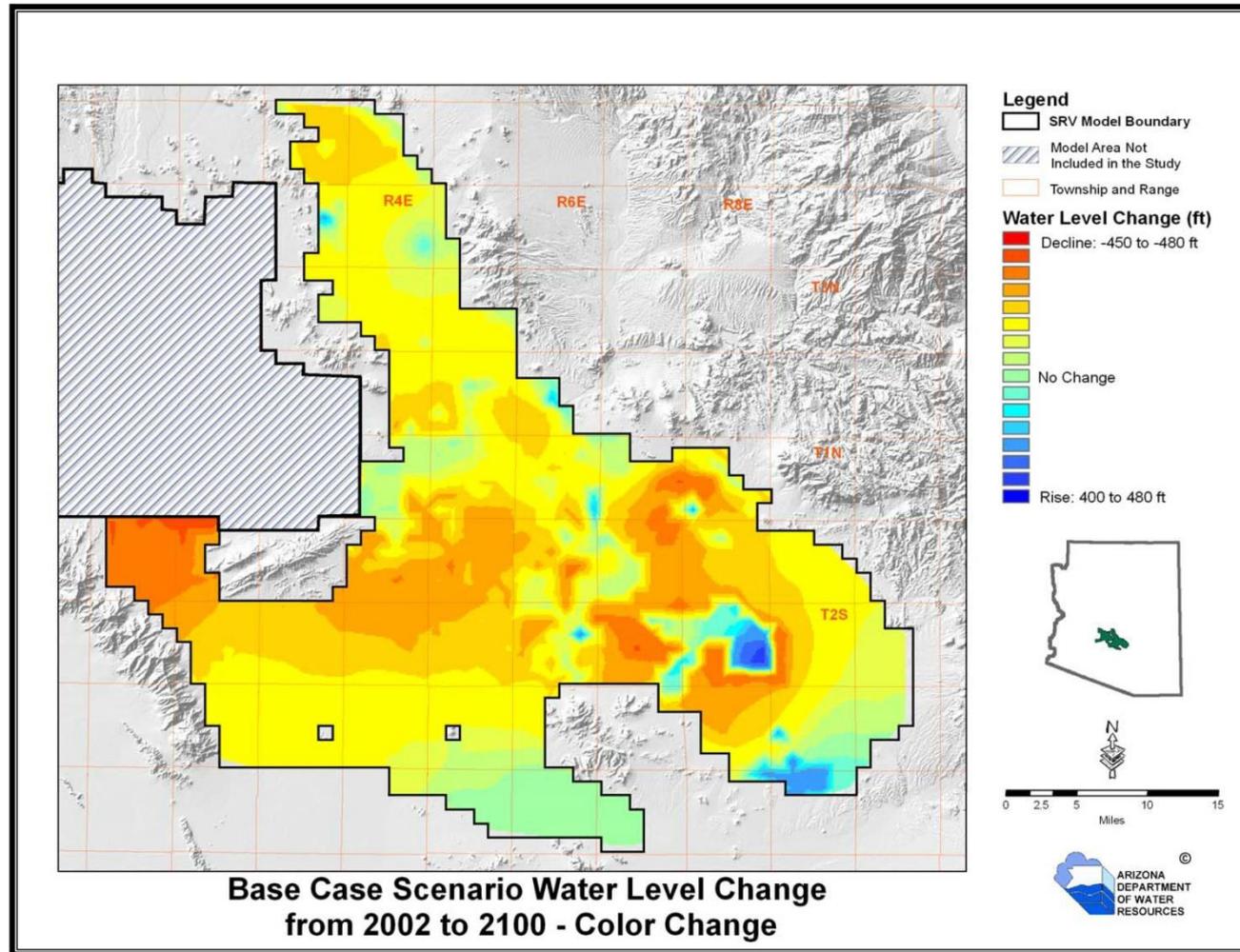
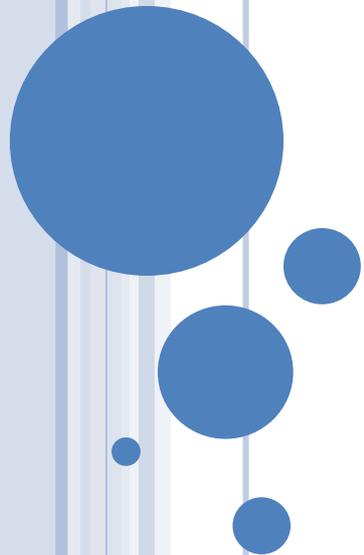
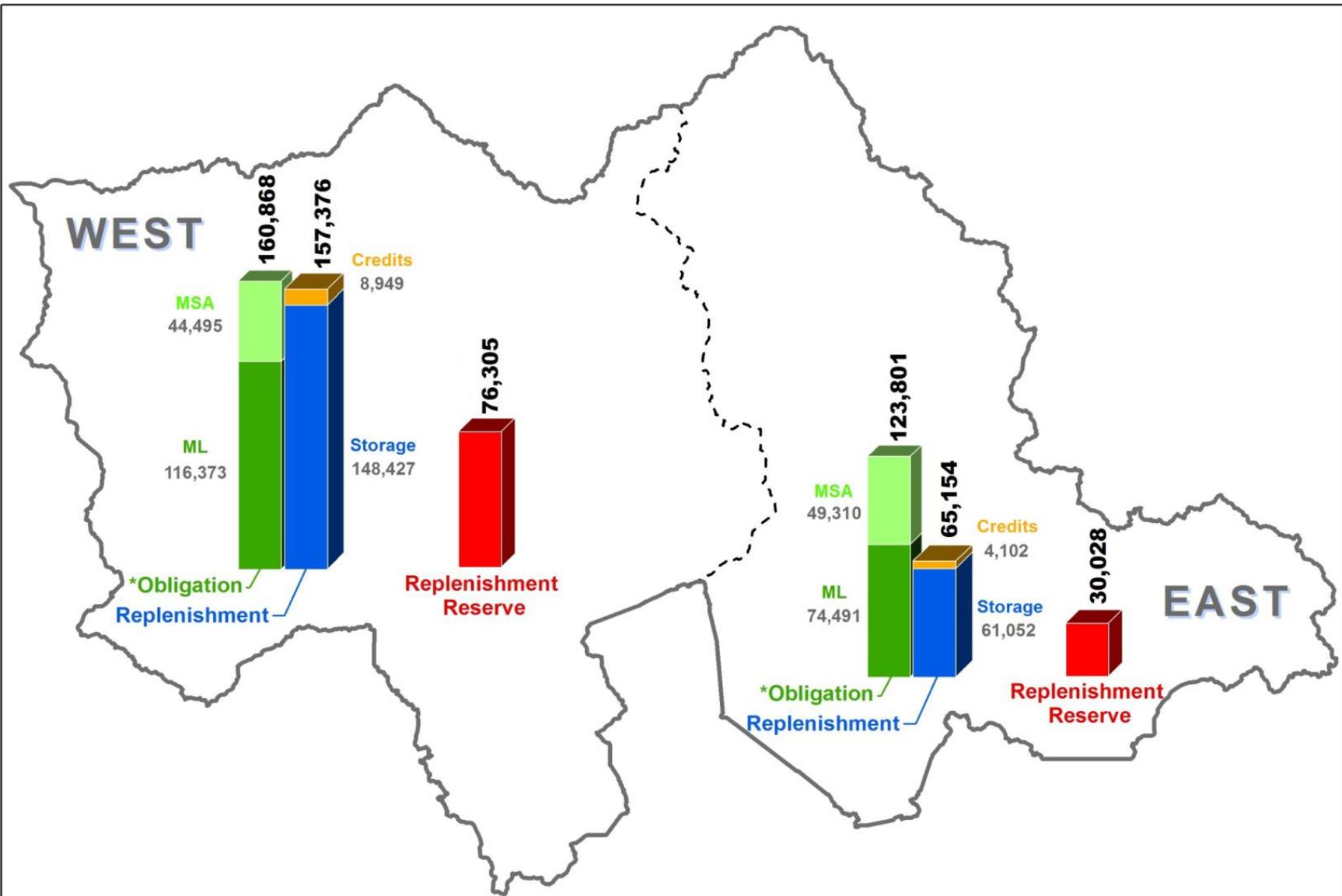


Figure 12. Base Case Scenario Water Level Change from 2002 to 2100 - represented by change in color.

LOCATION MATTERS

How municipal pumping and recharge/replenishment can help improve or worsen where the declines are felt.

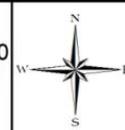




* Total obligation from 1995 through 2012

PHOENIX AMA ACCRUALS THROUGH 2011 & ESTIMATES THROUGH 2012

SCALE



Date: JULY 31st, 2013
 Location: * IGRD/Project/Analysis/Replenishment
 Projection: NAD 83, 1983, AZ State Plane, Central Zone, Intl. Feet
This map is not a legal document and is intended for reference only. It is not intended to be used for any other purpose. The user is responsible for the accuracy and reliability of the information. No warranty or guarantee of fitness is made for any use of this information. The user is responsible for the accuracy and reliability of the information. No warranty or guarantee of fitness is made for any use of this information. The user is responsible for the accuracy and reliability of the information. No warranty or guarantee of fitness is made for any use of this information.



ADWR MODEL

REPORT 22

JULY 2010

100-year modeling using new designation requests:

1. 2025 City Demands
2. 2025 City Demands using 80% surface water treatment capacity
3. Scenario 2 with demands held at 2020



2010 AWS DESIGNATIONS

SCENARIO 1 – 2025 CITY DEMANDS

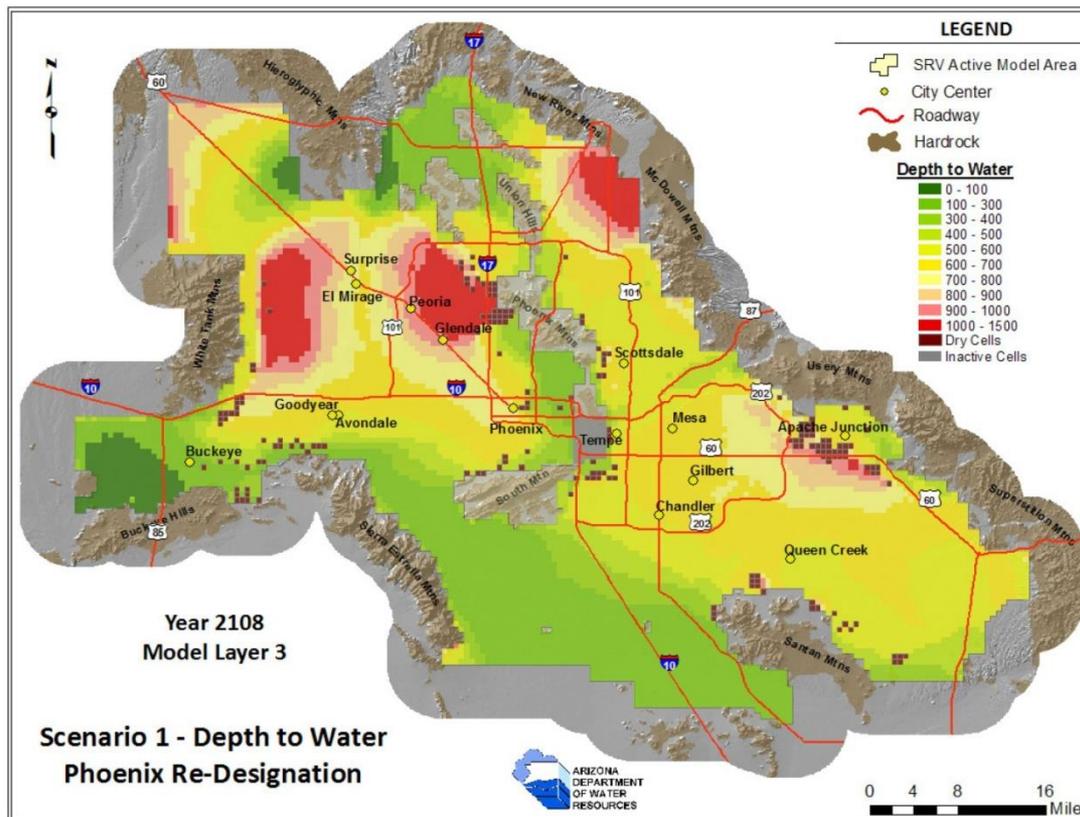


Figure 18. Scenario 1 - Depth to Water (DTW) of Layer 3 for the year 2108.

2010 AWS DESIGNATIONS

SCENARIO 2 – 2025 CITY DEMANDS USING 80% SURFACE WATER TREATMENT CAPACITY

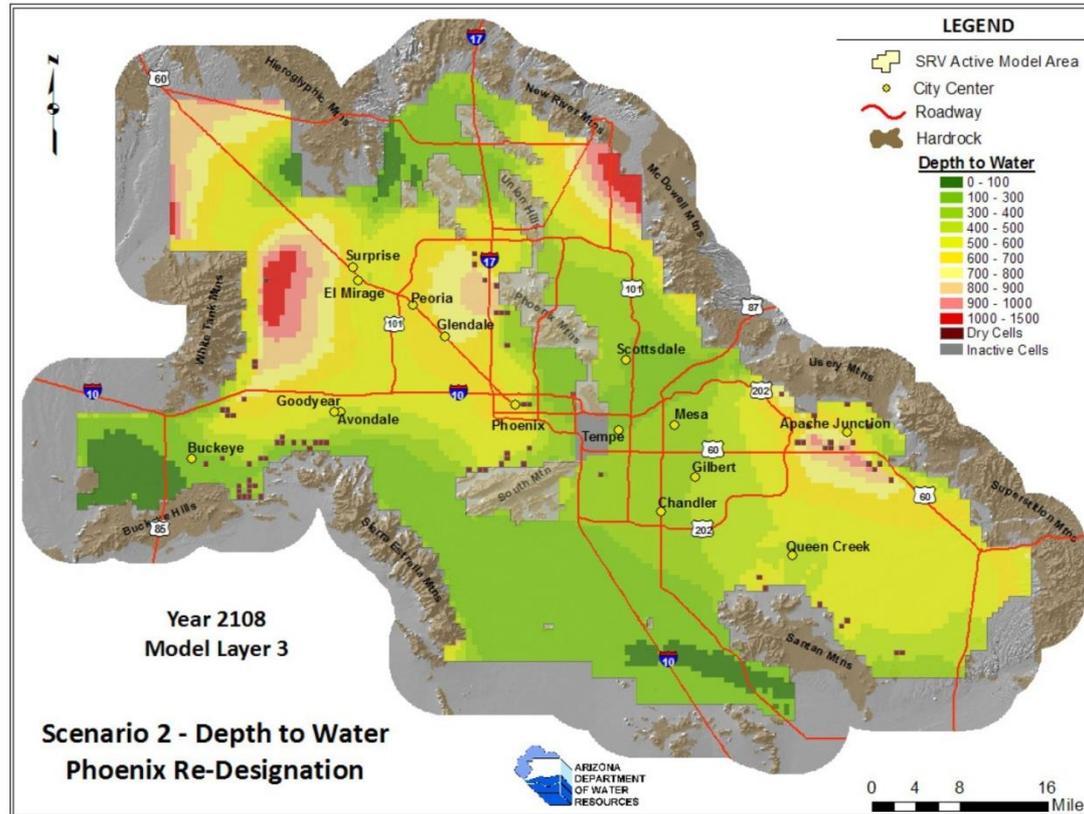


Figure 22. Scenario 2 - Depth to Water (DTW) of Layer 3 for the year 2108.

2010 AWS DESIGNATIONS

SCENARIO 3 – 2020 CITY DEMANDS USING 80% SURFACE WATER TREATMENT CAPACITY

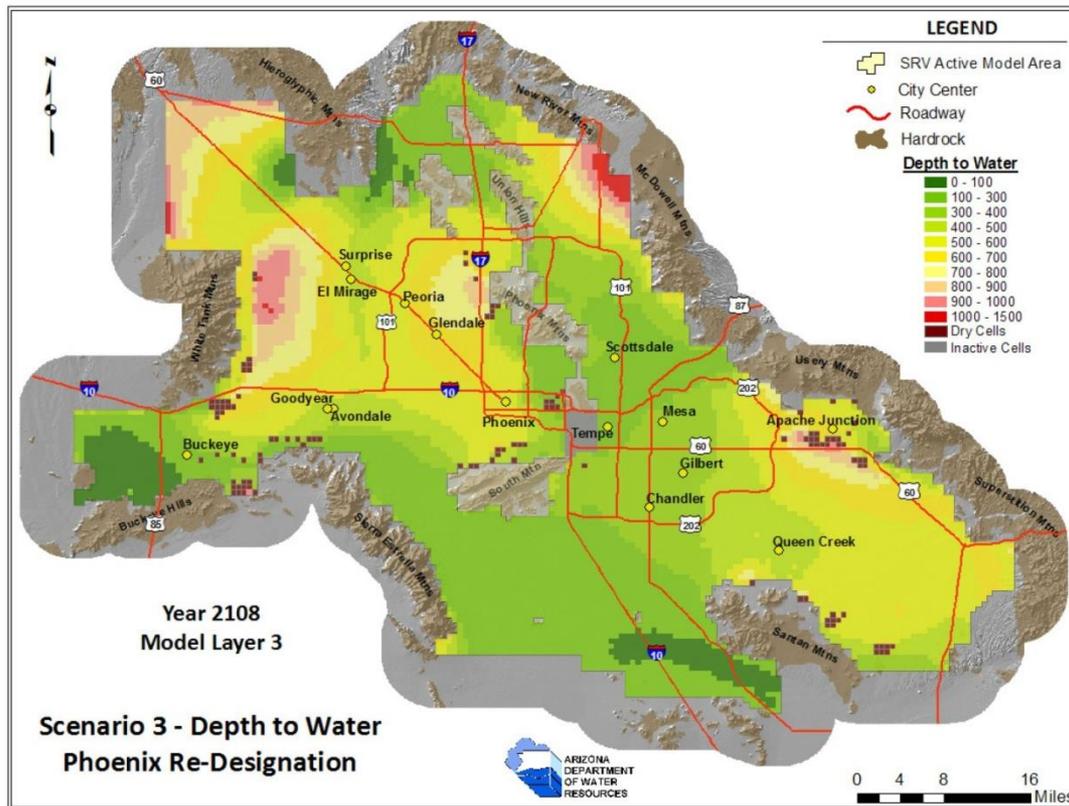


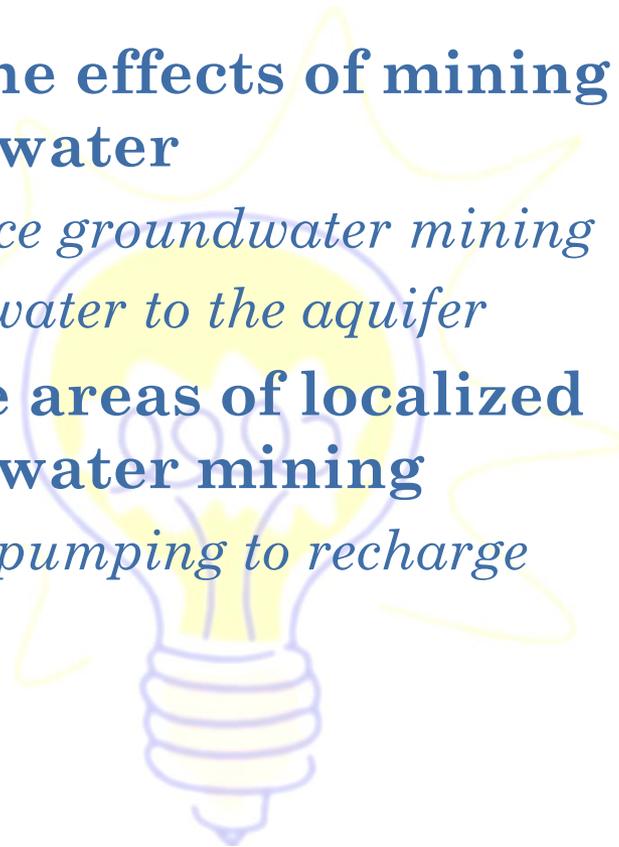
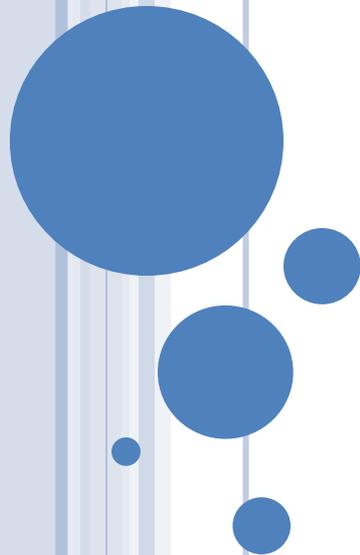
Figure 24. Scenario 3 - Depth to Water (DTW) of Layer 3 for the year 2108.

TAKEAWAYS FROM ADWR MODELING

- The aquifer will continue to decline
- Aquifer declines are more pronounced in the mountain front areas
- There are “hot spots” in the Phoenix AMA

WATER MANAGEMENT ISSUES TO RESOLVE IN THE PHOENIX AMA

1. **Limit the effects of mining groundwater**
 - *Reduce groundwater mining*
 - *Add water to the aquifer*
2. **Manage areas of localized groundwater mining**
 - *Link pumping to recharge*



ADWR'S ENHANCED AQUIFER MANAGEMENT CONCEPTS (NOVEMBER 2012)

**Link Recharge to Pumping in the same
sub-basin and within 1-mile radius**



Picture source: <http://therunningstories.com/galleries/one-mile-in>

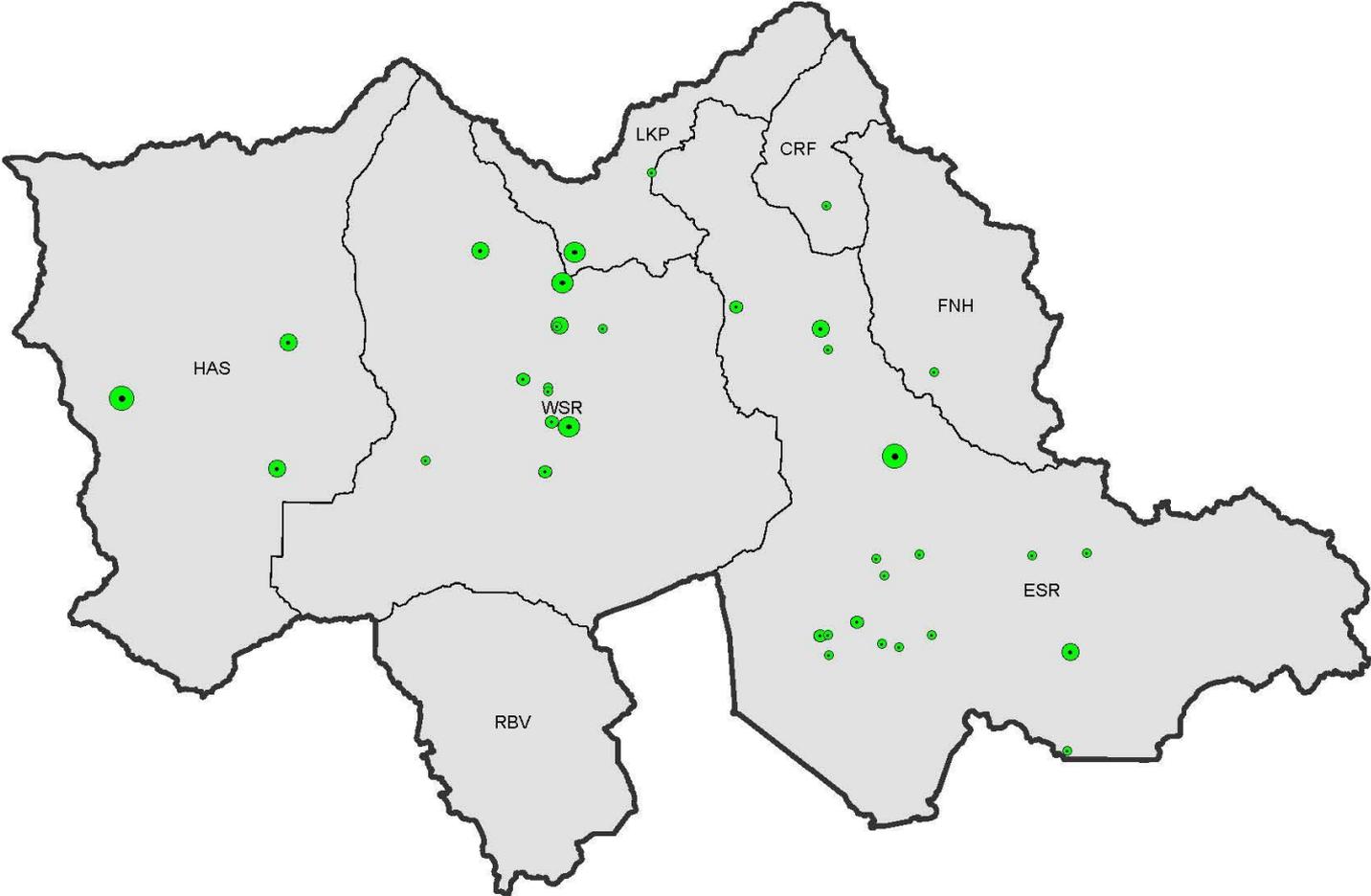
ADWR ENHANCED AQUIFER MANAGEMENT CONCEPTS

Recharge* distance from pumping	Cut to the Aquifer
Within 1 mile	0%
Outside 1 mile and in same sub-basin	10%
Outside 1 mile and different sub-basin	20%

*Recharge and replenishment are considered the same



PHOENIX AMA SUB-BASINS with Recharge Facilities



AMWUA'S ENHANCED AQUIFER MANAGEMENT CONCEPTS (JULY 2013)

**Link Recharge to Pumping in the
same sub-basin**



AMWUA ENHANCED AQUIFER MANAGEMENT CONCEPTS

Recharge* distance from pumping	Cut to the Aquifer
AS&R or Effluent	0%
Same sub-basin	5%
Different sub-basin	20%
Encourages recharge in Special Enhancement Areas	

*Recharge and replenishment are considered the same



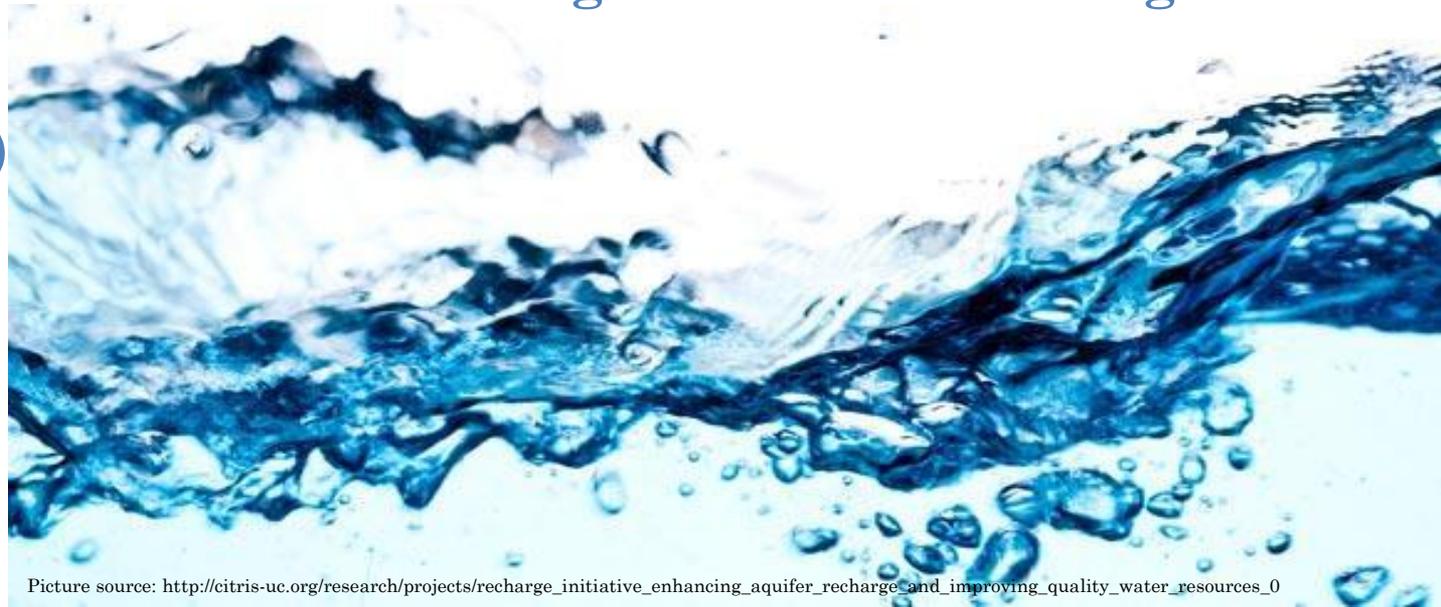
AMWUA's EAM – SPECIAL ENHANCEMENT AREAS

- Concept – Encourages recharge in Special Enhancement Areas
- ADWR designates Special Enhancement Areas
- Criteria – groundwater conditions



SUMMARY OF AMWUA'S ENHANCED AQUIFER MANAGEMENT CONCEPTS

- Links recharge to recovery
- Encourages water to be recharged in the “hot spots”
- Reduces net groundwater mining



ENHANCED AQUIFER MANAGEMENT

Both ADWR's and AMWUA's proposal can be found online
at ADWR's Fourth Management Plan:

<http://www.azwater.gov/AzDWR/WaterManagement/AMAs/FourthManagementPlan.htm>



REPORTS USED

- East Valley Water Forum Management Plant, EVWF, 2007
- Draft Demand and Supply Assessment, ADWR, 2010
- Modeling Report No. 22, ADWR, 2010

