Attention attendees:
There is no assigned seating.
We are hoping for a collaborative and interactive process.
Please have a seat at the front table with the microphones if you would like to speak.
Safe-Yield Technical Subgroup

September 23, 2019
I. Introduction and Meeting Logistics
II. Overview of Safe-Yield Data and Calculation
III. Discussion of Methodology and Analyses
IV. Future Meetings
V. Closing Remarks
Meeting Logistics

* Meetings are open to anyone who would like to participate.
* We are looking for feedback and to learn from participants’ expertise.
* We are expecting an open and collaborative process, including opportunity to challenge ideas in a transparent manner.
A.R.S. § 45-563 (A)

“The director shall develop a management plan for each initial active management area for each of five management periods... and shall adopt the plans only after public hearings... The plans shall include a continuing mandatory conservation program... designed to achieve reductions in withdrawals of groundwater.”

Management Plans Work Group

ADWR-led stakeholder forum for the development of the 5th Management Plans

* Goals:
  * Assess existing conservation programs
  * Update existing management strategies
  * Develop new management strategies
Timeline

4MP

Phoenix AMA Adoption
Pinal AMA Adoption
Santa Cruz AMA Adoption

2019

MPWG
Drafting Plans
Adopting Plans

5MP

2021

2022

2023
Safe-Yield Data and Calculation
Management Goals
(A.R.S. § 45-562)

**Safe-yield:**
“A groundwater management goal which attempts to achieve and thereafter maintain a long-term balance between the annual amount of groundwater withdrawn in an active management area and the annual amount of natural and artificial recharge in the active management area.”
(A.R.S. § 45-561(12))

**Prescott, Phoenix, and Tucson AMAs:**
Safe-yield by the year 2025

**Pinal AMA:**
To allow development of non-irrigation uses and to preserve existing agricultural economies in the AMA for as long as feasible, consistent with the necessity to preserve future water supplies for non-irrigation uses.

**Santa Cruz AMA:**
To maintain a safe-yield condition in the AMA and to prevent local water tables from experiencing long term declines
Safe-Yield

A.R.S. § 45-561(12):

“A groundwater management goal which attempts to achieve and thereafter maintain a long-term balance between the annual amount of groundwater withdrawn in an active management area and the annual amount of natural and artificial recharge in the active management area.”
Annual Calculation

Inflows

* Natural
  * Groundwater Inflow
  * Streambed Recharge
  * Mountain-front Recharge

* Artificial
  * Incidental Recharge
    * Agricultural
    * Municipal
    * Industrial
  * Canal Seepage
  * Cut to the Aquifer
  * CAGRD Replenishment

Outflows

* Natural
  * Groundwater Outflow
  * Riparian Demand

* Artificial
  * Sector Demands
    * Agricultural
    * Municipal
    * Industrial
    * Indian
  * Remediated Groundwater
  * Poor Quality Groundwater
Annual Calculation – Data Sources

Inflows

* Natural
  * Groundwater Inflow
  * Streambed Recharge
  * Mountain-front Recharge
* Artificial
  * Incidental Recharge
    * Agricultural
    * Municipal
    * Industrial
  * Canal Seepage
  * Cut to the Aquifer
  * CAGRD Replenishment

Outflows

* Natural
  * Groundwater Outflow
  * Riparian Demand
* Artificial
  * Sector Demands
    * Agricultural
    * Municipal
    * Industrial
    * Indian
  * Remediated Groundwater
  * Poor Quality Groundwater

Items highlighted in blue are outputs of ADWR’s regional groundwater models. Items highlighted in gray are compiled from AMA Annual Reports.
ADWR Data

AMA Compilation

Sector Compilation

Data Entry & Quality

AMA Annual Reports

Statewide Water Use Estimates

Regional Groundwater Models
Safe-Yield by AMA
Prescott AMA
Water Demand & Supply

### Water Demand & Supply Graph

#### Time Series
- **X-axis**: Years (1991-2017)
- **Y-axis**: Thousands

#### Water Sources
- **Municipal**
- **Industrial**
- **Agricultural**

#### Water Sources Breakdown
- **Groundwater**
- **Surface Water**
- **Colorado River**
- **Reclaimed**

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Prescott AMA
Annual Overdraft
Prescott AMA
Annual Overdraft & Groundwater Demands

Recharge | AF | Overdraft

- Municipal Groundwater
- Industrial Groundwater
- Agricultural Groundwater
- Overdraft
Prescott AMA

Annual Overdraft – Inflows & Outflows

Recharge | AF Overdraft

Inflows | Outflows | Overdraft
Prescott AMA
Annual Overdraft & Running Average

Graph showing annual overdraft and running average over the years 1985 to 2015.
Phoenix AMA
Annual Overdraft
Phoenix AMA
Annual Overdraft & Groundwater Demands
Phoenix AMA
Annual Overdraft – Inflows & Outflows

Recharge | AF | Overdraft

- Inflows
- Outflows
- Overdraft
Phoenix AMA
Annual Overdraft & Trendlines
Phoenix AMA
Annual Overdraft & Running Average

Recharge | AF | Overdraft

To Date Average


Overdraft

To Date Average

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Pinal AMA
Water Supply & Demand

[Graph showing water supply and demand from 1991 to 2017, with categories for Municipal, Industrial, Indian, and Agricultural water use, and sources for Groundwater, Surface Water, Colorado River, and Reclaimed water.]
Pinal AMA
Annual Overdraft

Recharge | AF | Overdraft

Overdraft


1985 0 100000 200000 300000 400000

0 100000 200000 300000 400000

-100000 -200000 -300000 -400000 -500000

-600000 -700000

Overdraft
Pinal AMA
Annual Overdraft & Groundwater Demands

Chart showing annual overdraft and groundwater demands from 1985 to 2015.
Pinal AMA
Annual Overdraft – Inflows & Outflows
Pinal AMA
Annual Overdraft & Running Average
Tucson AMA
Annual Overdraft

Recharge | AF | Overdraft

Overdraft

Tucson AMA
Annual Overdraft & Groundwater Demands
Tucson AMA
Annual Overdraft – Inflows & Outflows
Tucson AMA
Annual Overdraft & Trendlines
Tucson AMA
Annual Overdraft & Running Average
Santa Cruz AMA
Water Demand & Supply

[Graph showing water demand and supply over time for different sectors and sources.]
Santa Cruz AMA
Annual Overdraft

Recharge | AF | Overdraft

Overdraft
Santa Cruz AMA
Annual Overdraft & Groundwater Demands
Santa Cruz AMA
Annual Overdraft – Inflows & Outflows
Santa Cruz AMA
Annual Overdraft & Trendlines
Santa Cruz AMA
Annual Overdraft & Running Average

Graph showing the annual overdraft and running average over the years 1985 to 2015.
As a part of the 4MP, ADWR will periodically publish an analysis of each AMA’s progress toward its goal.

* Expand scope of report required under A.R.S. § 45-563.01 to include analysis of:
  * Effectiveness of Conservation Programs in all 3 sectors
  * Progress toward the goal in each of the 5 AMAs

* Transparency
  * Communicating success or need for improvement
  * Tracking and ensuring progress of each AMA toward its goal
  * Sharing underlying data and methodology
Data Availability

* Reported data is compiled and updated on an annual basis.
* Data from ADWR’s models lags behind the reported data.
  * Source data from the dashboard can also be downloaded from this site.
Discussion of Future Analyses
Challenges in Analyzing Safe-Yield

* Extreme year-to-year variability
* Ambiguous definition
  * Annual Components
    * Differences in how data for various components is generated
    * “Long-term”
* Analyzing trends and identifying influences
Safe-Yield Technical Group Goals

* Consensus on methodology and definitions
  * Assessing each component
  * Identifying a general approach for assessing long-term status
  * Consistency across AMAs
* Clear communication of status of each AMA
Potential Resources and Analyses

* Questions
  * Annual overdraft
    * Are these components the right components?
    * Is the data source for each component the best source?
  * How do we quantify “long-term overdraft”?
  * How do we communicate where each AMA stands?

* Resources
  * Previous analyses
  * Other definitions or similar concepts

* Analyses
  * Smoothing or averaging individual components
  * Identifying influences
Future Meetings
Future Meetings

* Frequency?
* Next Dates?
* Topics? Available tools? Guests?

* Subgroups
  * Additional Meetings TBD
* Next MPWG meeting: 2pm on December 4, 2019
Questions?

managementplans@azwater.gov

Management Plans Work Group:
new.azwater.gov/5MP

Full Text of Management Plans:
new.azwater.gov/ama/management-plans