

5th Management Plans Work Group Agricultural Subgroup Meeting

November 18, 2019



Agenda

- I. Welcome
- II. Overview of Best Management Practices (BMPs)
Conservation Program Data and Analyses
- III. Discussion of Individual BMPs
- IV. Closing Remarks



Overview of BMP Conservation Program Data and Analyses



Agricultural Conservation Programs

- * Base Program
- * Historic Cropping Program
- * Best Management Practices Program (BMP)
- * Conservation Programs include:
 - * Regulatory requirements related to water use
 - * Reporting requirements
 - * Conservation targets
 - * Flexibility provisions
 - * Compliance provisions

A.R.S. § 45-563(A): "... The plans shall include a continuing mandatory conservation program for all persons withdrawing, distributing or receiving groundwater designed to achieve reductions in withdrawals of groundwater."



Agricultural BMP Program

A.R.S. § 45-568.02(G)

“The director shall include... a best management practices program... in lieu of complying with an irrigation water duty and a maximum annual groundwater allotment. The program shall be designed to achieve conservation that is at least equivalent to that required under [the Base Program].”



Agricultural BMP Program

- * Farm operator agrees to implement approved BMPs on their farm relating to water conveyance, irrigation systems, and efficient water & soil management practices.
- * Must implement and report on practices annually, in addition to adhering to water use reporting requirements, under BMP farm unit number.
- * No annual allotment to adhere to, therefore the water duty & flexibility account provisions are irrelevant to IGFRs while enrolled in the BMP Program.

AMA	Number of IGRs Enrolled in the BMP Program	Irrigation Acres Enrolled in the BMP Program
Phoenix	172	26,700
Pinal	312	83,481
Total	484	110,181



Agricultural BMP Program

Provision	3MP & Adopted 4MPs	Proposed for Remaining 4MPs
Points target and structure	10 total points ✓ At least 1 point/category ✓ At least 2 points in Category 2 ✓ No more than 3 points/category	12 total points ✓ At least 1 point/category ✓ At least 2 points in Category 2 ✓ No more than 4 points/category
Points values	No changes	Changes made in Categories 1 & 2 (See Appendix 4B)

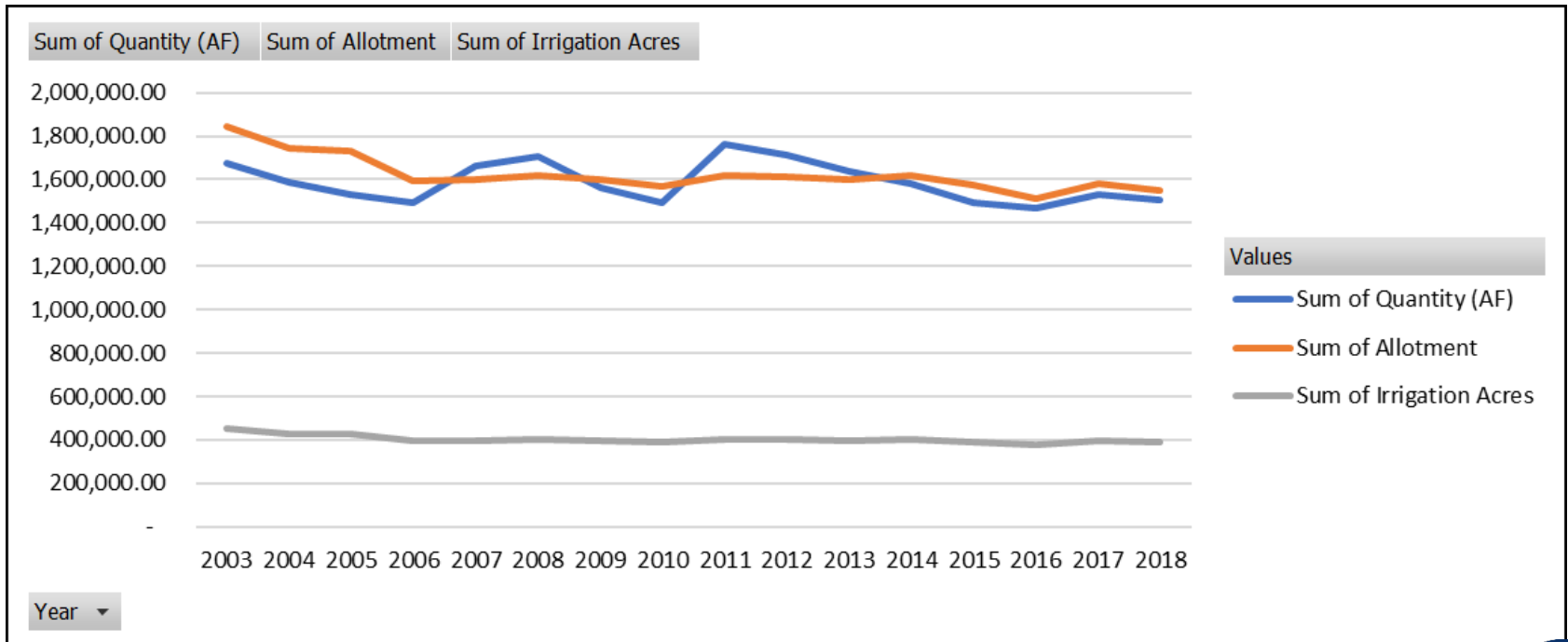


Agricultural BMP Program

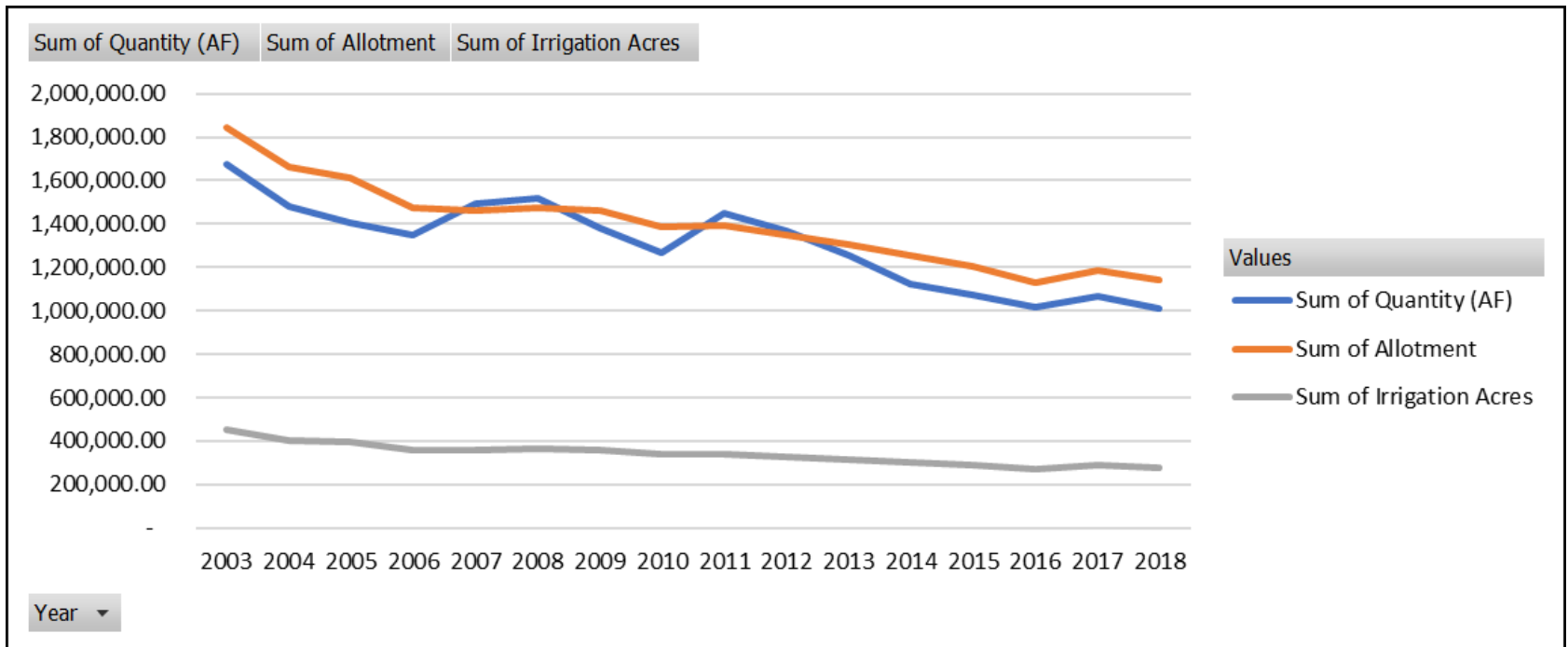
	AF/Irrigation Acre			% Total Irrigation Acres	% of Total Ag Water Use
	Base	BMP	% difference	BMP	BMP
Phoenix AMA	4.7	5.1	10%	20%	22%
Pinal AMA	3.1	4.0	29%	35%	42%
Total All AMAs	3.7	4.3	15%	27%	30%



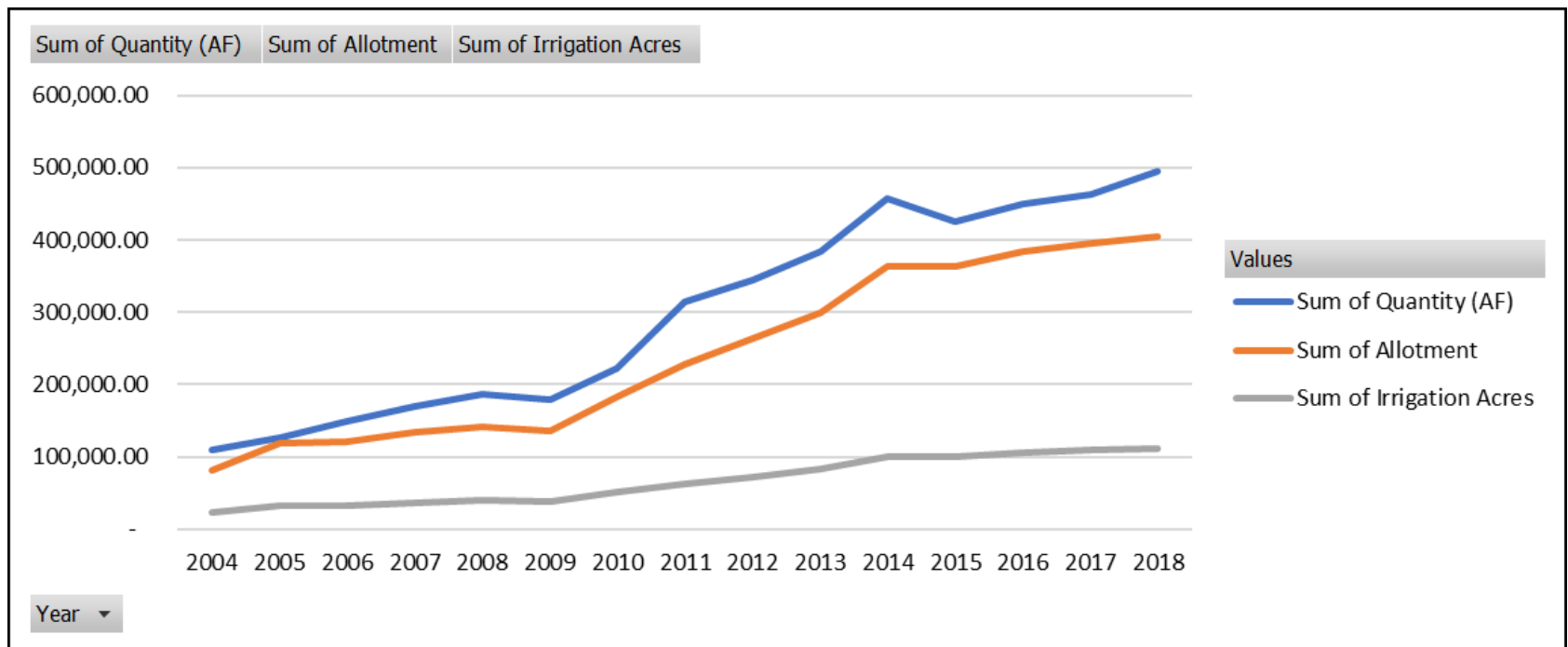
Base Program & BMP Program Combined Water Use and Allotments



Base Program Water Use and Allotments

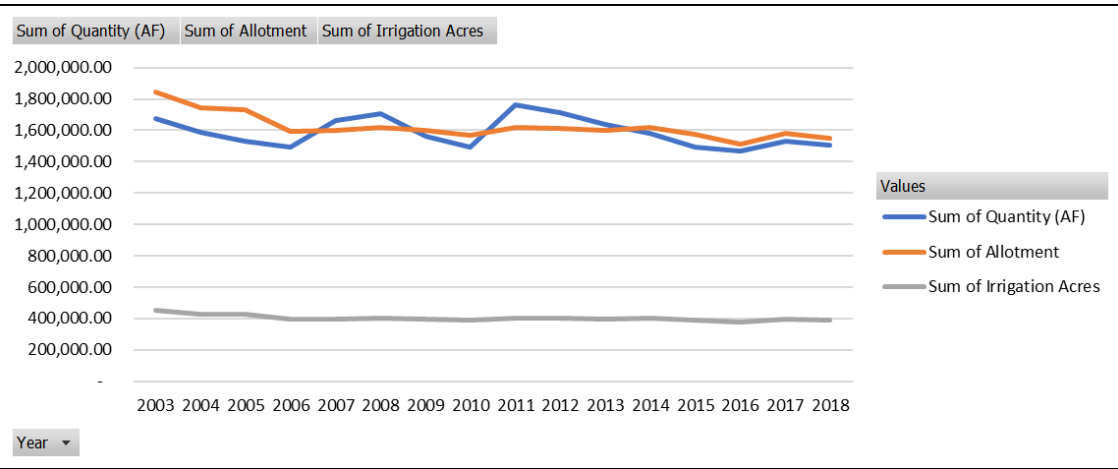


BMP Program Water Use and Allotments

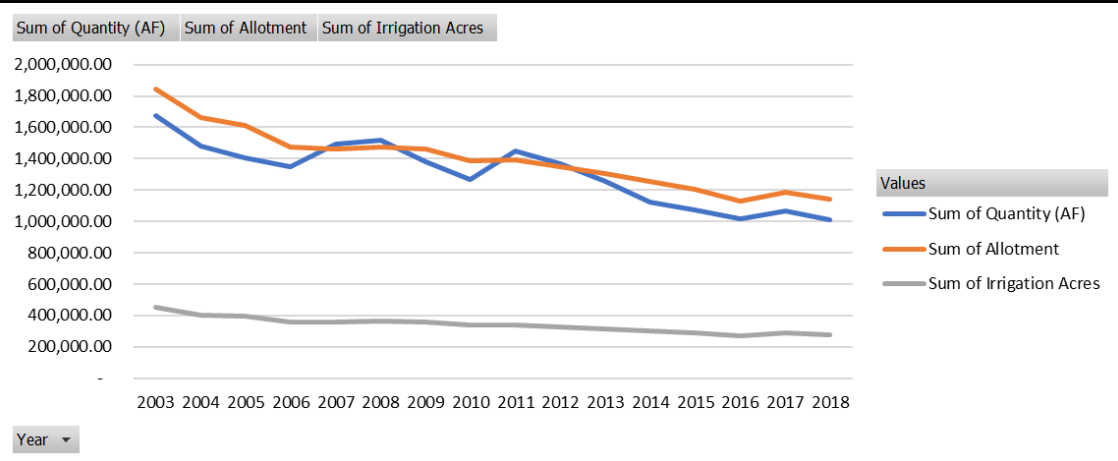




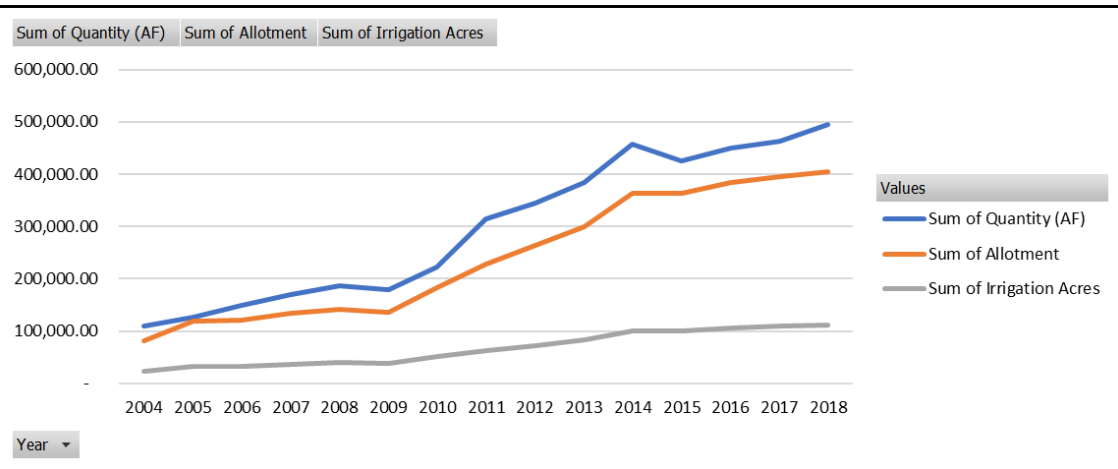
Base Program & BMP Program Combined Water Use and Allotments



Base Program Water Use and Allotments



BMP Program Water Use and Allotments

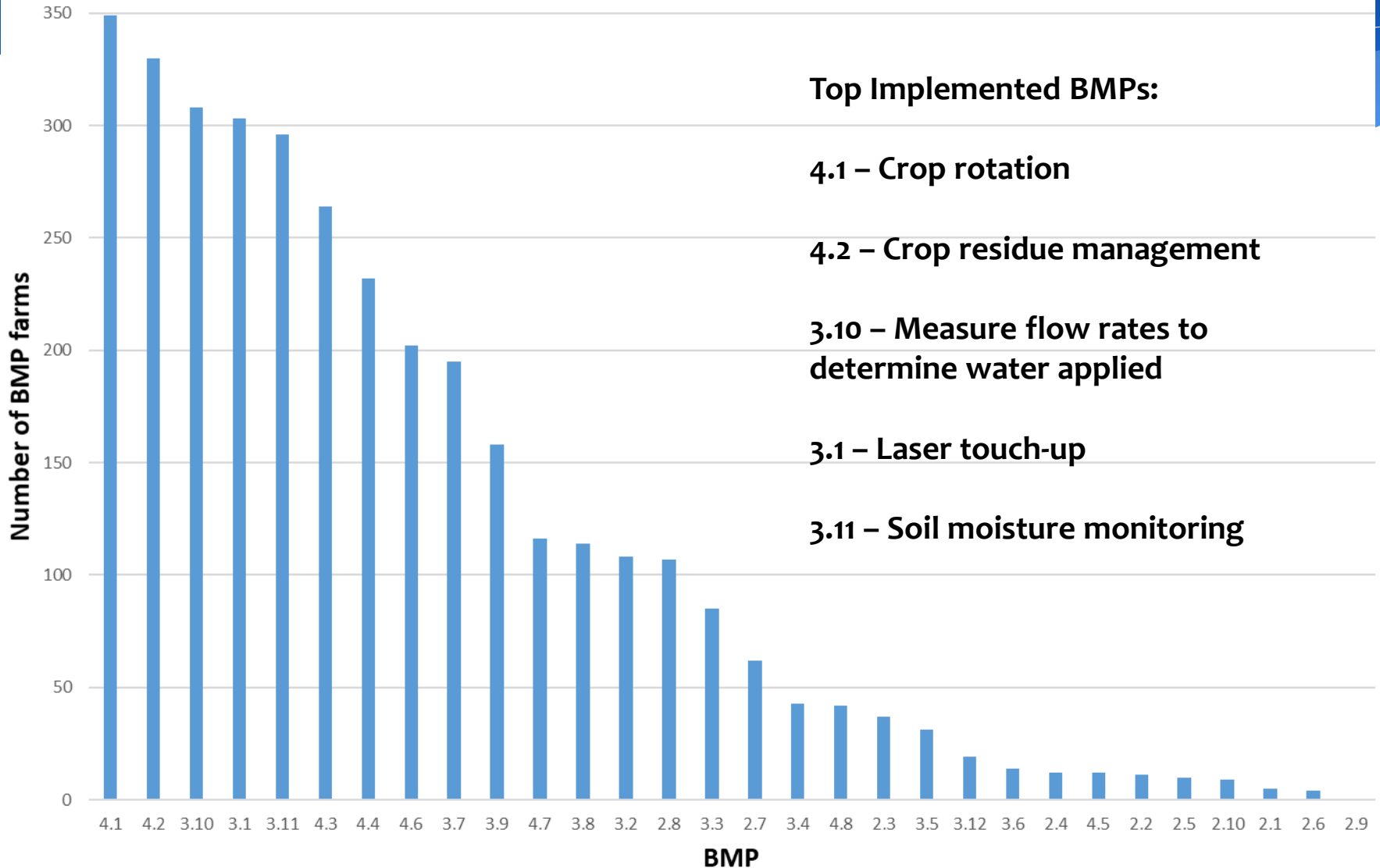


Discussion of Individual BMPs





Implemented BMPs



BMP Category 1: Water Conveyance System Improvements

BMP 1.1 Concrete-lined ditch

A means of transporting water to farm fields via a concrete-lined ditch in order to minimize transmission losses through seepage.

BMP 1.2 Pipelines

Any type of low or high-pressure pipeline used to convey water to a farm field in order to reduce or eliminate water loss prior to the act of irrigation. Pipelines may be constructed of PVC, ABS, concrete, aluminum, and or steel.

BMP 1.3 Drainback system

Level irrigation system technology utilizing headland channel conveyance which is designed and maintained to “drain” excess water applications from one irrigated field to the next down gradient field.

Category 1: Water Conveyance System – Point Table

Percentage of the farm’s total irrigated acreage served by the approved BMPs	Point Value
60-64	1.0
65-69	1.3
70-74	1.8
75-79	2.3
80-84	2.8
85-89	3.3
90-94	3.8
95-100	4.0





BMP Category 2: Farm Irrigation Systems

BMP 2.1 Slope systems without uniform grades with tailwater reuse - (0.5 Point)

Definition: Sloped fields without uniform grades with a constructed recovery system that allows for the reuse of water that runs off the end of the field after an irrigation event.

BMP 2.2 Uniform slope systems without tailwater reuse - (0.5 Point)

Definition: Sloped fields that have been engineered to uniform grades with no means of reusing the water that runs off the end of the field after an irrigation event.

BMP 2.3 Uniform slope systems with tailwater reuse - (1.5 Points)

Definition: Sloped fields that have been engineered to uniform grades with a constructed recovery system that allows for the reuse of water that runs off the end of the field after an irrigation event.

BMP 2.4 Uniform slope within an irrigation district that captures and redistributes return flows - (1.5 Points)

Definition: Sloped fields that have been engineered to uniform grades enabling an irrigation district to collect the water that leaves a farm field after an irrigation event for distribution to another farm field.

BMP 2.5 Modified slope systems - (2 Points)

Definition: Sloped fields that have been engineered to uniform grades in the upper portion of the field, with the bottom portion generally having a field slope of 0.0 to 0.2 feet of total fall in the direction of irrigation. All irrigation water is retained on the field.

BMP 2.6 High pressure sprinkler systems - (2 Points)

Definition: Side-roll, linear, center-pivot, and solid set designs that operate at mainline water pressures of 10 pounds per square inch (psi) or more.

BMP 2.7 Near level systems - (2.5 Points)

Definition: Sloped fields that have been engineered to uniform grades between 0.2 to 0.5 feet of total fall in the direction of irrigation over the entire length of the field. All irrigation water is retained on the field.

BMP 2.8 Level systems - (3 Points)

Definition: Level border or level furrow system where the field slope may vary from 0.0 to 0.2 feet of total fall in the direction of irrigation over the entire length of the field. Either all irrigation water is retained on the field or a level drainback system is used.

BMP 2.9 Low pressure sprinkler systems - (4 Points)

Definition: Linear and center-pivot sprinkler designs that operate at water pressures measured at the high end of the mainline of no greater than 10 psi.

BMP 2.10 Trickle irrigation systems - (4 Points)

Definition: Pressurized drip or subsurface irrigation capable of applying precise amounts of water to the crop root zone (also referred to as drip irrigation).



BMP Category 3: Irrigation Water Management

BMP 3.1 Laser touch-up - (1 Point)

Definition: Annual re-establishment of precision laser grades to ensure good advancement of applied irrigation water. Must be applied to a minimum of 20 percent of the near level and level basin acreage irrigated the prior year.

BMP 3.2 Alternate row irrigation - (1 Point)

Definition: The practice of irrigating every other cultivated row during either single or multiple irrigation events to minimize the surface area of applied water. Annually, must be used on at least 20 percent of the acreage irrigated in row crops for at least one irrigation.

BMP 3.3 Furrow checks - (1 Point)

Definition: Manually applied or installed devices placed in rows to raise the water level in the row reducing the velocity to prevent erosion and enhance infiltration rates. Annually, must be used on at least 20 percent of irrigated acreage for at least one irrigation.

BMP 3.4 Angled rows/contour farming - (1 Point)

Definition: Annual practice of reducing row fall through row angling and/or contouring to enhance water advancement and infiltration rates. This practice may also minimize or eliminate tailwater runoff. Annually, must be used on at least 20 percent of irrigated acreage.

BMP 3.5 Surge irrigation - (1 Point)

Definition: The practice of applying irrigation water to a field by intermittent surges or pulses of water rather than by a continuous flow rate. The irrigation water advances down the field (or furrow), in stages, allowing uniform water penetration and avoiding tailwater runoff. A gradual sealing and soil conditioning occurs with each progressive surge allowing a more efficient water application. Annually, must be used on at least 20 percent of irrigated acreage.

BMP 3.6 Temporary sprinklers - (1 Point)

Definition: Utilization of portable, roller and/or solid set sprinkler system for meeting pre-irrigation needs, seedling germination to establish a crop, and/or pre-harvest irrigation for maintaining crop quality. This practice reduces water use when compared to conventional flood irrigation techniques that require excessive water applications for seedling germination and/or crop quality. Annually, must be used on at least 20 percent of irrigated acreage.



BMP Category 3: Irrigation Water Management (cont.)

BMP 3.7 Participation in an educational irrigation water management program - (1 Point)

Definition: Enrollment in a private or Department sponsored educational irrigation water management program that includes irrigation water management topics such as soil water replacement needs, application rates, and irrigation scheduling. Annually, must participate in such a program throughout the entire crop season.

BMP 3.8 Participation in a consultant or irrigation district sponsored irrigation scheduling service - (1 Point)

Definition: Enrollment in a consultant or Department sponsored irrigation scheduling service that provides recommendations on soil moisture monitoring, soil water replacement needs, irrigation application rates, and irrigation scheduling dates based on soil moisture monitoring or real-time evapotranspiration data. Annually, must participate in such a program throughout the entire crop season.

BMP 3.9 Participation in an irrigation district program to increase the flexibility of water deliveries - (1 Point)

Definition: Enrollment in a cooperative program set up by the irrigation district to assist a farmer with timely irrigation deliveries and shut off, constant flow rates, and other water order guidelines developed by the irrigation district. Annually, must participate in such a program throughout the entire crop season.

BMP 3.10 Measure flow rates to determine the amount of water applied - (1 Point)

Definition: Measure flow rates to determine the amount of water applied for each irrigation event on each field for the purpose of achieving good application efficiencies.

BMP 3.11 Soil moisture monitoring - (1 Point)

Definition: Use of a number of accepted methods to monitor/measure soil moisture for the purpose of determining soil water replacement needs, application rates, and irrigation scheduling on each field (accepted methods may include core sampling, resistance blocks, neutron probe, tensiometers) throughout the entire crop season.

BMP 3.12 Computer based model using meteorological data - (1 Point)

Definition: Use of a computer based irrigation scheduling program that incorporates real-time meteorological data (e.g. AZMET) for the purpose of determining irrigation event schedules on each field throughout the entire crop season.

Substitute Practice - (1 Point)

Definition: A new or existing irrigation water management practice not listed above that the director determines will likely result in water savings on the farm at least equivalent to the water savings that would result from implementation of one of the approved BMPs described in this category.



BMP Category 4: Agronomic Management

BMP 4.1 Crop rotation - (1 point)

Definition: Periodic rotation of crop types on a given farm field to ensure the non-degradation of soil tilth. Annually, at least 20 percent of the acreage irrigated the prior year needs to be rotated to a different crop.

BMP 4.2 Crop residue management - (1 point)

Definition: Crop residue should be left on the soil surface or incorporated to a shallow depth into the soil profile to increase soil nutrients, soil water holding capacities, and increase the available soil moisture to a crop. Annually, must be employed on at least 20 percent of the total irrigated acreage.

BMP 4.3 Soil and water quality testing - (1 point)

Definition: Annual soil testing to determine: 1) residual amounts of fertilizer, 2) soil salinity for leaching needs, and 3) water intake rates and water holding capacity. Soil testing is required on at least 50 percent of the irrigated acreage. Water quality testing for needs such as estimating leaching requirements or avoiding potential injury to crops. Testing must include a “blend” analysis of irrigation water used from all sources.

BMP 4.4 Pre-irrigation surface conditioning - (1 point)

Definition: Mechanical means (i.e. driving rows, soil torpedoes, etc.) by which rows or borders are prepared prior to an initial irrigation to smooth flow of water to avoid unwanted deep percolation during dry conditions or to enhance water advancement rates. Annually, must be used on at least 20 percent of irrigated acreage.

BMP 4.5 Transplants - (1 point)

Definition: Use of established seedlings transplanted into a field. This practice eliminates excessive applications of water to germinate crops in the field from seeds. Annually, must be used on at least 20 percent of irrigated acreage.

BMP 4.6 Mulching - (1 point)

Definition: Use of organic matter (apart from or in addition to crop residues) or plastic sheets to cover plant beds (plastic mulch) and/or use of plastic material laid over hoops suspended above the plant beds (floatable row covers) to reduce evaporation losses. Annually, must be used on at least 20 percent of irrigated acreage.

BMP 4.7 Shaping furrow or bed - (1 point)

Definition: Use of mechanical means such as a row former to make the bed profile more shallow to minimize time of infiltration and minimize the wetted surface area along the rows. Annually, must be used on at least 20 percent of irrigated acreage.

BMP 4.8 Planting in bottom of furrow - (1 point)

Definition: Practice of planting in the bottom of the furrow as opposed to planting along the top of the row bed to minimize impacts of salt build up and wetting (subbing) requirements for germination. Annually, must be used on at least 20 percent of irrigated acreage.

Substitute Practice - (1 Point)

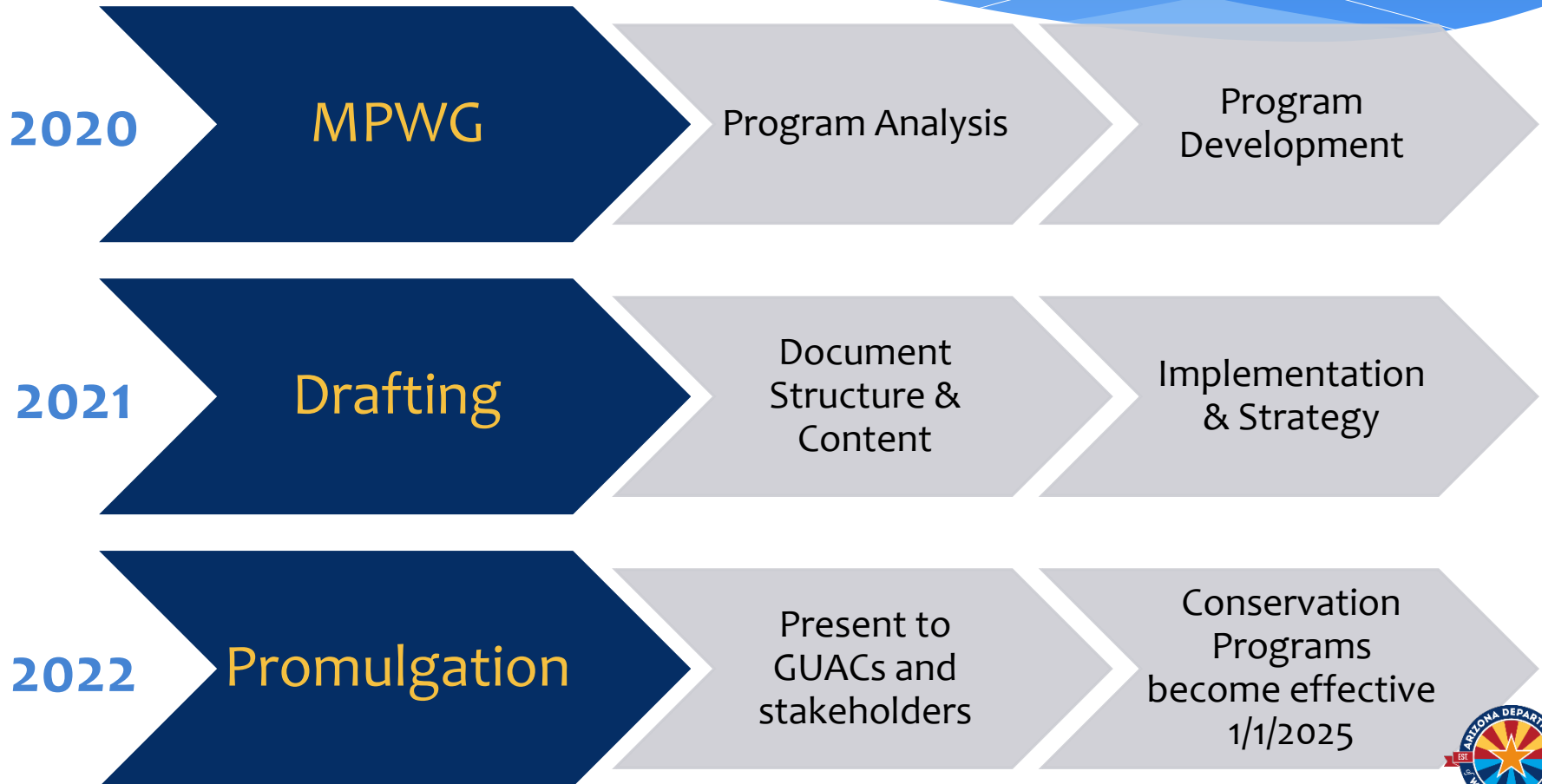
Definition: A new or existing agronomic management practice not listed above that the director determines will likely result in water savings on the farm at least equivalent to the water savings that would result from implementation of one of the approved BMPs described in this category.

Closing Remarks



Estimated 5MP Timeline

Next MPWG meeting: 2pm on December 4, 2019



Questions?

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

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

