



5th Management Plans Work Group
Safe-Yield Technical Subgroup Meeting

July 7, 2020

Agenda

- I. Welcome
- II. Continue Discussion of Annual Safe-Yield Calculation
 - A. Municipal Incidental Recharge
 - B. Agricultural Incidental Recharge
- III. Discuss Strategies for the Long-Term Analysis of Management Goals
 - A. Safe-Yield Dashboard Update
 - B. Proposed Method for Long-Term Analysis of Safe-Yield
 - C. Methods of Communicating Safe-Yield
- IV. Closing Remarks



Timeline

4MP

Phoenix
AMA
Adoption

Pinal AMA
Adoption

Santa Cruz
AMA
Adoption

2019

2021

2022

2023

MPWG

Drafting
Plans

Adopting
Plans

5MP



MANAGEMENT PLANS WORK GROUP

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

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

Data Availability

AMA Data Page: <https://new.azwater.gov/ama/ama-data>

NEW

Safe-yield Dashboard Long-Term Analysis Update
Safe-Yield Dataset

- * Reported data is compiled and updated on an annual basis.
- * Page also contains AMA Water Supply & Demand Dashboard and Dataset

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goal which attempts to achieve and thereafter maintain a long-term balance between the annual amount of groundwater withdrawn in an active management area and the annual amount of natural and artificial recharge in the active management area.”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



Annual Calculation

Inflows

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

Outflows

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

Outstanding Items

- * Artificial
 - * Municipal Incidental Recharge
 - * Agricultural Incidental Recharge
 - * “Water Budget Approach”
- * Anything else?

Municipal Incidental Recharge

Current

Municipal Incidental Recharge is calculated as a percent of total sector demands

- * Rate is based on AWS Rules: 4% for Phoenix, Pinal, and Tucson AMAs
- * Demands are compiled from AMA Annual Reports
- * Not lagged

Proposal

For the purpose of calculating safe-yield, include 4% Municipal Incidental Recharge rate for Prescott and Santa Cruz AMAs



Agricultural Incidental Recharge

- * Inflow
- * Artificial
- * Current Method:
 - * Output of ADWR's regional groundwater models
 - * Method of lagging may differ between AMAs
- * Current method differs from other sectors
 - * Municipal & Industrial Incidental Recharge are calculated as a percent of total sector demands
 - * Demands are compiled from AMA Annual Reports
 - * Not lagged
- * General consensus that we should move to “water budget method” and calculate this as a percent of total sector water use.

Outstanding Items

- * Incidental Recharge rate for each AMA
 - Suggestion: Total demand * (___% transmission losses + ___% application losses)
 - Application losses = 100% - ___% irrigation efficiency

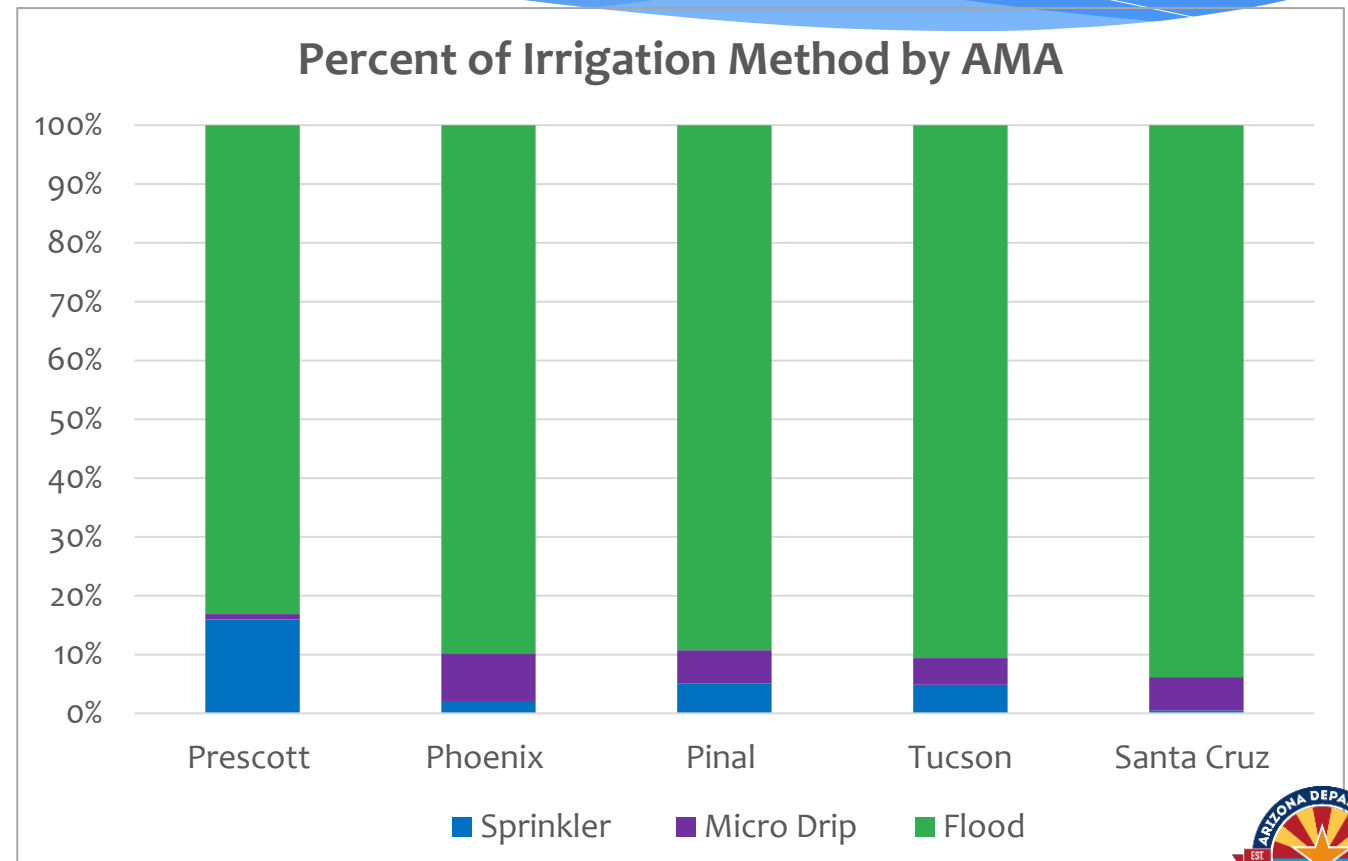
Agricultural Incidental Recharge

* Data:

* USGS Irrigation Efficiency Data for Pinal

Sprinkler	Micro Drip	Flood
84%	90%	75%

* 2015 Irrigation Methods by County from [USGS Water Use Data](#)



Agricultural Incidental Recharge

* Irrigation Efficiency by AMA:

AMA	Irrigation Efficiency
Prescott	76.6%
Phoenix	76.4%
Pinal	76.3%
Tucson	76.1%
Santa Cruz	75.9%

* Suggestion:

___% transmission losses

+ ___% application losses

___% **Agricultural Incidental Recharge**

* Proposal:

$(8\% * 75\%) \approx 6\%$ Transmission Losses

+ $(100\% - 76\%) = 24\%$ Application Losses

~30% Agricultural Incidental Recharge

Strategies for the Long-Term Analysis of Management Goals



Long-term Analysis

*“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

- * Safe-Yield Dashboard Update
- * Proposed Method for Long-Term Analysis of Safe-Yield
- * Methods of Communicating Safe-Yield





Long-Term Analysis: Updated Safe-Yield Dashboard

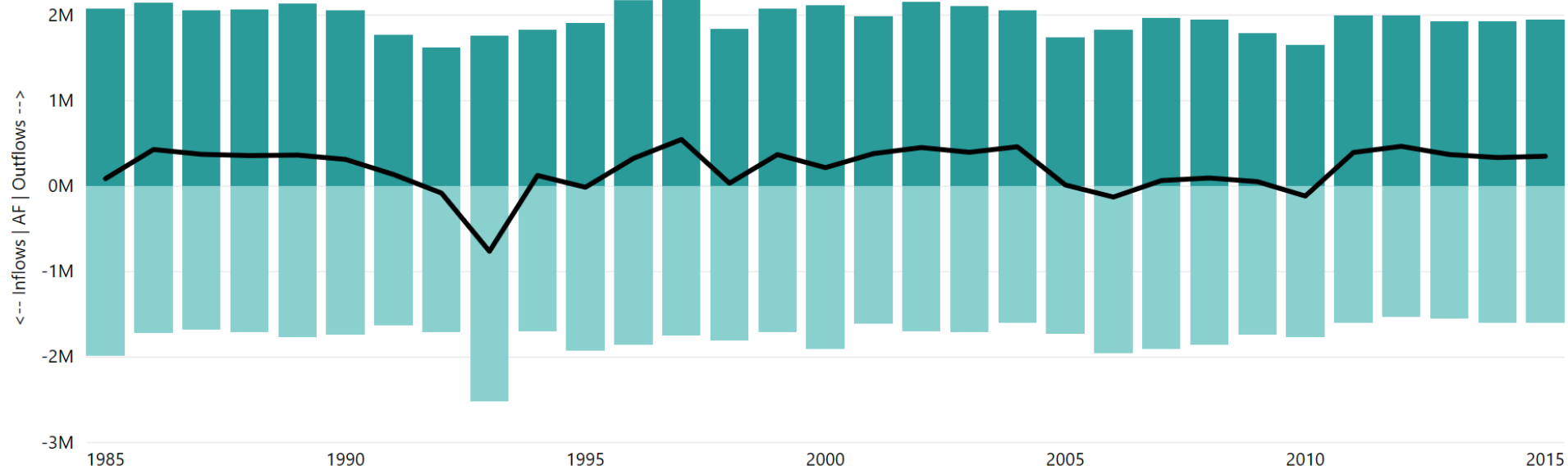
OVERDRAFT DASHBOARD

Last Updated: 06/26/2020

ANNUAL INFLOWS & OUTFLOWS

● Inflow ● Outflow ● Overdraft

Click on the columns and/or legend components to highlight specific data



- * Updated Safe-Yield Tabs:
 - * Time
 - * Natural
 - * Time Periods
 - * Sector
 - * Proposed
 - * Definitions
 - * Management Goals

AMA Click here to see AMA Management Plan Goals

- Phoenix
- Pinal
- Prescott
- Santa Cruz
- Tucson

YEAR

Hold down "Ctrl" to select multiple AMAs



SAFE-YIELD INFLOWS:

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

SAFE-YIELD OUTFLOWS:

- Groundwater Outflow (Natural)
- Riparian Demand (Natural)
- Agricultural Demand (Artificial)
- Municipal Demand (Artificial)
- Industrial Demand (Artificial)
- Indian Demand (Artificial)



Show Components

Hide Components

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
 - * CAGR D Replenishment
- * Outflows
 - * Sector Demands
 - * Remediated Groundwater
 - * Poor Quality Groundwater

* Outstanding Items:

- * Long-Term Cycle Length
 - * All data available
 - * 10, 20 years
 - * Weather Patterns
- * Short-Term Cycle Length:
 - * 5, 10 years
 - * 3 Years to align with GPCD, L&U
 - * Economic Factors

Potential Safe-Yield Communication Strategies

- * Goals:
 - * Simple and clear
 - * Accurate
 - * Communicates status and/or progress needed

Potential Safe-Yield Communication Strategies

Strategy	Pros	Cons
Identify a specific number as an annual target	<ul style="list-style-type: none"> • Clear, easy to understand • Quantitative 	<ul style="list-style-type: none"> • Number could be variable & hard to determine • Too much weight on one metric
“How far from safe-yield?”	<ul style="list-style-type: none"> • Clear, easy to understand • Quantitative 	<ul style="list-style-type: none"> • Number could be variable & hard to determine • Too much weight on one metric
Directionality	<ul style="list-style-type: none"> • Shows progress or lack of progress 	<ul style="list-style-type: none"> • Slow – trends take time • Not quantitative • Not a metric of achieving safe-yield
By Sector	<ul style="list-style-type: none"> • Can help demonstrate how overdraft is occurring 	<ul style="list-style-type: none"> • Requires splitting natural recharge
Other suggestions?		



Next Steps



5MP Safe-Yield Technical Subgroup

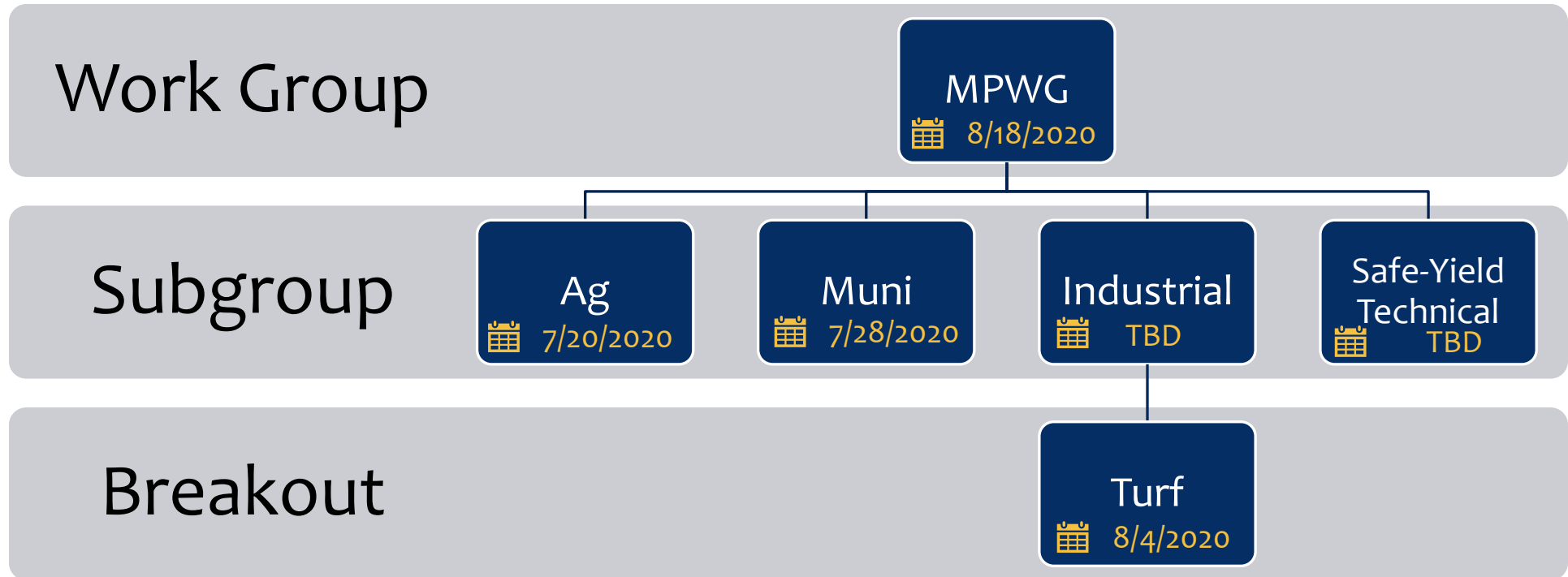
Goals

- * 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

MPWG Subgroups



Questions?

managementplans@azwater.gov

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

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

