Opportunity to provide input and feedback on items discussed in the meeting
Questions are optional so you can choose what you’d like to provide input on
Responses will be posted anonymously on our 5MP Concepts Webpage
Please respond by 10/7/2020

Link to Google Form Questionnaire: https://forms.gle/n3CStdWzRaLQwbKk9
I. Welcome

II. Continue Discussion of Annual Safe-Yield Calculation

III. Discuss Strategies for the Long-Term Analysis of Safe-Yield
   A. Proposed Method for Long-Term Analysis of Safe-Yield
   B. Results of Proposed Method in each AMA

IV. Methods of Communicating Safe-Yield
   A. Proposed Method for Communication of Safe-Yield

V. Closing Remarks
Timeline

4MP
- Phoenix AMA Adoption
- Pinal AMA Adoption
- Santa Cruz AMA Adoption

MPWG

2019

2021

2022

2023

Drafting Plans

Adopting Plans

5MP
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.”

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
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goal which attempts to achieve and thereafter maintain a long-term balance between the annual amount of groundwater withdrawn in an active management area and the annual amount of natural and artificial recharge in the active management area.”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.
5MP Safe-Yield Technical Subgroup

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

Strategy

* Annual Calculation
  * Consensus on treatment of components
  * Consensus on annual calculation
* Long-Term Analysis
  * Approach(es) for “Long-Term” Analysis
  * Assessing “Progress toward goal”
* Best Practices for Communicating Status
Annual Safe-Yield Calculation
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

**Outstanding Items**
* Artificial
  * Agricultural Incidental Recharge
  * “Water Budget Approach”
  * Indian Demand
* Anything else?
Feedback on Indian Demand

* Direct Ask
  * Some ADWR methodology was based on federal documents or previous conversation with representatives of Tribal Nations
  * Could be considered as a part of future updates

* Use of Settlement Agreements
  * Agreements do not have information specifically related to groundwater use

Proposal

* Continue using ADWR estimates including new data if/when it becomes available
* Irrigation Efficiency by AMA:
  * USGS Irrigation Efficiency Data for Pinal AMA
  * 2015 Irrigation Methods by County from USGS Water Use Data

<table>
<thead>
<tr>
<th>AMA</th>
<th>Irrigation Efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescott</td>
<td>76.6%</td>
</tr>
<tr>
<td>Phoenix</td>
<td>76.4%</td>
</tr>
<tr>
<td>Pinal</td>
<td>76.3%</td>
</tr>
<tr>
<td>Tucson</td>
<td>76.1%</td>
</tr>
<tr>
<td>Santa Cruz</td>
<td>75.9%</td>
</tr>
</tbody>
</table>

* Suggestion:
  \[ ___\% \text{ transmission losses} + ___\% \text{ application losses} \]

\[ ___\% \text{ Agricultural Incidental Recharge} \]

* Proposal:
  \[ (8\% \times 75\%) \approx 6\% \text{ Transmission Losses} \]
  \[ + (100\% - 76\%) = 24\% \text{ Application Losses} \]

\[ \sim 30\% \text{ Agricultural Incidental Recharge} \]
Agricultural Incidental Recharge Feedback

* Analysis by Irrigation District
  * Using data from Irrigation Districts
    • Would be open to this as data becomes consistently available
  * Historic water use, ET, CU
    • Annual report data does not include information on crops that are planted
    • Using other crop data would require many assumptions
  * Revisit value every 10 years

Proposal

* \[(8\% \times 75\%) \approx 6\%\] Transmission Losses
  \[+(100\% - 76\%) = 24\%\] Application Losses
  \(~30\%\) Agricultural Incidental Recharge

- Using USGS county level irrigation data
- Using Pinal AMA irrigation efficiency data

* Revisit value with every management plan
  • Consider new irrigation efficiency data, as available:
    • USGS partnership
    • Irrigation Districts
Questions & Comments

* Are there any other suggestions related to agricultural incidental recharge?
* Are there any additional questions/comments on the annual components and calculation of safe-yield?
Strategies for the Long-Term Analysis of 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)
Long-Term Analysis: Proposed Method

* Long-Term Average of Natural Components
  * Inflows:
    * Groundwater Inflow
    * Streambed Recharge
    * Mountain-front Recharge
  * Outflows
    * Groundwater Outflow
    * Riparian Demand

* Short-Term Average of Artificial Components
  * Inflows
    * Sector Incidental Recharge
    * Canal Seepage
    * Cut to the Aquifer
    * CAGRD Replenishment
  * Outflows
    * Sector Demands
    * Remediated Groundwater
    * Poor Quality Groundwater

* Outstanding Items:
  * Long-Term Cycle Length
    * Proposal: 20 Years
  * Short-Term Cycle Length:
    * Proposal: 3 Year
Proposed Method: Prescott AMA

Proposed Method: Phoenix AMA

Proposed Method: Pinal AMA

Proposed Method: Tucson AMA

Proposed Method: Santa Cruz AMA

* Are there any additional questions/comments on the proposed method for the long-term analysis of safe-yield?
* Are there questions about specific AMAs?
Potential Safe-Yield Communication Strategies
* Goals:
  * Simple and clear
  * Accurate
  * Communicates status and/or progress needed
## Potential Safe-Yield Communication Strategies

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
</table>
| Identify a specific number as an annual target | • Clear, easy to understand  
• Quantitative | • Number could be variable & hard to determine  
• Too much weight on one metric |
| “How far from safe-yield?” | • Clear, easy to understand  
• Quantitative | • Number could be variable & hard to determine  
• Too much weight on one metric |
| Directionality | • Shows progress or lack of progress | • Slow – trends take time  
• Not quantitative  
• Not a metric of achieving safe-yield |
| By Sector | • Can help demonstrate how overdraft is occurring | • Requires splitting natural recharge |

### Other suggestions?
Proposed Method of Communication

General Public

Summary of each AMA’s status:
* Is the AMA achieving its goal?

Potential Educational Infographics:
* What is Safe-Yield?
* Safe-Yield vs. localized water levels
* What each AMA is doing to reach the goal?

Informed/Technical Audiences

Metric Checklist:
* Annual
* Long Term
  * Status
  * Directionality
  * Single Year Overdraft
  * Percent by Total Demand
  * Percent by Groundwater Demand
* Outlook
* Long-Term Status-What does this all mean?
## Proposed Method of Communication

<table>
<thead>
<tr>
<th>Safe-Yield Metric</th>
<th>Definition</th>
<th>AMA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Prescott</td>
</tr>
<tr>
<td>Annual</td>
<td>Proportion of years in overdraft</td>
<td>✗</td>
</tr>
<tr>
<td>Long-Term Status</td>
<td>Overdraft status of the most recent year of long-term analysis</td>
<td>✗</td>
</tr>
<tr>
<td>Long-Term Direction</td>
<td>Direction of overdraft in the most recent 3 years of the long-term analysis</td>
<td>✗</td>
</tr>
<tr>
<td>Single Year Overdraft</td>
<td>Amount of overdraft in the most recent year of the long-term analysis</td>
<td>12,154</td>
</tr>
<tr>
<td>% Overdraft (by Total Demand)</td>
<td>Single year overdraft, using the most recent year of the long-term analysis, as a percent of total water demand</td>
<td>35.8%</td>
</tr>
<tr>
<td>% Overdraft (by Groundwater Demand)</td>
<td>Single year overdraft, using the most recent year of the long-term analysis, as a percent of groundwater demand</td>
<td>77.3%</td>
</tr>
<tr>
<td>Outlook</td>
<td>Narrative about potential future issues that may impact the achievement or maintenance of safe-yield</td>
<td>*Absence of imported water supplies</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Not at Safe-Yield, unlikely to achieve with current practices</td>
</tr>
</tbody>
</table>

** Safe-yield is not the goal for the Pinal AMA
* Is this an effective way to communicate the status of safe-yield?
* Are there questions about individual metrics?
* Do you have any suggestions on how we might improve on this communication proposal?
Next Steps
5MP Safe-Yield Technical Subgroup

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* Best Practices for Communicating Status
MPWG Subgroups

{All meeting info is available at new.azwater.gov/5MP/meetings}

Work Group

Subgroup

Breakout

MPWG

12/9/2020

Ag
TBD

Muni
11/4/2020

Industrial
TBD

Safe-Yield
Technical
TBD

Turf
10/22/2020
Questions?

managementplans@azwater.gov

Management Plans Work Group:
new.azwater.gov/5MP
https://new.azwater.gov/5MP/plans-concepts

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