

Questions and Answers Prepared by ADWR About the 2019 Pinal Model and 100-Year Assured Water Supply Projection Technical Memorandum

ADWR recently released the 2019 Pinal Model and 100-Year Assured Water Supply Projection Technical Memorandum (Technical Memo), dated October 11, 2019, available on the Arizona Department of Water Resources' (ADWR) website at: <http://infoshare.azwater.gov/docushare/dsweb/View/Collection-19686>

The 2019 Pinal Model used for this analysis is an updated and modified version of the Pinal model completed in 2014. The 2019 Pinal Model includes reported pumping and estimated recharge data through 2015 and structural modifications to the conceptual aquifer thickness in several areas of the model domain. Model updates and modifications will be discussed at the upcoming Pinal Model Presentation to be held at ADWR on November 1st, 2019 from 1-5 pm.

The purpose of this 100-Year Assured Water Supply Projection (2019 AWS Run) was to model existing and projected future groundwater use and recharge over the 100-year projection period, quantify any unmet demands by sector and location within the model domain, and project the depth to water after 100 years of pumping. See the Technical Memo, Page 9 for further details.

Below is a list of potential model-related questions with ADWR's answers:

- 1. Given that the 2019 AWS Run shows significant unmet demand that were not apparent with the use of smaller, local models, would it make more sense to revert to smaller, local models to allow development to proceed?**

Smaller, local models do not accurately represent the cumulative impacts of pumping throughout the aquifer. This is why the full volume of unmet demand in the Pinal AMA was not apparent in the smaller, local models that were relied on previously. In order to provide the consumer protection intended by the Assured Water Supply (AWS) program, ADWR must rely on the best tools available to estimate the future groundwater supply. In the Pinal AMA, the 2019 Pinal Model is currently the best available tool. Rather than weakening the consumer protections of the AWS program, it is incumbent upon Pinal stakeholders to identify real water solutions to ensure that long-term, reliable water supplies will be available to support Pinal's economic development in the future.

- 2. Does the 2019 AWS Run assume that all irrigation grandfathered groundwater rights (IGFRs) will be pumped to the maximum limits authorized by law?**

No. ADWR recognizes that the legal authorization to pump groundwater pursuant to an IGFR is a maximum limit, and not necessarily the likely annual pumping volume.

Additionally, under certain management plan programs (particularly flex credits and the Best Management Practices program), the annual authorized pumping volume would be difficult to quantify. Instead, ADWR relied on 2015 reported use on a district-wide basis (rather than IGFR-specific), in combination with information available regarding likely future changes, to develop the assumptions regarding future agricultural pumping.

3. How did ADWR develop the pumping assumptions for agricultural pumping in the 2019 AWS Run?

ADWR relied on reported well pumping data for 2015 to establish a baseline for existing agricultural use. This baseline was projected forward, subject to the following assumptions regarding changes in pumping:

- a. As required by the AWS rules, ADWR assumed discontinuation of agricultural pumping (and associated incidental agricultural recharge) for all agricultural lands that are also included in an analysis of assured water supply (analysis) or a certificate of assured water supply (certificate). The discontinued agricultural pumping was replaced with the groundwater pumping associated with the respective analysis or certificate.
- b. ADWR incorporated projected changes in future groundwater pumping to account for the reduction in CAP water deliveries to the agricultural/excess pool beginning in 2024 and the elimination of the agricultural/excess pool beginning in 2031.
- c. ADWR incorporated reductions in agricultural pumping based on projections from CAIDD and MSIDD in combination with planning and other projection data.

ADWR did *not* incorporate assumptions regarding additional agricultural production wells or pumping related to the Arizona Drought Contingency Implementation Plan, which was still under negotiation during the development of the 2019 AWS Run assumptions.

4. Does the 2019 AWS Run assume maximum pumping for Type 1 and Type 2 Grandfathered Rights for 100 years?

No. Model assumptions regarding Type 1 and Type 2 rights are described under Municipal and Industrial Groundwater Uses in the Technical Memo. Type 1 and Type 2 rights were assumed to continue pumping at the rates reported in 2015.

5. How are long-term storage credits treated in the 2019 AWS Run?

Long-term storage credits that are not included in issued assured water supply determinations were treated as follows:

- a. Existing long-term storage credits are projected to be removed at a rate of 1/100th of the total per year, for 100 years.
- b. The 2019 AWS Run does not include future storage at underground storage facilities.
- c. Future storage and accrual of long-term storage credits at groundwater savings facilities (GSFs) are simulated to be removed in the same year.
- d. The long-term storage credits associated with the Central Arizona Groundwater Replenishment District (CAGRDR), except for a small volume set aside as the Replenishment Reserve Account, remain in storage to meet CAGRDR replenishment obligations within the early years of the simulation (2016 – 2035). Thereafter, additional CAGRDR replenishment is simulated at a rate of 15,500 acre-feet per year based on the 2015 CAGRDR Plan of Operation (related to question 6).

Long-term storage credits included in assured water supply determinations are included in the model, along with the associated removal of those credits to meet the water demand.

6. Does the 2019 AWS Run include groundwater allowances and extinguishment credits?

ADWR did not consider groundwater allowances and extinguishment credits. ADWR used the replenishment projection of 15,500 acre-feet per year included in the 2015 CAGRDR Plan of Operation, which already incorporated assumptions regarding groundwater allowances and extinguishment credits.

Groundwater allowance and extinguishment credits do not directly affect physical availability. Groundwater allowance and extinguishment credits may be used to reduce replenishment requirements.

7. How is natural inflow, including Gila River flood flows, simulated in the 2019 AWS Run?

Stream recharge is simulated to fluctuate consistent with the 16-year historical pattern between 1995-2010, which includes an average mix of wet and dry years. Mountain front recharge is simulated to remain at 2014 levels. Groundwater underflows at model boundaries are held constant at 2009 published model rates from 2010 – 2115 as specified flux boundary cells.

8. What sources of incidental recharge are simulated in the 2019 AWS Run?

Incidental recharge sources include urban, Picacho Reservoir, canal seepage, and agriculture.

9. How are issued assured water supply determinations (analyses, certificates and designations) included in the 2019 AWS Run?

Pursuant to the existing rules, all issued AWS determinations are assumed to be fully constructed and full pumping volumes are assumed for 100 years.

- a. **Analyses:** The pumping demand associated with each analysis, less any portion converted to a certificate, was assigned a proposed new well location in the center of the development's geographic footprint. For large developments, the pumping is represented in the center of several model cells covering the development's footprint.
- b. **Certificates:** ADWR determined whether the subdivisions associated with issued certificates have been fully constructed, partially constructed, or remain unconstructed.
 - i. **Fully constructed:** Pumping demands of certificates for fully built-out developments were assumed to be included in existing municipal pumping based on 2015 reported pumping data, and the certificated demand volume was not added.
 - ii. **Partially constructed:** For partially constructed certificates, ADWR estimated the portion constructed and the portion unconstructed. The pumping associated with the constructed portion was assumed to be included in existing municipal pumping from 2015. ADWR then estimated the remaining certificate demand associated with the unconstructed portion. This pumping was assigned to proposed new well locations, located in the center of the certificate's geographic footprint, or in larger developments, the center of several model cells covering the certificate's footprint.
 - iii. **Unconstructed:** For unconstructed subdivisions, the full pumping volume was assigned to new well locations in the center of each certificate's geographic footprint, or for larger subdivisions, the center of several model cells covering the certificate's footprint.
- c. **Designations:** The pumping associated with issued designations, other than the City of Eloy, was simulated at fully issued rates, simulated to be pumped from their existing well networks. In the case of Eloy, ADWR reduced the pumping to the volume requested in the pending application.
- d. Ten developments (certificates and analyses) are located outside the model domain but are expected to be served by water providers within the model domain. For these developments, the pumping was simulated within the model domain and within a few miles of the respective development.

10. How are existing wells and proposed wells represented in the 2019 AWS Run?

Most demands for existing sectors and for the AWS Designations are simulated at existing wells that were active in 2015 and reported their pumping to ADWR. Certain wells within the model domain, including wells located on or operated by the Gila River Indian Community or the federally run San Carlos Irrigation Project, do not report pumping to ADWR. In these cases, ADWR developed assumptions based on the most recent information available. Wherever possible, ADWR used actual well construction information without assuming future deepening or replacement.

Proposed new wells created for simulating demands of unconstructed lots associated with issued AWS determinations are all assumed to be 20" diameter wells screened across all 3 model layers. The actual depth would depend on the model thickness assigned to the model cell where the well is located.

Both existing and proposed new wells use the Modflow Multi-Node Well (MNW) package for the projection period only. All wells are limited by the aquifer characteristics, well construction and simulated saturated thickness in their locations. Existing wells are further limited by their physical depth. ADWR did not impose any limitations on future pumping based on the economic feasibility of pumping from increasingly deeper depths. The Technical Memo provides further detail.