



Arizona Department of Water Resources

Mohave County Water Resources Investigation

**Estimating Groundwater Availability in the Detrital Valley, Hualapai Valley,
and Sacramento Valley Groundwater Basins in Northwestern Arizona**

Brian D. Conway
Geophysics/Surveying Unit Supervisor



Hydrogeologic Investigations of the Detrital Valley, Hualapai Valley, and Sacramento Valley of Northwestern Arizona

- **A project of ADWR's Rural Watershed Initiative Program**
 - **Governor Hull created the Arizona Rural Watershed Initiative to focus attention on rural water resource issues and provide funds to develop regional and watershed solutions.**
 - **This funding from the legislature meets the mission of ADWR: "...ensuring long-term, safe, sufficient and secure water supply..."**
- **A contract was initiated with the USGS in 2005 for the Mohave County region**
 - **The Detrital Valley, the Sacramento Valley, and the Hualapai Valley groundwater basins are all being studied with the same intensity.**
 - **ADWR and USGS have worked cooperatively to complete work projects in this contract.**

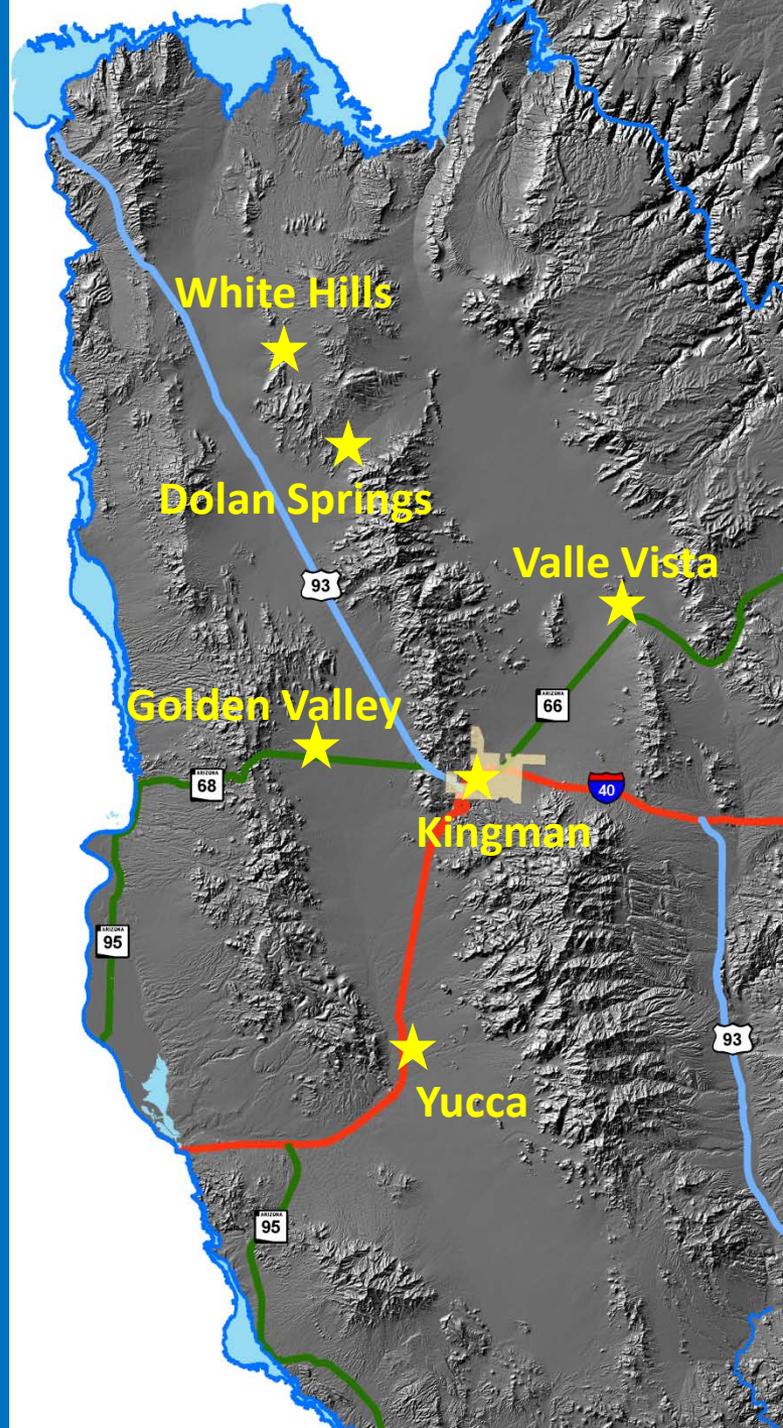
- **Study Components**

- **Assess the current state of knowledge of groundwater movement, existing data collection networks, and need for improvement**
- **The hydrogeologic framework**
 - **GEOTEM**
 - **Ground-based TEM data**
 - **Gravity surveys and analysis**
 - **Aquifer properties**
- **Current groundwater storage**
- **Groundwater flow, groundwater storage and the water budget**
 - **Ground water movement**
 - **Water budget**
- **Evaluate groundwater quality for key beneficial uses**
- **Establish a hydrologic-monitoring network**
- **Develop a predictive numerical model**
- **Develop scenarios and simulate changes in aquifer conditions based on future growth**

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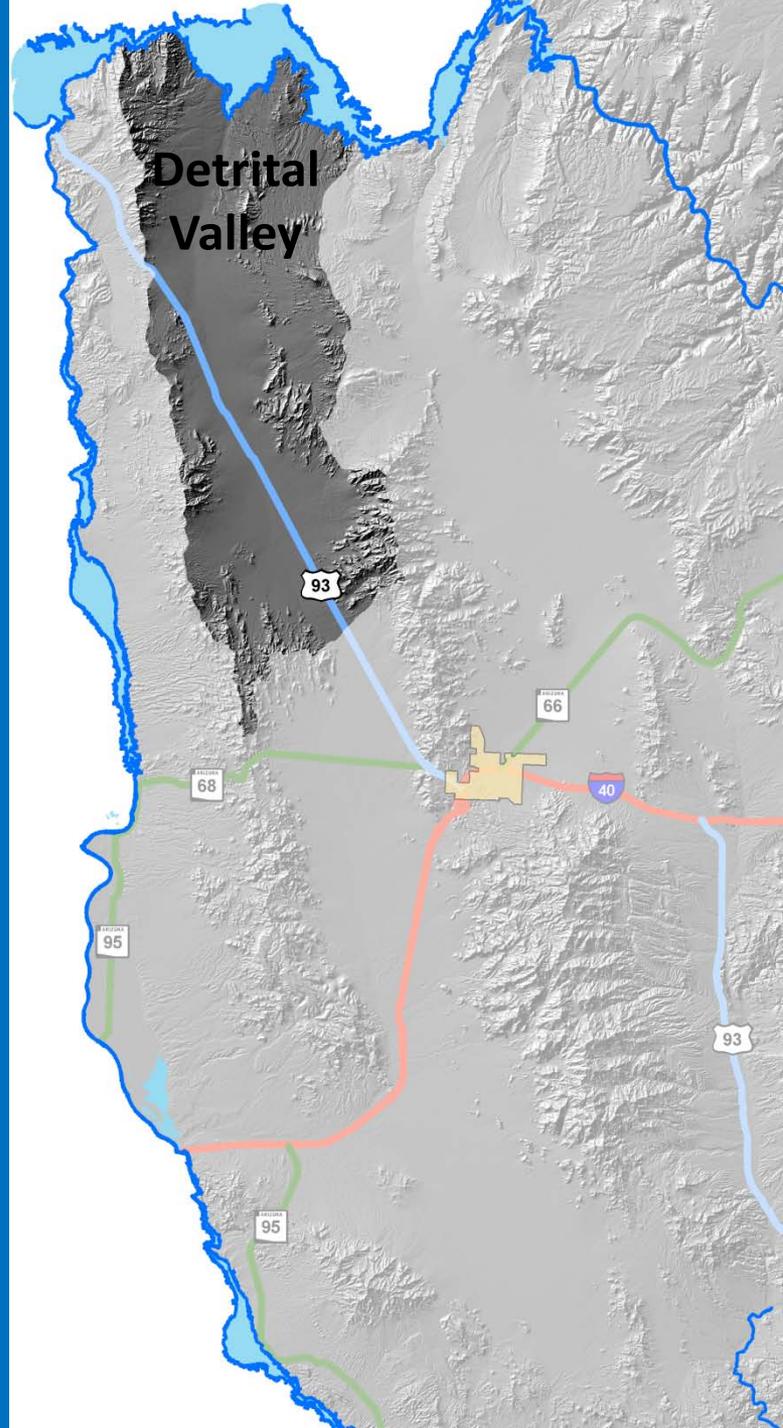
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Hydrogeologic Investigations of the Detrital Valley, Hualapai Valley, and Sacramento Valley



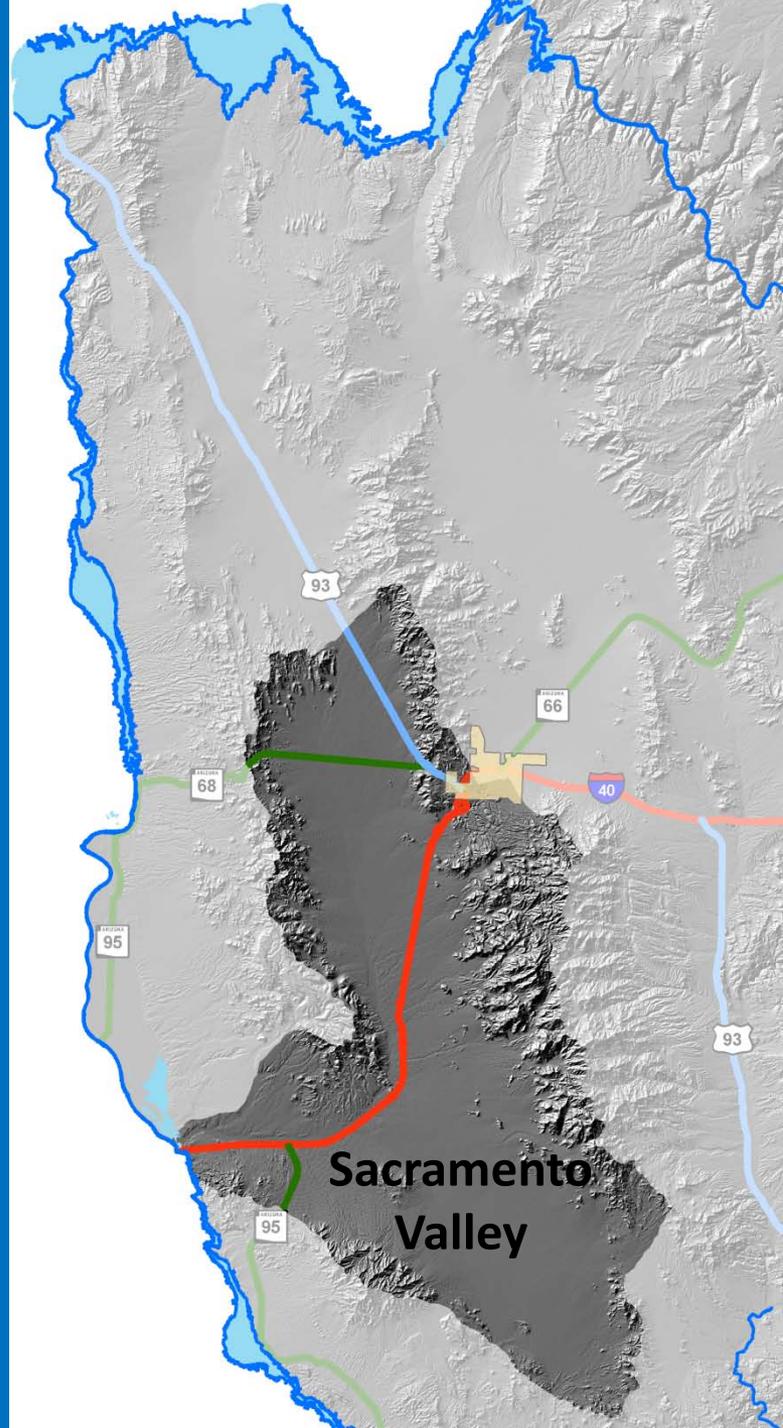
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ADWR Open-File Report No. 9: Preliminary Estimate of Groundwater in Storage for the Detrital Valley Groundwater Basin, Mohave County, Arizona, May 2007



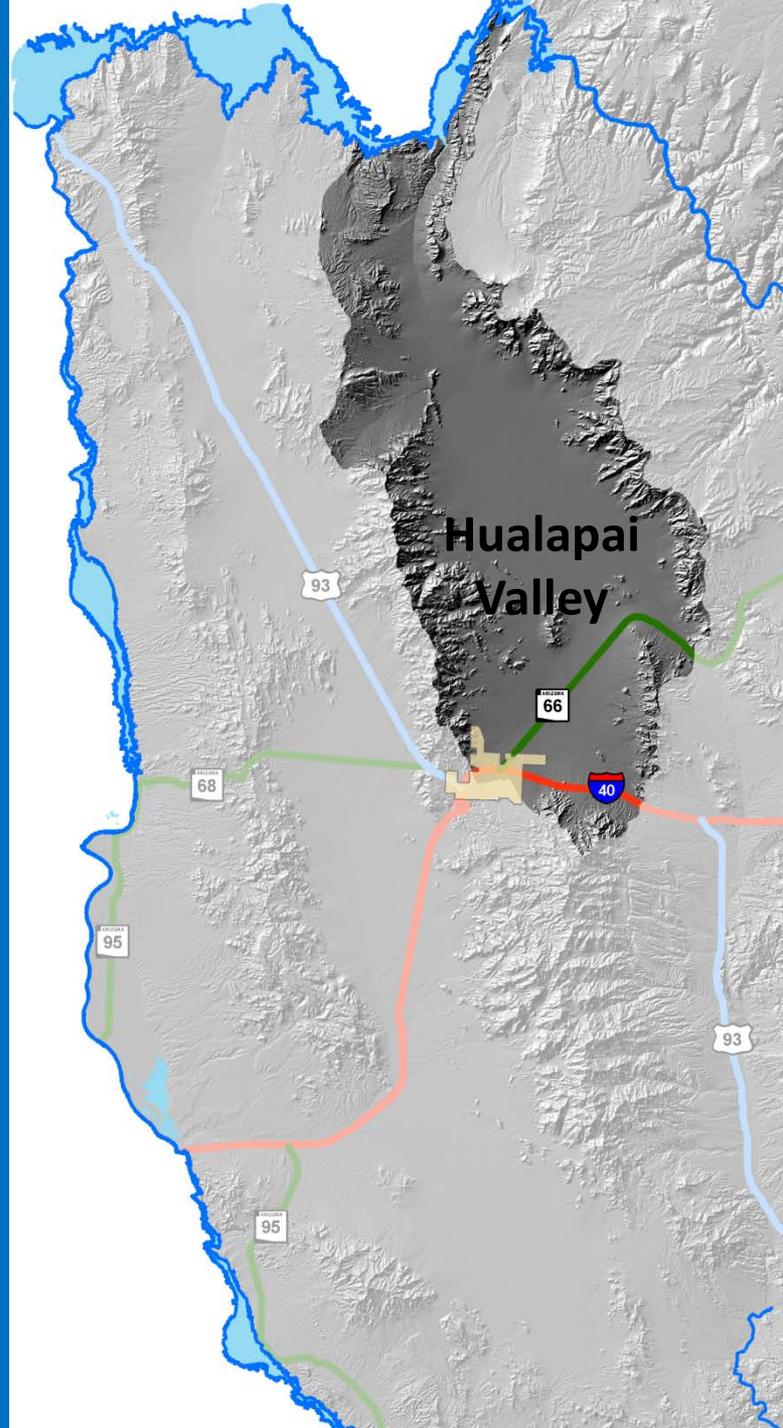
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ADWR Open-File Report No. 10: Preliminary Estimate of Groundwater in Storage for the Sacramento Valley Groundwater Basin, Mohave County, Arizona, March 2008



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ADWR Open-File Report No. 11: Preliminary Estimate of Groundwater in Storage for the Hualapai Valley Groundwater Basin, Mohave County, Arizona, September 2009

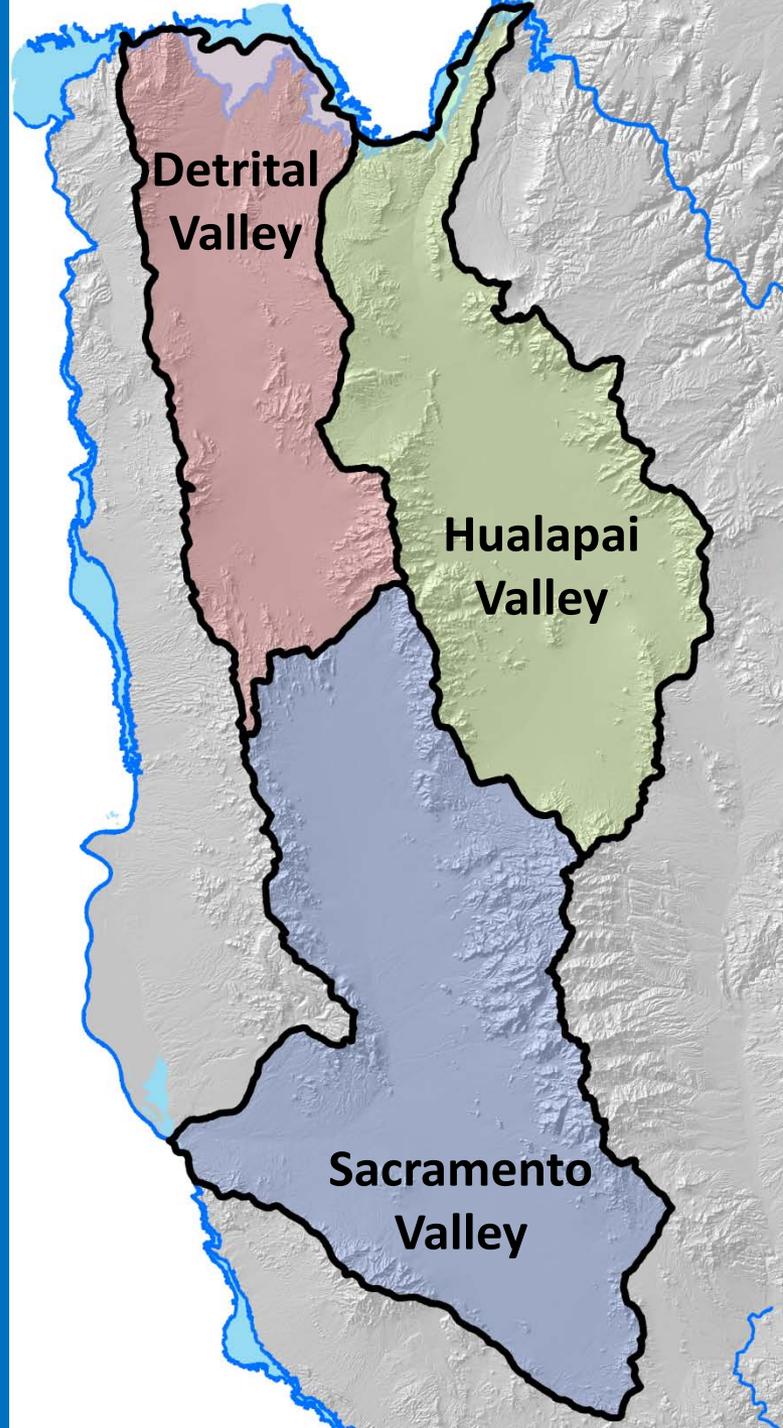


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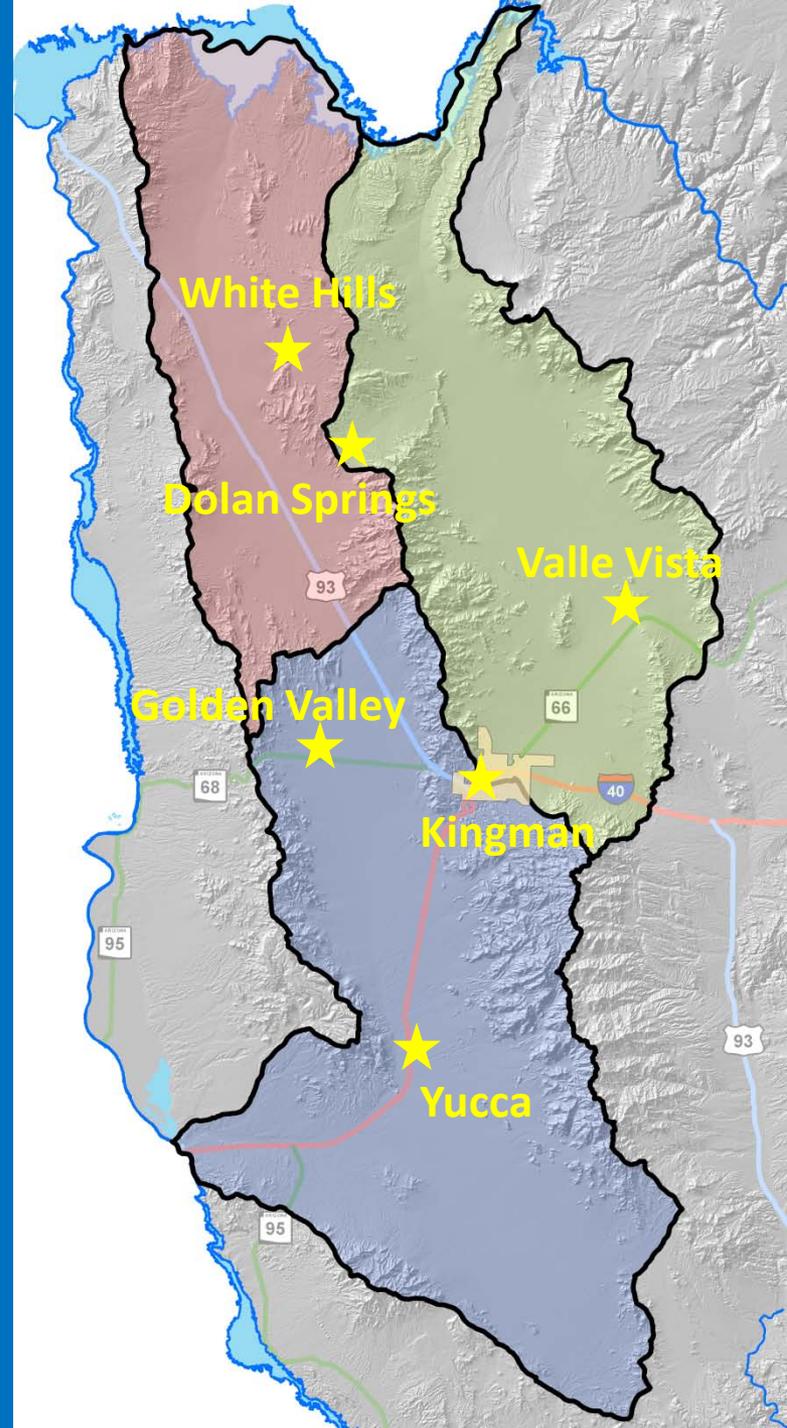
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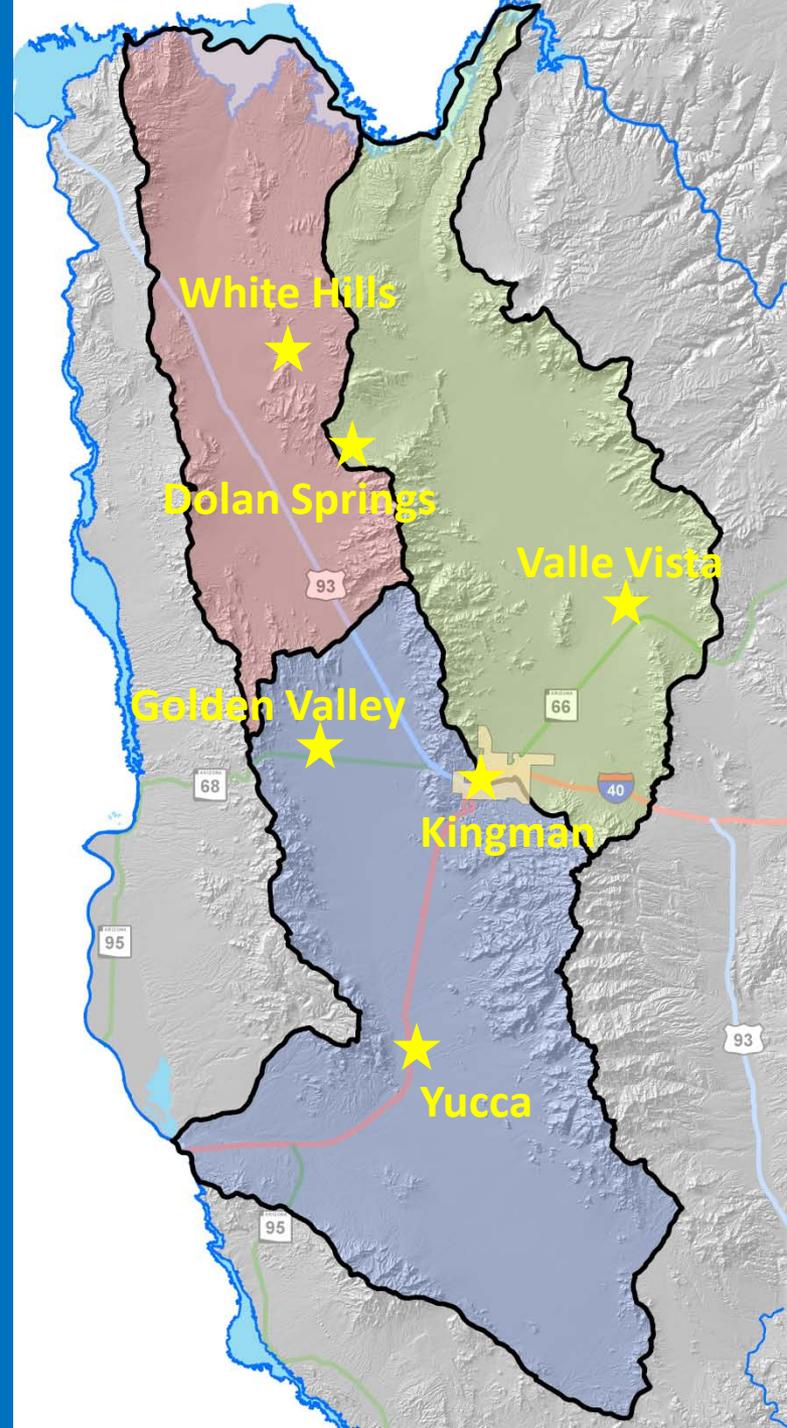
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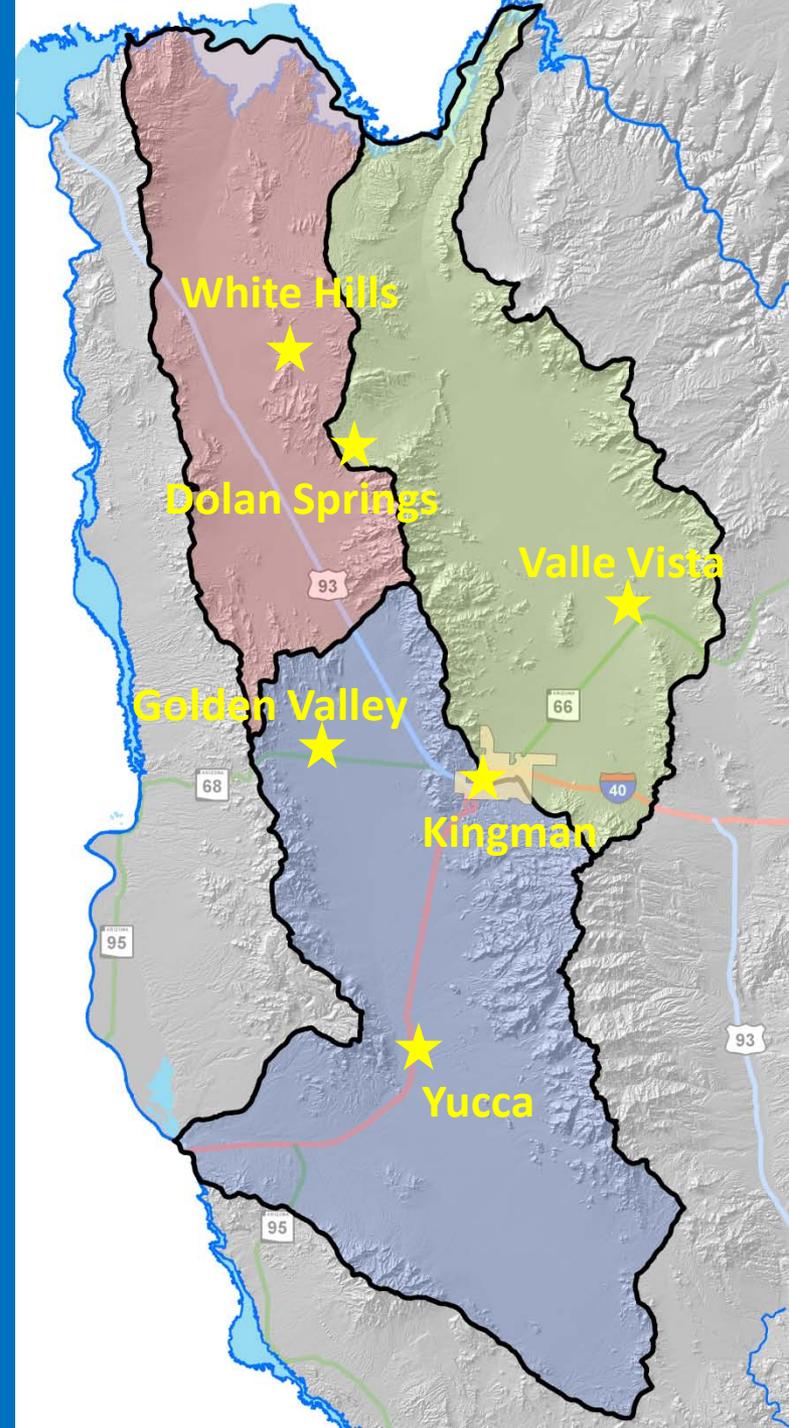


How ADWR Estimated Volume of Groundwater in Storage for the Detrital Valley, Sacramento Valley, and Hualapai Valley Groundwater Basins



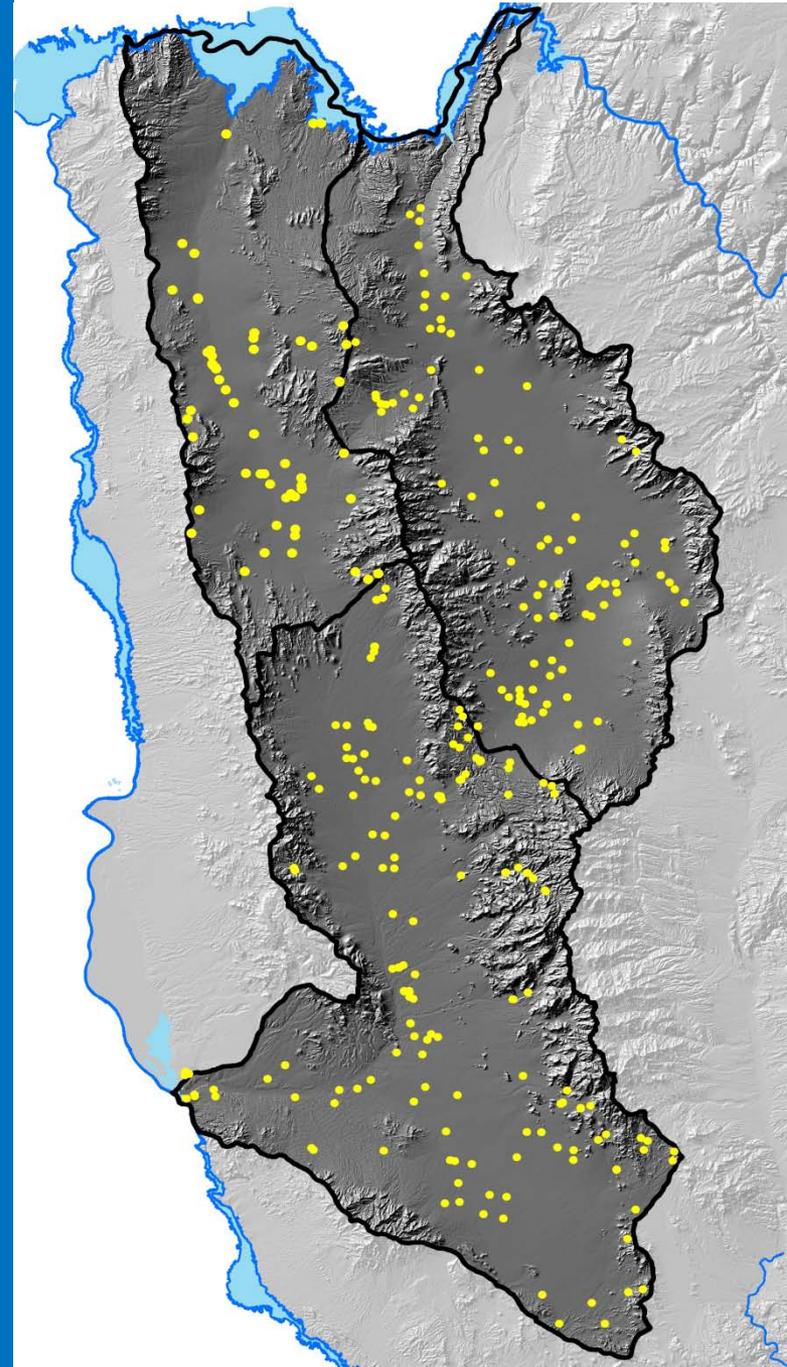
How ADWR Estimated Volume of Groundwater in Storage for the Detrital Valley, Sacramento Valley, and Hualapai Valley Groundwater Basins

- Constructed groundwater contours and groundwater elevation surface from collected ADWR groundwater data.
- Constructed depth-to-bedrock model from collected ADWR and historical gravity data and available well log and geologic data.
- Determined the extent of the aquifer for each groundwater basin by combining depth-to-bedrock and groundwater data.
- Estimated the volume of groundwater-in-storage for each township and range for all three groundwater basins to 1,200 feet below land surface.



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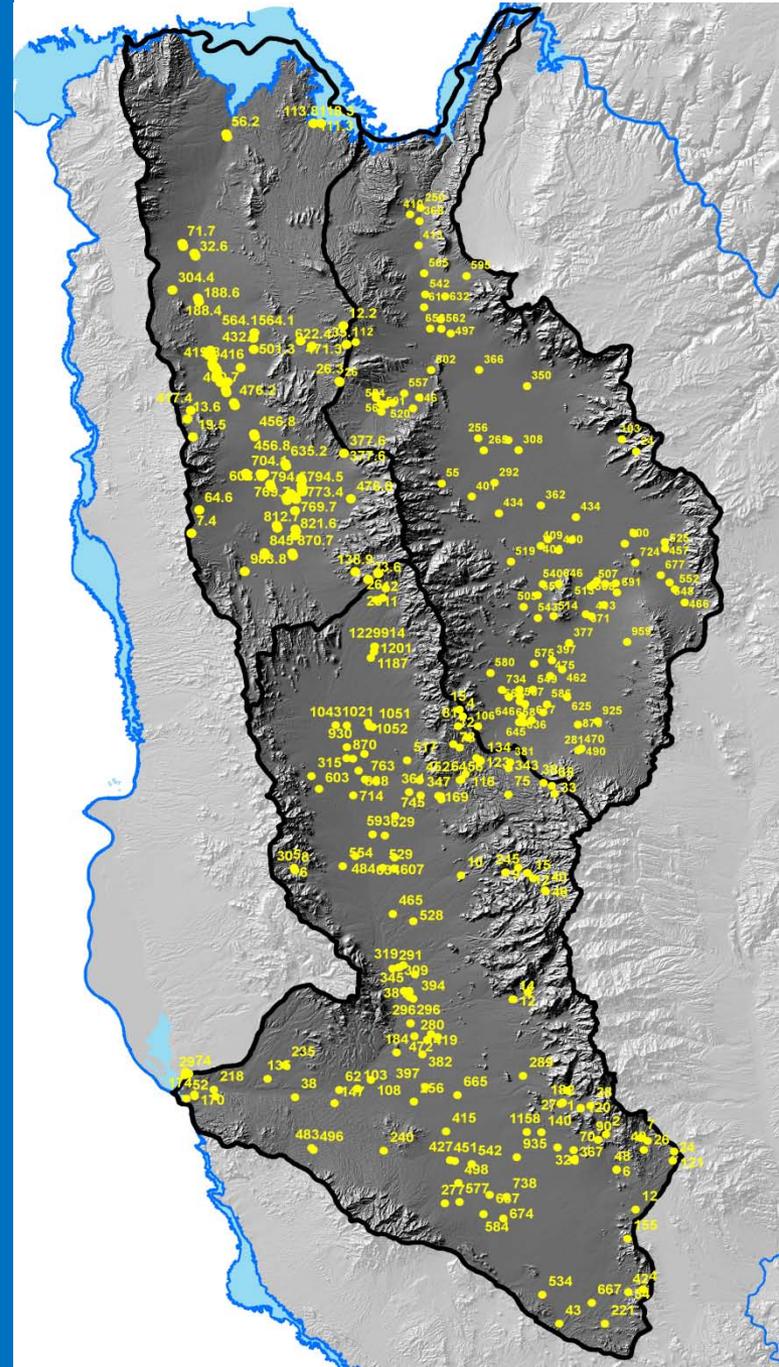
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- Collected depth-to-groundwater water measurements at more than 300 wells in all three groundwater basins in 2006.
- Depth-to-groundwater varies throughout all three groundwater basins.

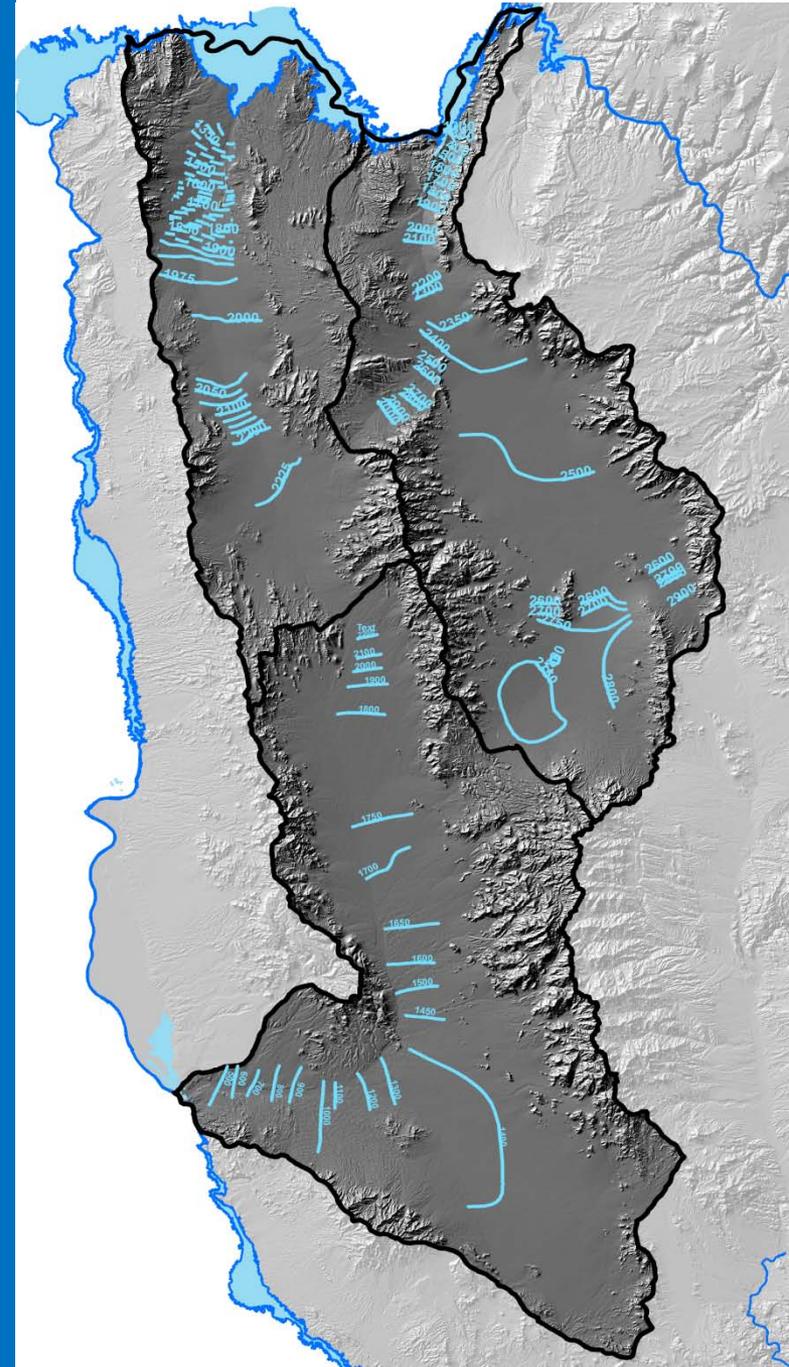
ADWR Depth-to-Groundwater Measurements



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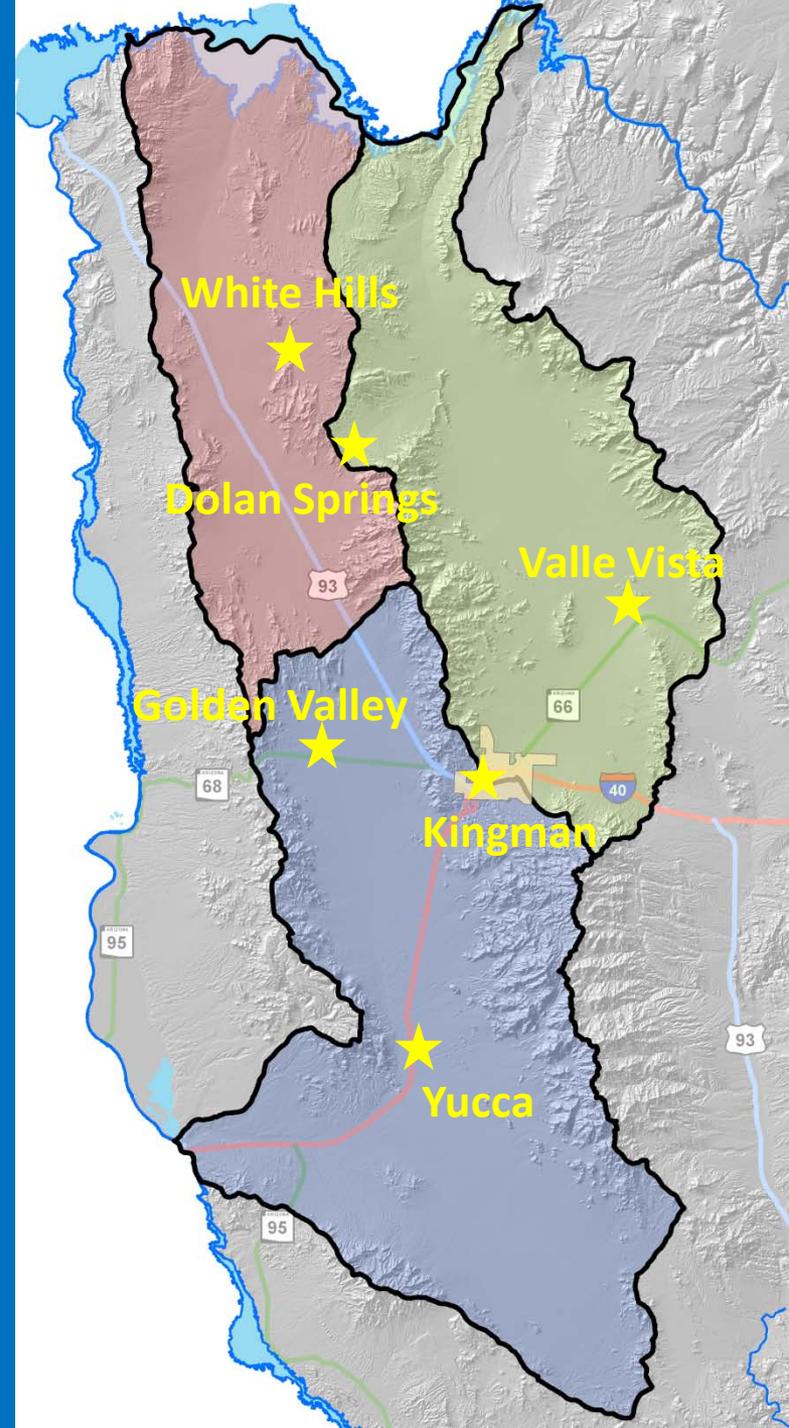
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- Groundwater data was contoured, resulting in both groundwater contours and a groundwater elevation surface for all three groundwater basins.

ADWR Groundwater Level Contours



How ADWR Estimated Volume of Groundwater in Storage for the Detrital Valley, Sacramento Valley, and Hualapai Valley Groundwater Basins

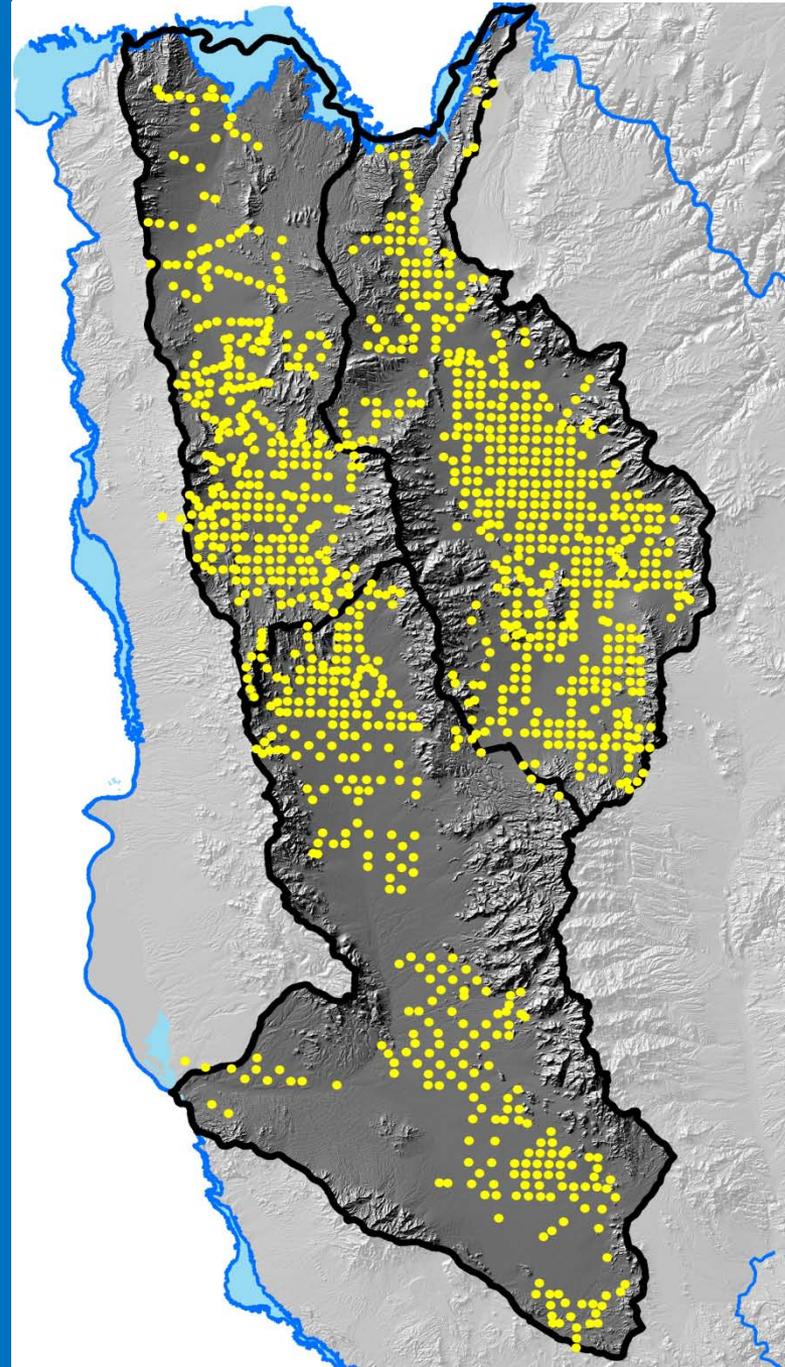
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Constructed depth-to-bedrock model from collected ADWR and historical gravity data and available well log and geologic data.

- Collected more than 1,100 gravity measurements in the three groundwater basins in 2006.

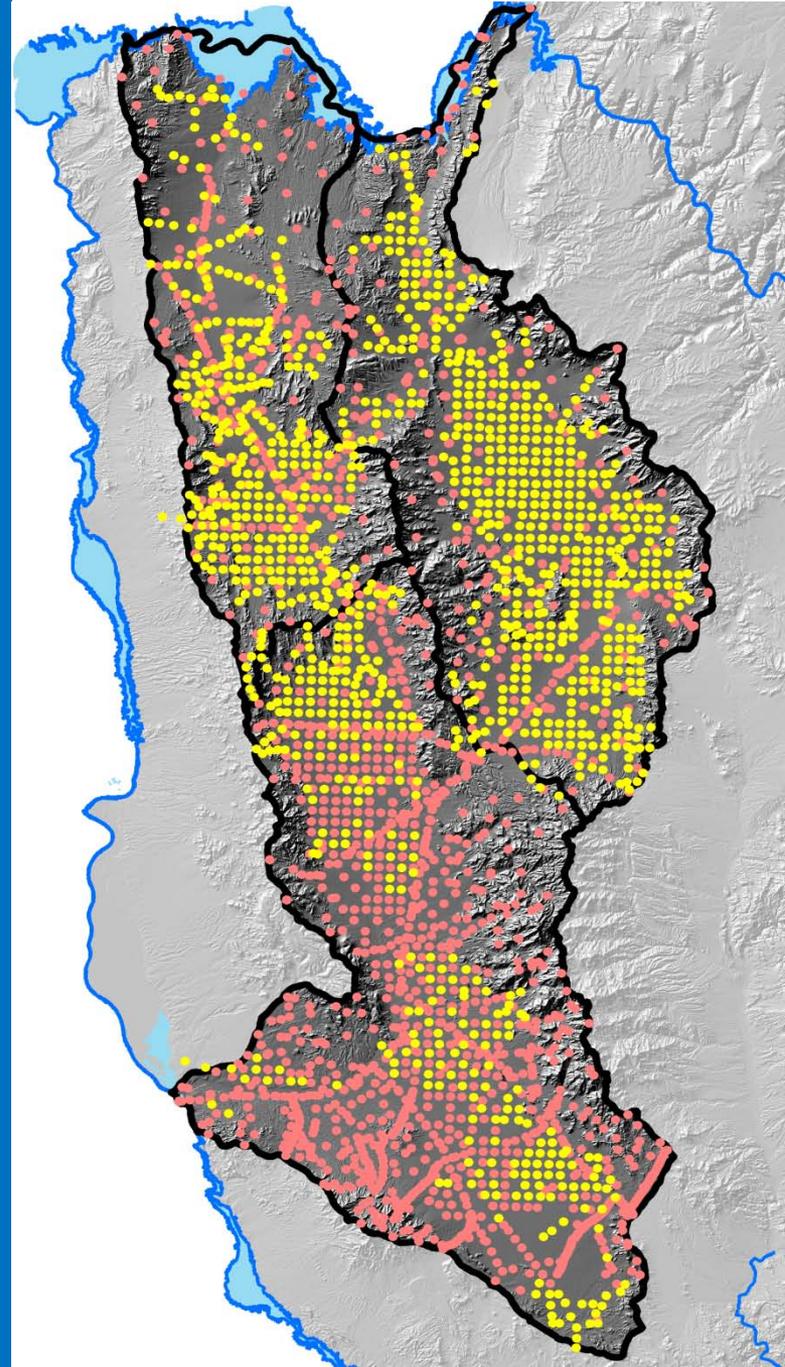
Gravity Data Collected by ADWR



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- Collected more than 1,100 gravity measurements in the three groundwater basins.
- Utilized more than 2,400 historical gravity measurements in the three groundwater basins.

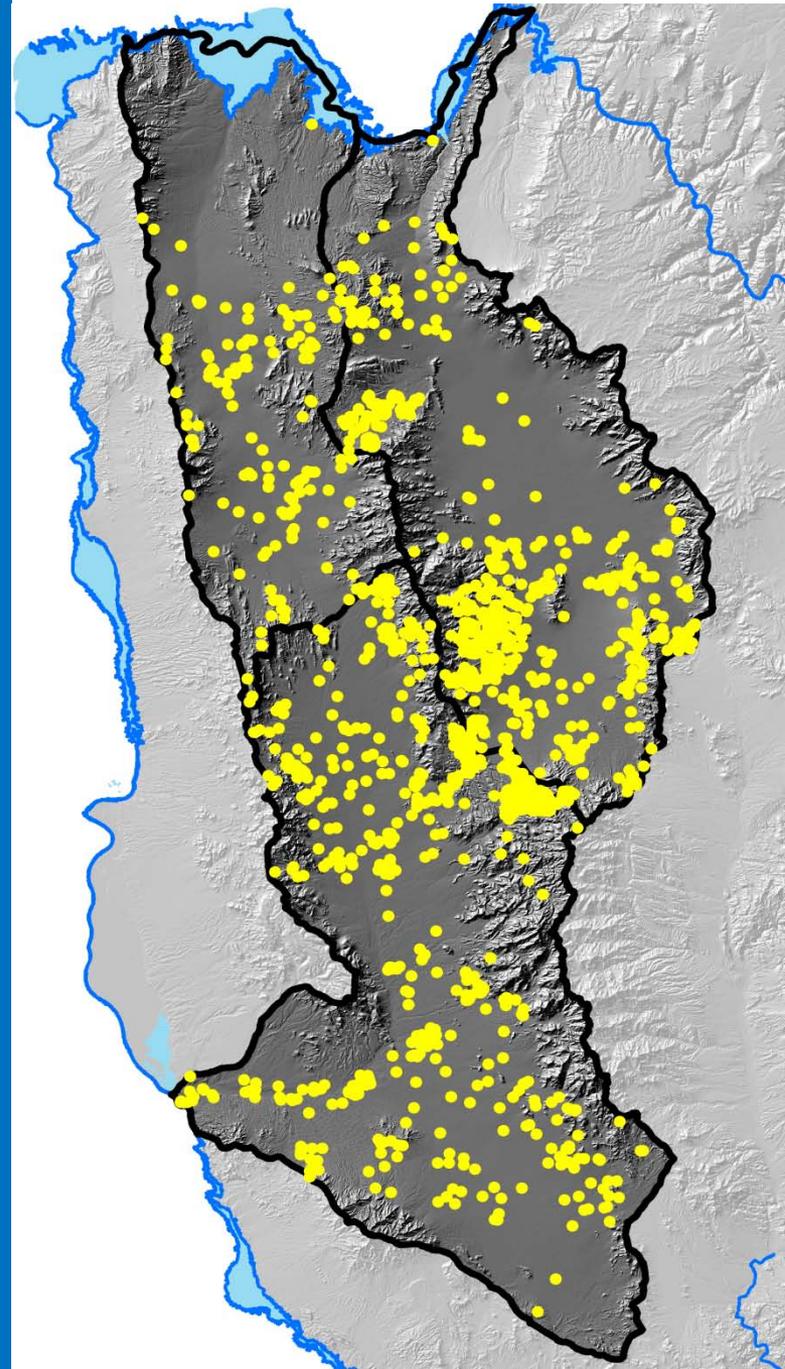
Historical and ADWR Gravity Data



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- Collected more than 1,100 gravity measurements in the three groundwater basins.
- Utilized more than 2,400 historical gravity measurements in the three groundwater basins.
- Utilized all available well-log data and other geologic data. Reviewed more than 2,000 well logs for constraining depth-to-bedrock model.

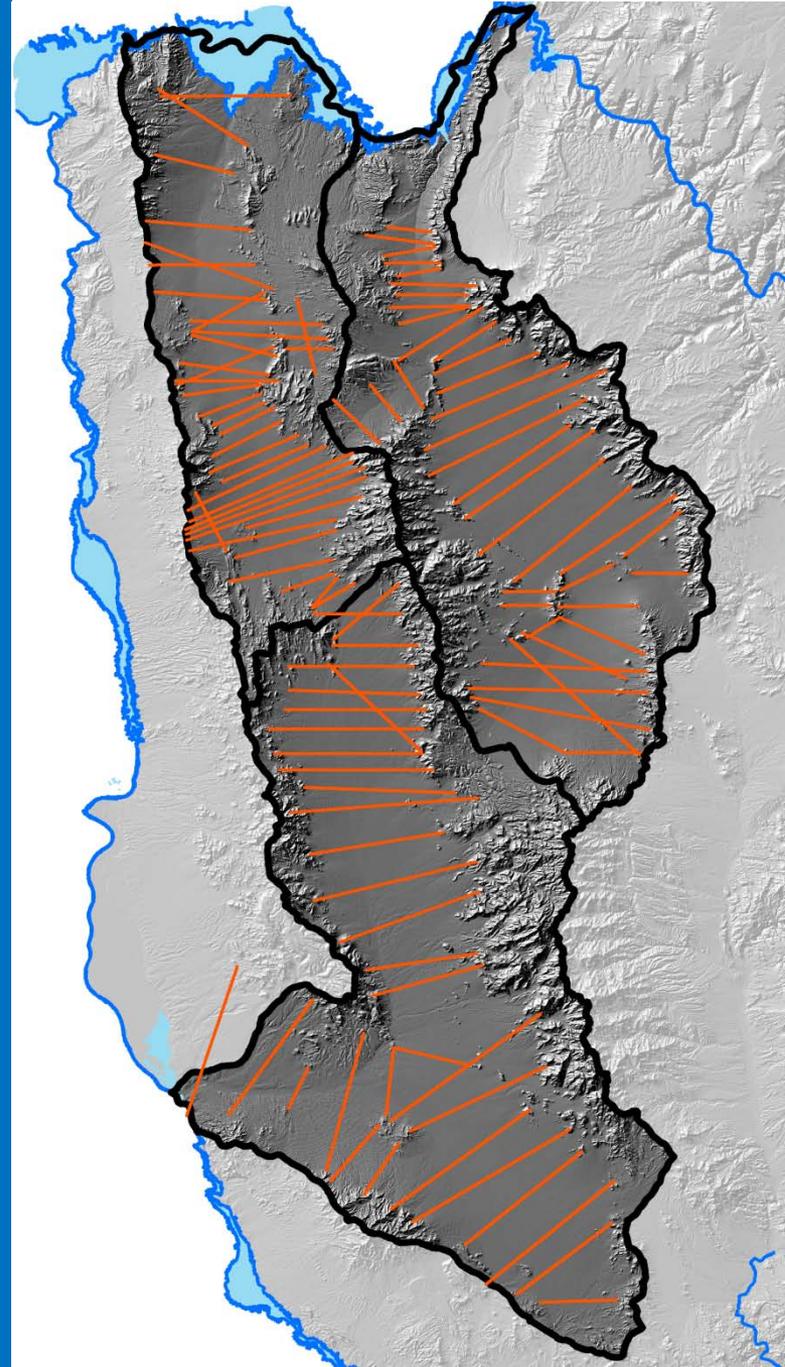
Well Logs Examined by ADWR



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- Modeled the gravity data using 2-dimensional gravity profiles dependent on the sub-surface geology.

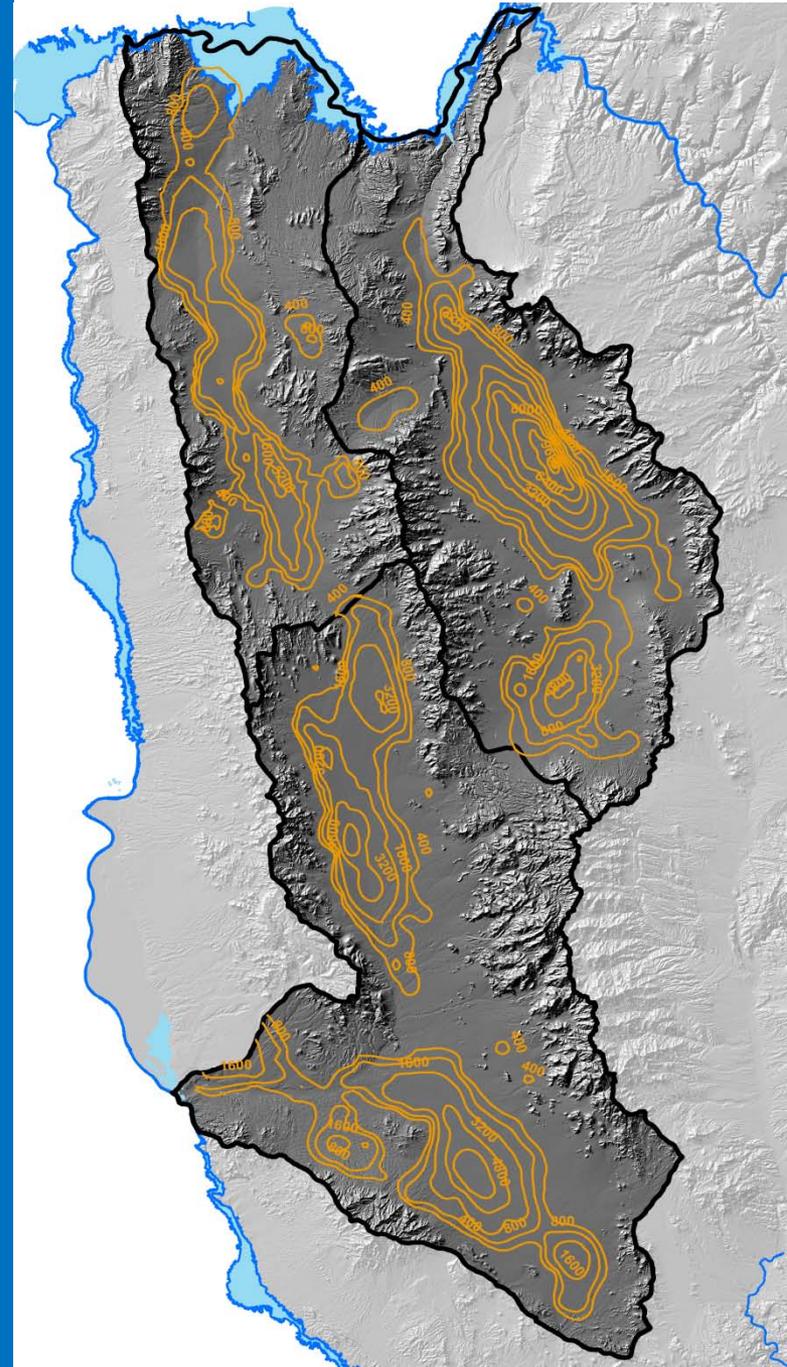
2-D Gravity Profiles Used in Gravity Modeling



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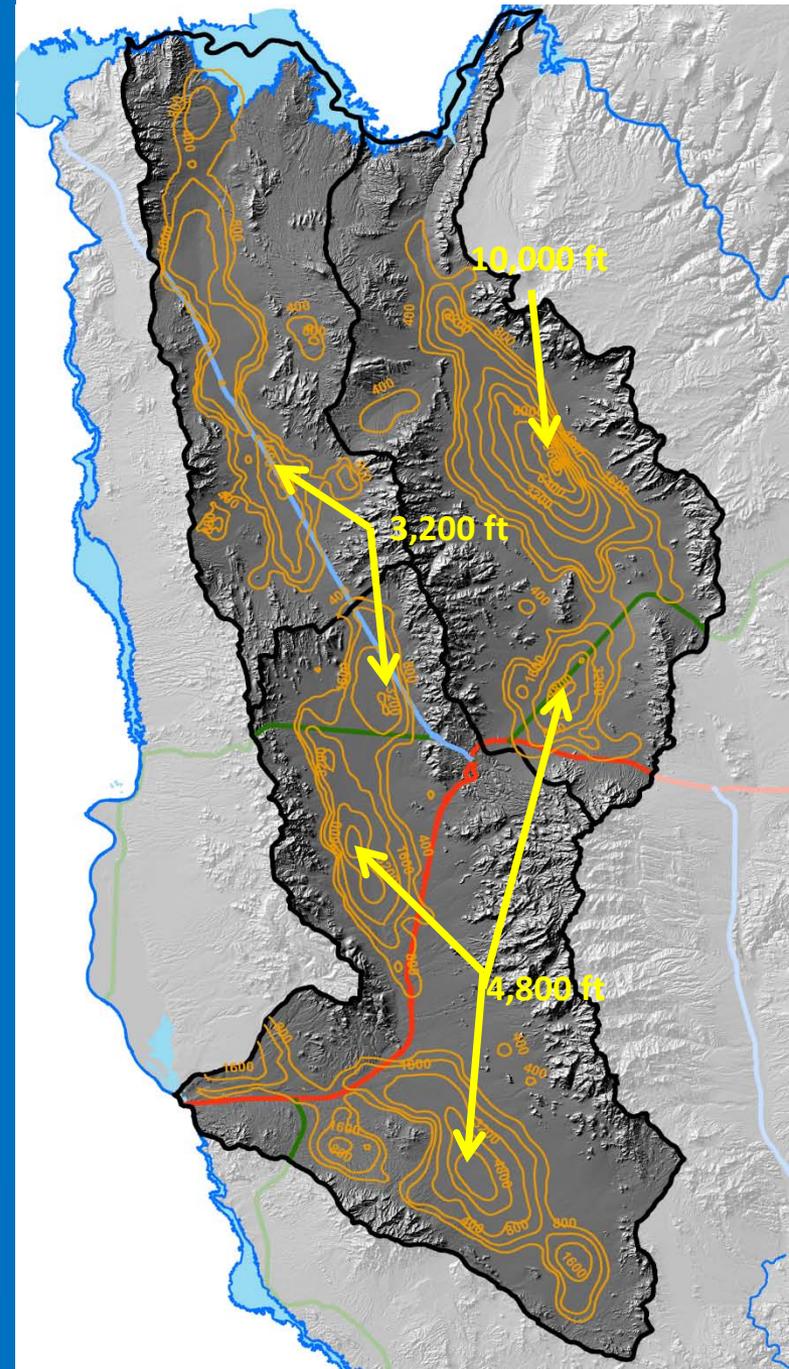
ADWR Depth-to-Bedrock Contours



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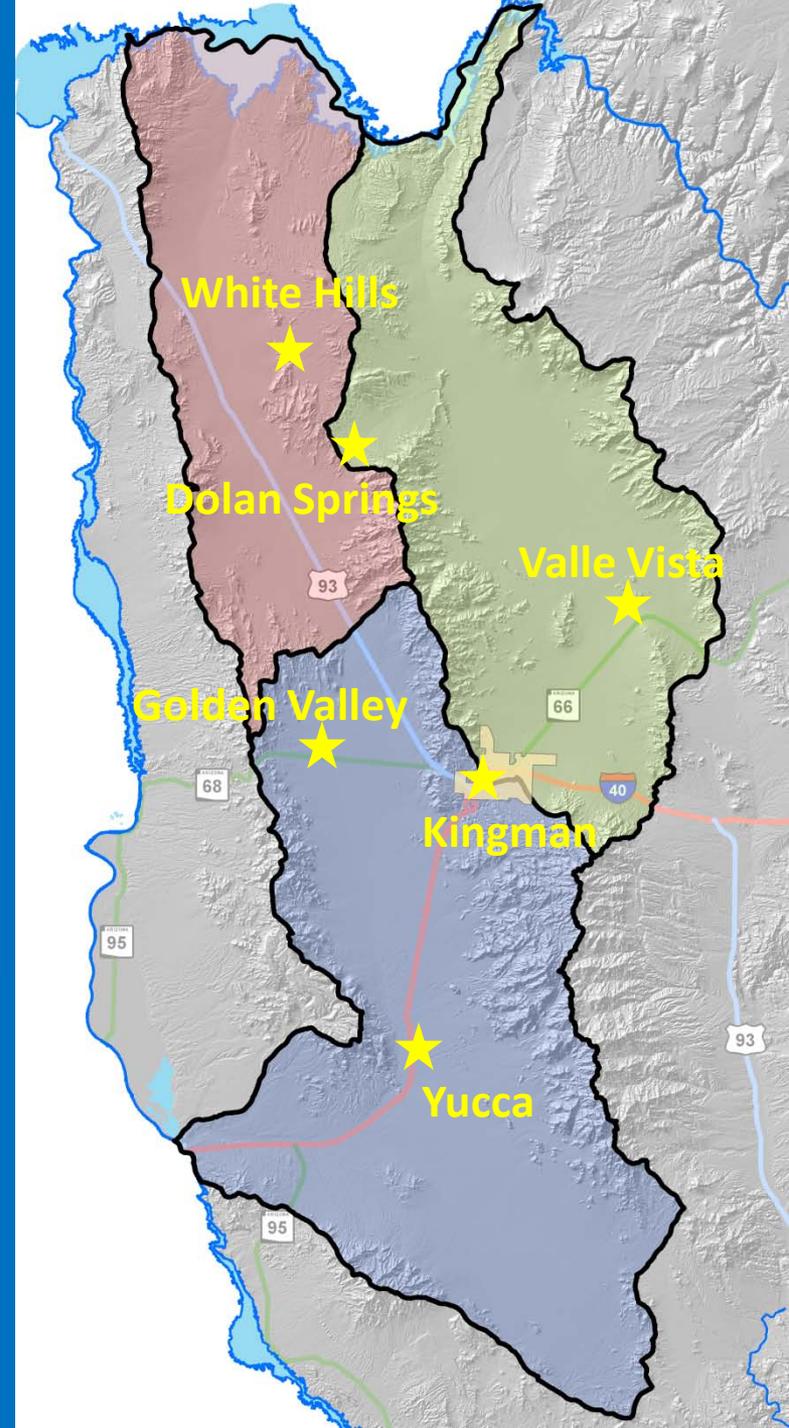
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ADWR Depth-to-Bedrock Contours



How ADWR Estimated Volume of Groundwater in Storage for the Detrital Valley, Sacramento Valley, and Hualapai Valley Groundwater Basins

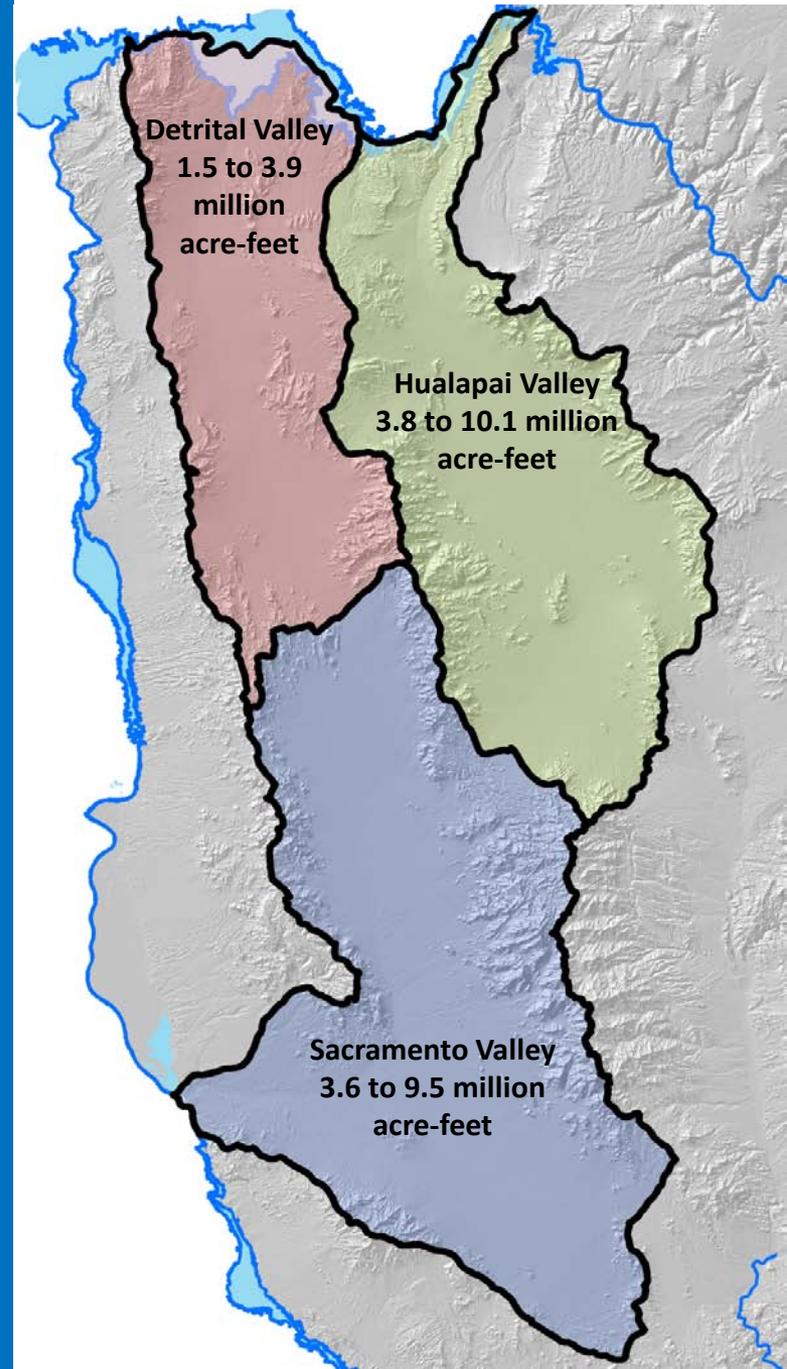
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ADWR Water-in-Storage Estimates



Benefits of ADWR's Data Collection and Water-in-Storage Reports

- **Improved hydrological understanding of all three basins**
- **Provide depth-to-bedrock data and water-in-storage estimates as a hydrological data resource that can be used by consultants, the scientific community, and the public for future analysis and modeling within the three groundwater basins**
- **Provided gravity data and groundwater level data to the USGS to be used in their 3-D gravity model and groundwater modeling projects**
- **Project will be completed with a USGS groundwater flow model and water budget for all three groundwater basins, greatly improving the hydrological and geological understanding of the Detrital Valley, Sacramento Valley, and Hualapai Valley groundwater basins**

Questions?

