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**Date:** August 12, 2019  
**To:** Donovan Neese  
**From:** Sheryl Sweeney   
**Subject:** Fourth and Fifth Management Plans

**A. Management Plans Kickoff**

On July 9, 2019, Arizona Department of Water Resources (“ADWR”) held its Management Plans Work Group Kickoff meeting.

The Fourth Management Period is 2010 to 2020. Fourth Management Plans (“4MPs”) have been adopted for the Prescott and Tucson AMAs. Phoenix, Pinal and Santa Cruz AMA 4MPs were never completed.

ADWR’s plan is to finish the Phoenix 4MP by summer of 2020. The Pinal 4MP will be done in winter of 2020. The Santa Cruz 4MP is expected to be done in the fall of 2021. Work on the Fifth Management Plans will begin immediately after that.

**B. Reporting, Audits, Conservation Reports**

ADWR proposes increased reporting for agriculture, which will include the following information:

- Crop type (will apply to IGFR holders)
- Number of active irrigated acres (will apply to IGFR holders)
- Percent of canals lined (may apply to both IGFR holders and entities like RID).

See Attachment A.

ADWR also proposes selective audits of records and practices related to conservation requirement. Such audits may include individual IGFR holders and the district.

Finally, ADWR is going to evaluate the effectiveness of existing conservation programs and issue a report regarding how the programs are making progress toward the AMA goals. At the kickoff meeting, ADWR used agriculture as an example. Farms switching from water duties per acre to Best Management Plans (“BMPs”) have resulted in an increase in water use. See Attachment B.

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**C. Conservation Program Changes for Districts**

Under the Third Management Plan (“3MP”), districts were required to line canals or have 10% or less lost and unaccounted for water on “10% or more of water deliveries for irrigation.” ADWR proposes to change the language to “10% or more of any water for irrigation use.” See Attachment C.

**D. Conservation Program Changes for IGFRs**

ADWR proposes the following changes to the IGFR conservation program:

With respect to IGFR holders that operate on the water duty per acre method, ADWR proposes to take the top 25% of the water duties, within an area of similar farming conditions, and reduce them by up to 10%. In the Phoenix AMA, 11% of the IGFRs operating under the water duty program will be adjusted. See Attachment D for details. The reduction cannot result in the 25% going below the highest water duty of the lower 75%. The reduction also cannot result in a water duty using an irrigation efficiency of greater than 80%. See Attachment E.

For IGFR holders operating under the BMP Program, ADWR proposes to increase the points target from 10 points to 12 points. In addition, the point values are going to be modified in Categories 1 and 2. See Attachment F. Farms participating in the BMP Program under the Third Management Plan have until July 1, 2022, to update their BMP worksheets.

**E. Next Meetings**

**Date:** Tuesday, August 20, 2019

**Topic:** Management Plans Work Group Meeting

**Time:** 1:00pm to 2:00pm

**Location:** ADWR, 1110 W. Washington St., Room 3175, Phoenix, AZ

**Date:** Wednesday, September 4, 2019

**Topic:** 5<sup>th</sup> Management Plans Subgroup Meeting – Municipal

**Time:** 1:00pm to 2:00pm

**Location:** ADWR, 1110 W. Washington St., Suite 310, Middle Verde Conference Room, Phoenix, AZ

**Date:** Thursday, September 5, 2019

**Topic:** 5<sup>th</sup> Management Plans Subgroup Meeting – Agriculture

**Time:** 1:00pm to 2:00pm

**Location:** ADWR, 1110 W. Washington St., Suite 310, Middle Verde Conference Room, Phoenix, AZ

**Date:** Tuesday, September 10, 2019

**Topic:** 5<sup>th</sup> Management Plans Subgroup Meeting – Industrial

**Time:** 1:00pm to 2:00pm

**Location:** ADWR, 1110 W. Washington St., Suite 310, Middle Verde Conference Room, Phoenix, AZ

**Date:** Tuesday, September 24, 2019

**Topic:** 5<sup>th</sup> Management Plans Subgroup Meeting – Safe-Yield Technical Group

**Time:** 1:00pm to 2:30pm

**Location:** ADWR, 1110 W. Washington St., Suite 310, Middle Verde Conference Room, Phoenix, AZ

# **ATTACHMENT A**

# New Provisions in the 4MP

## \* Reporting

- \* Agricultural
  - \* Crop type
  - \* Active irrigated acres
  - \* % of canals lined
- \* Industrial
  - \* Turfed Acres
  - \* Water Surface Acres
  - \* Low Water Use Plant Acres

## \* Audit

- \* Selected audits of records and practices related to conservation requirements
- \* Conservation Progress Report
  - \* Effectiveness of all conservation programs
  - \* Progress toward goals in all AMAs



# **ATTACHMENT B**

# 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%



# **ATTACHMENT C**





# Conservation Program Changes

Program	Provision	3MP	Adopted 4MPs	Remaining 4MPs
Ag – Districts	Line canals or 10% or less L&U	“10% or more of water deliveries for irrigation use”	“any water for irrigation use”	“any water for irrigation use”
Ag – Base	High Water Duty Adjustment	No change	No change	Top 25% of water duties reduced by up to 10%
Ag – BMP	Points target	10 points	10 points	12 points
Ag – BMP	Points restructuring	Points accrued from 4 Categories	No change	Point values modified in Categories 1 & 2
Muni – GPCD	GPCD target	Recalculated with each Management Plan		
Muni - NPCCP	BMP or Points target	Tier 1 = 1 BMP Tier 2 = 5 BMPs Tier 3 = 10 BMPs	No change	Tier 1 = 2 points Tier 2 = 8 points Tier 3 = 15 points
Muni – NPCCP	Points restructuring	All items count as 1 BMP	No change	Certain BMPs count as multiple points
Industrial – Turf	Application Rate (AF/acre)	Calculated based on 75% Irrigation Efficiency	No change	Calculated based on 80% Irrigation Efficiency
Industrial – Turf	Acres of turf	Certain golf courses limited to 5 acres of turf per hole	No change	Limitation applies to additional turf-related facilities

# **ATTACHMENT D**

# Agricultural Base Program Water Duties

AMA	Number of rights adjusted (% total in the Base Program)	Maximum change in allotment (% total)
Phoenix	219 (11%)	-6,216 AF (-1.0%)
Pinal	123 (11%)	-3,092 AF (-0.5%)
Santa Cruz	1 (-26%)	-5 AF (negligible)

Allotment = Water Duty x Water Duty Acres

Water Duty = Irrigation Requirement / Irrigation Efficiency

Irrigation Requirement = Consumptive Use + Other Needs + Leaching Allowance



# **ATTACHMENT E**

# Agricultural Base Program Water Duties

## A.R.S. § 45-567(A)(1)

*“... In setting the irrigation water duty or intermediate water duties for the fourth management period, the director may adjust the highest twenty-five per cent of the final irrigation water duties established within an area of similar farming conditions pursuant to section 45-566 by reducing each water duty in an amount up to ten per cent, except that, in making the adjustment, no water duty may be reduced to an amount less than the greater of the following:*

- (a) The highest water duty within the lowest seventy-five per cent of the water duties computed within the area of similar farming conditions for the fourth management period*
- (b) A water duty computed for the farm unit under this paragraph using an irrigation efficiency of eighty per cent.”*



# **ATTACHMENT F**

**APPENDIX 4B  
BEST MANAGEMENT PRACTICES PROGRAM  
APPROVED BEST MANAGEMENT PRACTICES**

<b>BMP CATEGORY 1. WATER CONVEYANCE SYSTEM IMPROVEMENTS</b>	
<b>Description:</b> A farm’s water conveyance system allows water to be conveyed from an irrigation district delivery point or a well head for irrigation of each field. This category includes water conveyance system improvements that qualify as approved BMPs.	
<b>Approved Water Conveyance Improvements</b>	
<b>BMP 1.1 Concrete-lined ditch</b>	A means of transporting water to farm fields via a concrete-lined ditch in order to minimize transmission losses through seepage.
<b>BMP 1.2 Pipelines</b>	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.
<b>BMP 1.3 Drainback system</b>	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.
<b>Point Value Determination for BMP Category 1</b>	
An applicant for the BMP Program must select one or more of the water conveyance system improvement BMPs described above in the application for the BMP Program. A BMP may be selected only if it is being implemented on the farm at the time the application is filed. The total points for the BMP or BMPs selected in this category shall be calculated by estimating the percentage of the farm’s irrigated acreage served by the selected BMP or BMPs, and then determining the point value for that percentage in the table below. For purposes of this determination, “irrigated acreage” means those acres within the farm that will be irrigated while the applicant is regulated under the BMP Program. If the applicant selects more than one BMP in this category, an acre shall not be counted twice in determining the total percentage of the farm’s irrigated acreage served by the BMPs. In this category, the maximum number of points allowed is four and the minimum number is one.	

<b>Category 1: Water Conveyance System – Point Table</b>	
<b>Percentage of the farm’s total irrigated acreage served by the approved BMPs</b>	<b>Point Value</b>
<b>60-64</b>	<b>1.0</b>
<b>65-69</b>	<b>1.3</b>
<b>70-74</b>	<b>1.8</b>
<b>75-79</b>	<b>2.3</b>
<b>80-84</b>	<b>2.8</b>
<b>85-89</b>	<b>3.3</b>
<b>90-94</b>	<b>3.8</b>
<b>95-100</b>	<b>4.0</b>

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<b>BMP CATEGORY 2. FARM IRRIGATION SYSTEMS</b>	
<b>Description:</b> Farm irrigation systems are the methods by which a farm field is irrigated. Farm irrigation systems include slope, modified slope, level or near level, sprinkler, trickle or drip, or any combination thereof. This category includes farm irrigation systems that qualify as approved BMPs.	
<b>Approved Farm Irrigation Systems</b>	
<b>BMP 2.1 Slope systems without uniform grades with tailwater reuse - (0.5 Point)</b>	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.
<b>BMP 2.2 Uniform slope systems without tailwater reuse - (0.5 Point)</b>	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.
<b>BMP 2.3 Uniform slope systems with tailwater reuse - (1.5 Points)</b>	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.
<b>BMP 2.4 Uniform slope within an irrigation district that captures and redistributes return flows - (1.5 Points)</b>	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.
<b>BMP 2.5 Modified slope systems - (2 Points)</b>	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.
<b>BMP 2.6 High pressure sprinkler systems - (2 Points)</b>	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.
<b>BMP 2.7 Near level systems - (2.5 Points)</b>	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.
<b>BMP 2.8 Level systems - (3 Points)</b>	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.
<b>BMP 2.9 Low pressure sprinkler systems - (4 Points)</b>	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.
<b>BMP 2.10 Trickle irrigation systems - (4 Points)</b>	Definition: Pressurized drip or subsurface irrigation capable of applying precise amounts of water to the crop root zone (also referred to as drip irrigation).



**APPENDIX 4B  
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<b>Point Value Determination for BMP Category 2</b>
<p>An applicant for the BMP Program must select one or more of the farm irrigation systems BMPs described above in the application for the BMP Program. A BMP may be selected only if it is being implemented on the farm at the time the application is filed. The points for a BMP selected in this category shall be calculated by multiplying the points assigned to the BMP as shown above by the percentage of the farm's irrigated acreage served by the irrigation system described in the BMP. For purposes of this determination, "irrigated acreage" means those acres within the farm that will be irrigated while the applicant is regulated under the BMP Program. If the applicant selects more than one BMP in this category, an acre shall not be counted twice in determining the total percentage of the farm's irrigated acreage served by the BMPs. In this category, the maximum number of points allowed is four and the minimum number is two.</p>

<b>BMP CATEGORY 3. IRRIGATION WATER MANAGEMENT</b>
<p><b>Description:</b> Irrigation water management practices include management practices that, when implemented properly, will increase a farm's overall efficiency of water application in a growing season. This category includes irrigation water management practices that qualify as approved BMPs.</p>
<b>Approved Irrigation Water Management Practices</b>
<p><b>BMP 3.1 Laser touch-up - (1 Point)</b>                  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.</p>
<p><b>BMP 3.2 Alternate row irrigation - (1 Point)</b>                  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.</p>
<p><b>BMP 3.3 Furrow checks - (1 Point)</b>                  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.</p>
<p><b>BMP 3.4 Angled rows/contour farming - (1 Point)</b>                  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.</p>
<p><b>BMP 3.5 Surge irrigation - (1 Point)</b>                  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.</p>

**APPENDIX 4B  
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<b>Approved Irrigation Water Management Practices (BMP Category 3 cont.)</b>
<p><b>BMP 3.6 Temporary sprinklers - (1 Point)</b> 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.</p>
<p><b>BMP 3.7 Participation in an educational irrigation water management program - (1 Point)</b> 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.</p>
<p><b>BMP 3.8 Participation in a consultant or irrigation district sponsored irrigation scheduling service - (1 Point)</b> 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.</p>
<p><b>BMP 3.9 Participation in an irrigation district program to increase the flexibility of water deliveries - (1 Point)</b> 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.</p>
<p><b>BMP 3.10 Measure flow rates to determine the amount of water applied - (1 Point)</b> 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.</p>
<p><b>BMP 3.11 Soil moisture monitoring - (1 Point)</b> 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.</p>
<p><b>BMP 3.12 Computer based model using meteorological data - (1 Point)</b> 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.</p>
<b>Substitute Irrigation Water Management Practices</b>
<p><b>Substitute Practice - (1 Point)</b> 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.</p>

**APPENDIX 4B  
BEST MANAGEMENT PRACTICES PROGRAM  
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**Point Value Determination for BMP Category 3**

An applicant for the BMP Program must select one or more of the irrigation water management BMPs described above in the application for the BMP Program. A BMP may be selected only if it will be implemented on an annual basis while the applicant is regulated under the BMP Program. In this category, the maximum number of points allowed is four and the minimum number is one.

**BMP CATEGORY 4. AGRONOMIC MANAGEMENT**

**Description:** Agronomic management practices include combinations of plant and soil management practices that, if implemented properly, will conserve water over the length of the growing season. This category includes agronomic management practices that qualify as approved BMPs.

**Approved Agronomic Management Practices**

**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: Incorporation of crop residue 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 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.

**APPENDIX 4B  
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APPROVED BEST MANAGEMENT PRACTICES**

<b>Approved Agronomic Management Practices (BMP Category 4 cont.)</b>
<p><b>BMP 4.8 Planting in bottom of furrow - (1 point)</b>                  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.</p>
<b>Substitute Agronomic Management Practices</b>
<p><b>Substitute Practice - (1 Point)</b>                  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.</p>
<b>Point Value Determination for Category 4</b>
<p>An applicant for the BMP Program must select one or more of the agronomic management BMPs described above in the application for the BMP Program. A BMP may be selected only if it will be implemented on an annual basis while the applicant is regulated under the BMP Program. In this category, the maximum number of points allowed is four and the minimum number is one.</p>

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