4.1 INTRODUCTION

The Agricultural Conservation Program for the Fourth Management Plan (4MP) is identical to the program included in the Third Management Plan (3MP). Historically, the agricultural sector has contributed to meeting the PRAMA safe-yield goal through the Code prohibiting new agricultural land being brought into production inside an AMA, and a combination of improved on-farm water management practices, decreasing reliance on groundwater by increasing utilization of renewable supplies, and reduction of irrigated acreage due to retirement and/or urban development of farmland.

What is an agricultural water user?
Pursuant to A.R.S. § 45-465, only land associated with a Certificate of Irrigation Grandfathered Right (IGFR) can be legally irrigated with groundwater within an AMA. IGFRs were issued by ADWR based on irrigated acreage from the years 1975 to 1980. The term "irrigation" is limited in the Code to the growing of crops for sale, human consumption or livestock or poultry feed on two or more acres. A key component of the Code prohibits the establishment of new IGFRs – prohibiting new acres from being put into agricultural production. Land not associated with an IGFR may not be irrigated with groundwater unless one of the exceptions stated in the Code applies (*See A.R.S. § 45-452*).

Agricultural Conservation Program Requirements
The Base Agricultural Conservation Program is an allotment-based program that provides flexibility for farmers to use water in excess of their allotment in some years, and less in other years, provided they do not exceed a maximum debit limit in their flexibility account. Since adoption of the Code, alternative conservation programs have been adopted for IGFR holders based not on meeting an allotment, but rather on implementation of best management practices and conservation measures.

Agricultural Program Goal and Objectives for the 4MP
The Agricultural Conservation Program for the 4MP is identical to the program included in the 3MP. The provisions of this program are mandated by statute.

PRAMA Agricultural Sector Description
Until the mid-1990s the agricultural sector comprised the largest portion of the PRAMA's total water demand. There were 11,192 acre-feet of groundwater and 9,795 acre-feet of surface water used by the agricultural sector in 1985, which was nearly 80 percent of total AMA water use. By 2012, agricultural water use had decreased by more than 87 percent. Groundwater use had dropped to 1,689 acre-feet and recovered reclaimed water long-term storage credits accounted for the remaining 994 acre-feet of water use. Table 4-1 illustrates the agricultural sector's decreasing water use trend in the PRAMA between 1985 and 2012. As the AMA's agricultural water demands decreased, the municipal sector emerged as the dominant water use sector in the AMA.

History of PRAMA Agricultural Regulatory Programs/4MP Goals Summarized
ADWR is required by statute to develop and administer an Agricultural Conservation Program in all five management plans. The original allotment-based program has been modified several times since the Code was adopted. Changes pertained to a farmer's ability to market some of his flexibility account credits to other farms, the treatment of reclaimed water in the calculation of compliance, the exemption of IGFRs of ten or fewer acres from compliance and reporting requirements, and limitations on the maximum on-farm efficiency ADWR may use when calculating irrigation water duties. In 2002 the 3MP was modified to add alternative conservation programs for famers who had difficulty staying in compliance with the base program.

Agricultural Conservation Programs – History and Background

A person using groundwater within an AMA must comply with conservation requirements established in the management plan for each management period (A.R.S. § 45-563). Holders of an IGFR are subject to agricultural conservation requirements, which include irrigation water duties and maximum annual allotments (A.R.S. § 45-567). Conservation requirements also exist for irrigation districts and private water companies that distribute groundwater for irrigation purposes.

TABLE 4-1
HISTORICAL AGRICULTURAL SECTOR DEMAND AND SUPPLY (AF)
PRAMA

Year	Demand	Groundwater	Surface Water	Reclaimed Water	Allotment
1985	20,987	11,192	9,795	0	28,078
1986	16,469	7,913	8,556	0	28,091
1987	14,043	5,513	8,530	0	27,956
1988	13,950	5,490	8,460	0	28,045
1989	7,927	6,794	1,134	0	28,031
1990	6,040	5,958	83	0	28,202
1991	14,321	5,861	8,460	0	28,597
1992	14,729	4,129	10,600	0	28,748
1993	19,172	6,452	12,720	0	26,972
1994	9,207	6,027	3,180	0	27,498
1995	17,745	5,331	12,415	0	27,263
1996	8,149	6,569	1,580	0	27,215
1997	11,057	2,597	8,460	0	26,581
1998	6,688	4,342	2,303	43	27,767
1999	8,566	6,447	2,120	0	24,869
2000	9,367	7,090	1,155	1,122	17,680
2001	6,567	4,167	900	1,499	17,450
2002	7,627	5,227	900	1,500	15,408
2003	4,254	2,754	0	1,500	8,083
2004	4,990	3,490	0	1,500	6,956
2005	3,302	2,091	0	1,211	5,224
2006	2,847	2,065	0	782	4,753
2007	3,868	2,801	0	1,068	4,744
2008	4,359	3,256	0	1,103	4,535
2009	3,822	2,717	0	1,105	4,535
2010	2,455	1,618	0	837	4,088
2011	3,231	2,260	0	971	4,067
2012	2,683	1,689	0	994	3,966

ADWR will calculate a maximum annual groundwater allotment in the fourth management period for each IGFR in the PRAMA in accordance with the statutory provisions of A.R.S. § 45-567(A)(1). The fourth management period calculation is identical to that mandated by A.R.S. § 45-566. Under this Agricultural Conservation Base Program (Base Program), the water duty for a farm unit is calculated using an assigned irrigation efficiency of 80 percent, with certain exceptions. The Code provides for participants in the Base Program to borrow or bank groundwater from year to year to allow for varying climatic and market conditions. To meet this provision, ADWR maintains an operating flexibility account for each IGFR. All IGFRs in the PRAMA will be regulated under the Base Program unless the owner of the IGFR has been accepted into one of the alternative conservation programs described below.

In addition to the Base Program, the 4MP includes two alternative conservation programs for IGFR owners, as required by A.R.S. § 45-567.02(A) and (G): 1) the Historic Cropping Program and 2) the Best Management Practices (BMP) Program. The owner of an IGFR may opt to enroll in one of the alternative conservation programs if certain requirements are met.

The Historic Cropping Program is similar to the Base Program in that it is allotment-based. The water duty for the farm unit is calculated based upon its 1975 to 1980 crop history and an assigned irrigation efficiency of 75 percent. This program also has a flexibility account provision. There is a limit, however, on the total amount of flexibility account credits and debits that may be accumulated. The Historic Cropping Program requires a high level of farm management. Participants in the Historic Cropping Program are required to provide information regarding irrigation water management practices, irrigation system type, and the acreage and type of crops grown to assist ADWR in determining program effectiveness.

Unlike the Base Program or the Historic Cropping Program, participation in the BMP Program requires the implementation and maintenance of specific agricultural conservation practices. To efficiently use water, this program relies upon physical on-farm improvements and farm management practices. Since this program is not allotment-based, there is no provision for an operating flexibility account. The BMP Program allows participants flexibility to make decisions concerning their farming operation. As with the Base Program and the Historic Cropping Program, only acres irrigated between 1975 and 1980 may be irrigated under the BMP Program.

4.2 RELATIONSHIP OF THE AGRICULTURAL SECTOR TO ACEHIVEMENT OF THE AMA WATER MANAGEMENT GOAL

Physical description

Within the PRAMA, the majority of irrigated lands are located in the northern reaches of the AMA near the Town of Chino Valley and in the southern part of the AMA along the Agua Fria River (*See Figure 4-1)*. There is one irrigation district within the PRAMA, the Chino Valley Irrigation District (CVID). Pasture, which tends to be deficit irrigated, is the predominant crop. Other crops include alfalfa, corn, small grains, and garden vegetables.

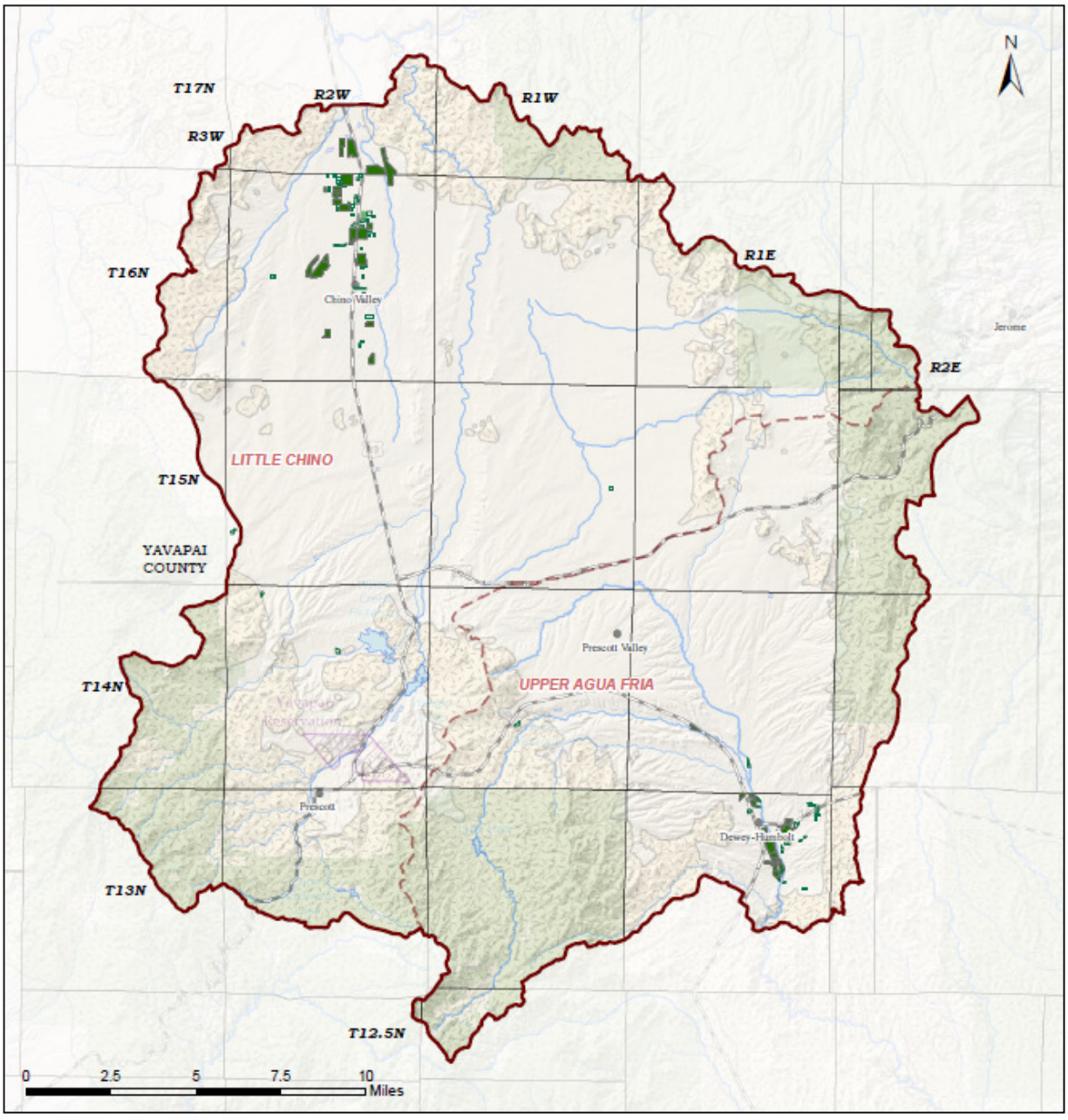
Assessment

ADWR anticipates the eventual retirement of most IGFRs in the PRAMA *(See Figure 4-2)*. Some will be retired to Type 1 non-irrigation grandfathered rights to be used to supply groundwater for industrial uses, and others will be subdivided for residential and commercial development. In the latter case, if the development occurs before 2025, the IGFR will be extinguished for credits to meet the consistency with goal criterion of the AWS Rules (*See A.A.C. R12-15-726*). As of 2013, all farms in the PRAMA are regulated under the Base Program. None of the farms in the AMA have opted for regulation under either the Historic Cropping Program or the BMP Program.

4.3 INCENTIVES FOR THE USE OF RENEWABLE SUPPLIES AND REMEDIATED GROUNDWATER

The State of Arizona and ADWR have developed incentives to increase the use of non-groundwater supplies. For example, in 1991, the Legislature amended A.R.S. § 45-467 to exclude reclaimed water from consideration in determining the amount of any debit to be registered to a farm's flex account (Laws 1991, Ch. 112, § 3). Under this amendment, a person using groundwater on a farm pursuant to an IGFR may use an unlimited amount of reclaimed water on the farm without any debit being registered to the farm's flex account as a result of reclaimed water use. This amendment has created an incentive for the use of reclaimed water.

FIGURE 4-1
AGRICULTURAL IRRIGATION ACRES
PRAMA



Prescott AMA

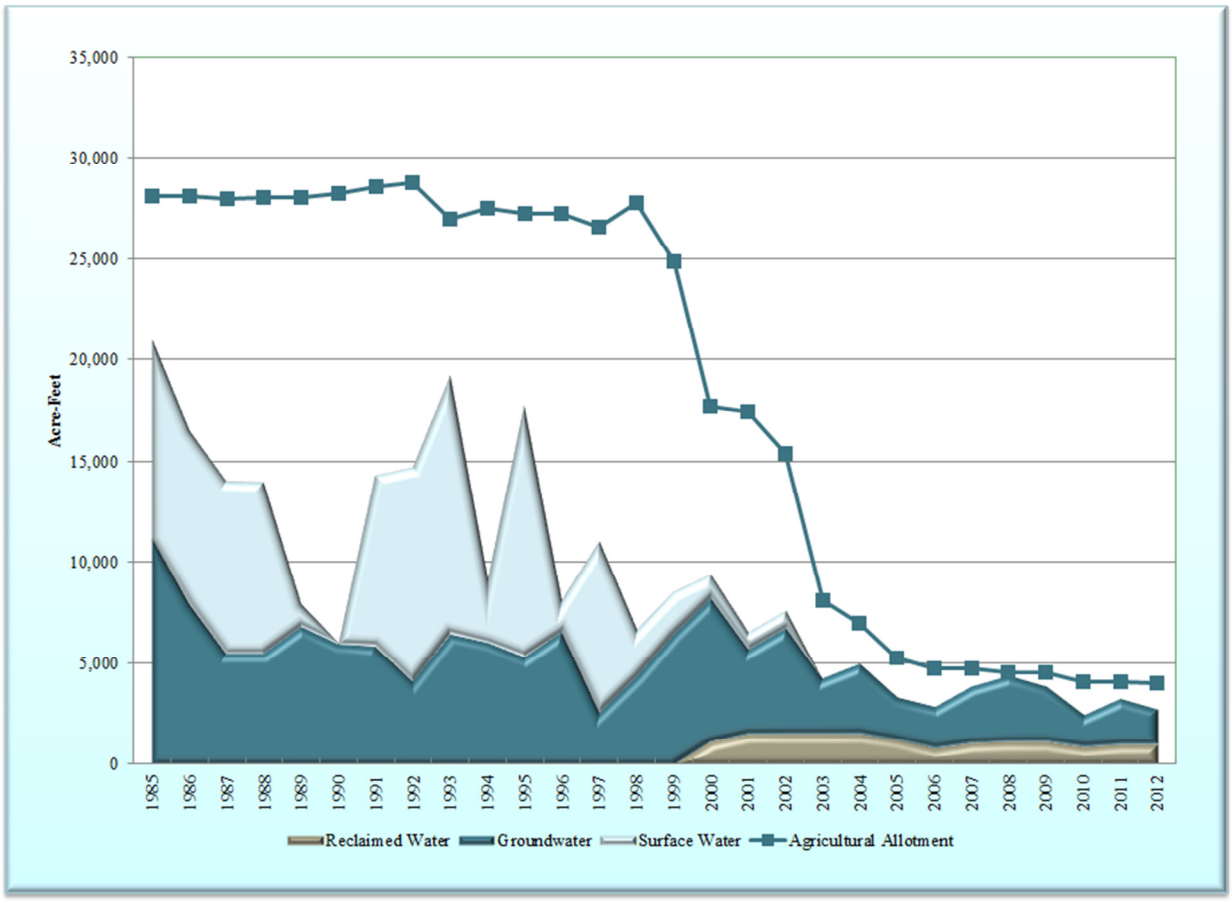
Legend

- Prescott AMA
- Sub-basin
- City or Town
- Major Road
- Lake
- Stream
- Hardrock
- Prescott National Forest
- State Boundary
- Township/Range
- County

PRAMA IGFRs

- 725 - Irrigation Right
- 500 - Active Partial Restoration
- 60 - Exempt Small Right

FIGURE 4-2
HISTORICAL AGRICULTURAL SECTOR DEMAND AND SUPPLY
PRAMA



Legislation was enacted in 1997 that significantly revised the Water Quality Assurance Revolving Fund (WQARF) Program to provide incentives for the use of remediated groundwater to facilitate the treatment of contaminated groundwater. This legislation provides that ADWR shall account for the use of groundwater withdrawn pursuant to an approved remedial action project as surface water when determining compliance with management plan conservation requirements (Laws 1997, Ch. 287, § 51(B)). The criteria that must be met to qualify for this accounting are set forth in Section 4-107 of this chapter, (legally enforceable provisions), entitled: *Agricultural Conservation Requirements and Monitoring and Reporting Requirements*. Groundwater withdrawn pursuant to an approved remedial action project retains its legal character as groundwater for all other purposes under Title 45, Arizona Revised Statutes Chapter 2. More information on the statutory mandates for ADWR's involvement in the WQARF Program is provided in Chapter 7.

During the fourth management period, ADWR will continue to support the increased use of reclaimed water in all sectors, including the agricultural sector. In the past, direct reclaimed water utilization for agricultural irrigation has been limited due to a lack of infrastructure. Other requirements, such as the wastewater reuse rules adopted by the Arizona Department of Environmental Quality, have limited the types of crops that can be irrigated solely by reclaimed water (A.A.C. R18-11-301 thru 309). As water treatment techniques improve and reclaimed water becomes more accessible to the agricultural sector, ADWR expects that reclaimed water use for agricultural purposes will increase. The agricultural sector may also use reclaimed water that is stored underground and later recovered within the area of impact of

storage or, subject to certain restrictions, recovered outside the area of impact of storage. This water experiences further treatment as it infiltrates the aquifer and is treated in the same manner as direct use reclaimed water in the calculation of the farm's flexibility account.

Indirect use of reclaimed water through underground storage and recovery is practiced in the Little Chino Sub-Basin of the PRAMA through the IGA between the City of Prescott and the CVID. In 2007, the Town of Prescott Valley auctioned the rights to the effluent it will generate with a stipulation that the water be put to use within the Town of Prescott Valley. This arrangement will likely preclude the reuse of reclaimed water for agricultural use in the Agua Fria Sub-Basin.

4.4 NON-REGULATORY EFFORTS

In addition to the agricultural conservation programs described above, other water resource management strategies have been developed to help achieve the water management goal for the PRAMA. The Water Management Assistance Program is designed to provide funds to enhance groundwater conservation activities within all use sectors, including the agricultural sector, and is expected to continue during the fourth management period. The Water Management Assistance Program is described more fully in Chapter 9 of this plan.

4.5 AGRICULTURAL CONSERVATION PROGRAM COMPONENTS AND CALCULATIONS

This section describes the Agricultural Conservation Program components for the 4MP. This program, which exists in all AMAs, consists of three conservation programs for IGFRs: (1) the Base Program, (2) the Historic Cropping Program, and (3) the BMP Program. The Agricultural Conservation Program also contains irrigation distribution system conservation requirements for irrigation districts and private water companies distributing groundwater for irrigation use. Each of these programs is described below.

4.5.1 Calculation of Irrigation Water Duties and Maximum Annual Groundwater Allotments

The irrigation water duty is the primary component of the Base Program and the Historic Cropping Program and is used to determine the maximum annual groundwater allotment for each IGFR regulated under these programs. This section describes how ADWR determines water duties and maximum annual groundwater allotments. This section does not apply to the BMP Program.

4.5.1.1 Irrigation Water Duties

The irrigation water duty is the quantity of water reasonably required per acre to annually irrigate the crops historically grown on a farm unit from 1975 to 1980. The crops historically grown in each farm unit were verified and established during the first management period. ADWR calculates the irrigation water duty for each IGFR using the following formula:

$$\textit{Irrigation Water Duty} = \frac{\textit{Total Irrigation Requirement per Acre}}{\textit{Assigned Irrigation Efficiency}}$$

In this formula, the irrigation water duty is calculated by dividing the total water requirements to produce the crops historically grown by the assigned irrigation efficiency. Each component of the formula is discussed below.

Assigned Irrigation Efficiencies

As described in the 3MP, all farm units in the PRAMA are situated on limiting soils. Under A.R.S. § 45-567(A)(1) an irrigation efficiency of 80 percent is assigned to farm units in the Base program having non-limiting soils; however, a lower irrigation efficiency may be used for a farm unit determined by the director to be on limiting soils or excessive slopes. Because all farms in the PRAMA have been determined to be situated on limiting soils, the director has determined that the assigned irrigation efficiency for each farm unit is 75 percent.

For the Historic Cropping Program, the assigned irrigation efficiency for farm units with non-limiting soils is 75 percent. Because all farm units within the PRAMA are situated on limiting soils, the director has determined that an assigned irrigation efficiency of 70 percent will be used to calculate a farm unit's water duty under the Historic Cropping Program. A.R.S. § 45-567.02(B)(2).

Total Irrigation Requirement

The total irrigation requirement for each farm unit equals the amount of water needed annually to satisfy the sum of the irrigation requirements for any crops grown between 1975 and 1980. For each crop, the irrigation requirement (IR) consists of the amount of water needed to meet the consumptive use (CU) requirement of the crop, plus any other needs (ON) that the crop may have, plus any needed leaching allowance (LA), less any effective precipitation (EP). The irrigation requirement is calculated by the following equation:

$$IR = CU + ON + LA - EP$$

The components of the irrigation requirement equation are discussed below.

Consumptive Use

The consumptive use requirement of a crop is the amount of water used in transpiration and building of plant tissue, together with the amount of water evaporated from adjacent soil during the growing season. Crop consumptive use values are unchanged from the information provided in the 3MP and commonly used values for the PRAMA. Appendix 4A lists the consumptive use requirement for each crop historically grown in the region.

Other Needs

Water required by certain crops for purposes other than consumptive use is referred to as "other needs" water. Examples of "other needs" include additional water for certain vegetable crops for germination, cooling, and quality control. ADWR makes adjustments for those crops that have "other needs". For the fourth management period, no crops grown in the PRAMA were identified as needing additional water for "other needs."

Leaching Allowance

In some situations, a crop may require additional water for leaching or deep percolation. A leaching allowance may be necessary to prevent salts from accumulating in the crop root zone when high levels of total dissolved solids (TDS) are present in the irrigation water. If the accumulated salts in the soil profile are not leached below the root zone, soil salinity will increase and eventually inhibit plant growth and yields.

The procedure ADWR uses to calculate the leaching allowance for a crop is shown by the following equation:

$$LA = \frac{AE}{0.85}\left[CU \left[\frac{1}{1 - \frac{EC_w}{5\,EC_e - EC_w}} - 1 \right] \right]$$

Where, LA = leaching allowance for the crop; AE = assigned irrigation efficiency for the farm unit; CU = consumptive use requirement of the crop; EC_w = electrical conductivity of the irrigation water (expressed in millimhos per centimeter); and EC_e = tolerance of the crop to soil salinity as indicated by the electrical conductivity of the soil saturation extract (expressed in millimhos per centimeter).

Most irrigation water in the PRAMA is of adequate quality for irrigation purposes. Consequently, ADWR does not include leaching allowances in the calculation of irrigation requirements for crops grown in the AMA. If, however, an IGFR had an irrigation water supply with an EC_w value greater than 1.5 millimhos per centimeter (a concentration of approximately 1,000 milligrams per liter of TDS), the owner of the IGFR may apply to ADWR for an administrative review to seek a leaching allowance as discussed in Chapter 10 of this plan.

Effective Precipitation
Effective precipitation is defined as the amount of precipitation occurring before and during the growing season that is available for plant growth. Because precipitation in the PRAMA is substantial during most years, an effective precipitation value was incorporated into the calculation of the total irrigation requirement. Consumptive use values for crops grown in the PRAMA, including values for effective precipitation, can be found in Appendix 4A.

4.5.1.2 Calculation of Maximum Annual Groundwater Allotments
The maximum annual groundwater allotment for each IGFR is determined by multiplying the irrigation water duty by the water duty acres. These calculations are governed by A.R.S. § 45-465.

4.5.2 Base Program

Pursuant to A.R.S. § 45-567(A)(1), each IGFR owner and any person entitled to use groundwater pursuant to the right will be regulated under the Base Program unless an application for regulation under an alternative conservation program is approved by ADWR. This statute requires ADWR to calculate the water duty for each farm unit by dividing the total irrigation requirement per acre of the crops historically grown on the farm unit by an assigned irrigation efficiency of 80 percent. A lower assigned irrigation efficiency may be used to calculate the water duties for farm units or portions of farm units that are determined by the director as having limiting soils or excessive slopes. As discussed earlier, all farm units in the PRAMA are situated on limiting soils and have been assigned an irrigation efficiency of 75 percent.

A.R.S. § 45-567(A)(1) authorizes ADWR, subject to certain limitations, to reduce the highest 25 percent of the water duties within an area of similar farming conditions. ADWR chose not to implement this provision for the fourth management period.

In the Base Program, the potential to accrue flex account credits is not limited. However, a negative balance that exceeds 50 percent of the annual allotment constitutes in a violation of the conservation requirement. Flex credits can be used at any time in future years, and may be used to offset debits. Under certain conditions, IGFR owners regulated under the Base Program may transfer, convey or acquire flex account credits during the second calendar year following the year in which the flex account credits were registered (A.R.S. § 45-467(O)).

4.5.3 Historic Cropping Program

ADWR developed the Historic Cropping Program pursuant to A.R.S. § 45-567.02. Because the director has determined that all farms in the PRAMA are situated on limiting soils, ADWR will calculate the water duty by dividing the total irrigation requirement per acre of the crops historically grown on the farm unit by the assigned irrigation efficiency of 70 percent.

In the Historic Cropping Program, accrued flex account credits are limited to 75 percent of the farm's annual allotment. A negative flex account balance that exceeds 25 percent of the annual allotment constitutes a violation of the conservation requirement. Flex credits can be used at any time in future years, and may be used to offset debits. Participants in the Historic Cropping Program are not allowed to convey, sell or acquire flex account credits (See A.R.S. § 45-467.02).

The Historic Cropping Program requires a high level of farm management. Participants in the Historic Cropping Program will be required to comply with certain reporting requirements. Participants must provide information regarding irrigation water management practices, irrigation system type, and the acreage and type of crops grown to assist ADWR in determining program effectiveness.

IGFR owners interested in enrolling in the Historic Cropping Program must satisfy the following requirements:

- File an application with ADWR.
- Reduce any debit balance in the existing flex account to an amount which does not exceed 25 percent of the existing maximum annual groundwater allotment.
- Reduce any flex account credits in the existing flex account balance to an amount which does not exceed 75 percent of the existing maximum annual groundwater allotment.
- Provide documentation showing that an actual irrigation efficiency of at least 70 percent has been, or will be, achieved on the farm unit on a seasonal basis, or agree to enroll in an irrigation management services program.

Once an IGFR owner has enrolled in the Historic Cropping Program, the owner must remain in the program until the effective date of the conservation requirements established in the subsequent management plan unless there is a change in ownership of the IGFR.

4.5.4 BMP Program

As required by A.R.S. § 45-567.02(G), the director has included a BMP Program in the 4MP. The BMP Program can best be characterized as an IGFR owner's commitment to implement certain agricultural conservation practices. The purpose of this program is to provide an alternative conservation program that is designed to be at least as effective in achieving water conservation as the Base Program. Program participants are not restricted to maximum annual groundwater allotments based on the crops historically grown. Instead, they are required to implement specific agricultural conservation practices that involve on-farm irrigation system improvements and increased farm management. This combination of applied physical and management improvements is designed to assist farmers in achieving a high level of on-farm seasonal irrigation efficiency.

BMPs are approved practices that can be used by farmers to increase the overall water use efficiency of the farm. In order to meet the changing demands of agricultural production, irrigation system improvements and a high level of farm management are essential. ADWR, with assistance of the agricultural community, has developed a menu of approved BMPs to ensure that individual farmers can select practices that provide the greatest opportunity for increased water savings and efficient operation of their farms.

Approved BMPs are listed in Appendix 4B and are separated into four distinct categories: 1) Water Conveyance System Improvements; 2) Farm Irrigation Systems; 3) Irrigation Water Management Practices; and 4) Agronomic Management Practices. Each category contains specific ADWR approved BMPs, with point values based on their potential contribution to water conservation. To ensure a balance between categories, an applicant to the BMP Program may only score a maximum of three points within each category. Furthermore, the applicant must score a minimum of two points in the Farm Irrigation Systems category, a minimum of one point in each of the other three categories, and at least 10 points overall. The applicant may select a BMP in Category 1 or 2 only if the BMP has already been installed and is in use on the farm at the time the application is filed. The applicant may select a BMP in Category 3 or 4 only if the BMP will be implemented annually during the time the farm is regulated under the BMP Program. In order to receive points for agricultural conservation practices in Category 3 or 4 that are not approved BMPs described in Appendix 4B, the applicant must demonstrate to ADWR that such practices will likely result in water savings that are at least equivalent to that of the approved BMPs.

In order to enroll in the BMP Program, an individual must apply to the director on a form provided by ADWR. If all eligibility requirements are met, the director will approve the application. The applicant must also submit the following:

- A current farm map showing all existing improvements to the farm unit respective to water conveyance and farm irrigation systems.

- If the applicant is leasing the land, a signed affidavit from the owner of each IGFR for which the application is filed stating that the owner agrees to regulation under the BMP Program until the conservation requirements in the 5MP become effective. ADWR will develop a policy that allows the owner and ADWR to agree to specific terms of compliance at the time the application is filed so that the owner will know at that time the extent of the owner's liability for any violations of the BMP Program while the land is leased.

It should be noted that under the BMP Program, it is possible to include multiple IGFRs under a single BMP enrollment as long as the IGFRs are either contiguous or in close proximity to each other, and part of a single farm unit. Once enrolled in the BMP Program, the IGFR owner and any person using groundwater pursuant to the right (e.g. farm operator or lessee) will be regulated under the BMP Program until the 5MP requirements become effective, unless there is a change in ownership of the farm unit. New owners of IGFRs may file a written request to withdraw from the BMP Program within 30 days after the conveyance of the IGFR has been completed. The director will grant the request unless the director determines that the transfer of ownership was made solely for the purpose of withdrawing from the BMP Program. If the request is granted, the new owner will be regulated under the Base Program, unless it applies and is accepted for regulation under the Historic Cropping Program.

An IGFR owner enrolled in the BMP Program may, under certain conditions, be allowed to withdraw from the program if the owner demonstrates to the director that the owner has been unable to find a person willing to lease the IGFR and be regulated under the BMP Program. If a person regulated under the BMP Program acquires or leases land with an IGFR that is not enrolled in the BMP Program, the

person may apply to have the IGFR enrolled in the BMP Program, subject to the owner's consent, if applicable.

While enrolled in the program, the participant must implement all BMPs selected in the application approved by ADWR, except that the owner or lessee of the farm unit may replace a selected BMP in Category 3 or 4 with a different BMP under certain conditions. A BMP selected in Category 3 or 4 may be replaced with an approved BMP in the same category without prior approval of ADWR. However, the owner or lessee of the farm unit must give ADWR written notice of the replacement within thirty days following replacement.

A BMP selected in Category 3 or 4 may also be replaced with a substitute practice (i.e., a practice that is not an approved BMP) in the same category if the owner or lessee of the farm unit applies to ADWR and the application is approved. ADWR will approve an application for replacement of a selected BMP with a substitute practice if it is determined that implementation of the substitute practice will likely result in water savings on the farm at least equivalent to the water savings that would result from implementation of the originally approved BMP.

4.5.4.1 BMP Advisory Committee

The Agricultural Water Conservation Best Management Practices Advisory Committee (BMP Advisory Committee) was established in 2002. The current members are listed on ADWR's website at http://www.azwater.gov/azdwr/default.aspx.

The BMP Advisory Committee, in consultation with ADWR and the agricultural community, will continue to review and analyze the effectiveness and administration of the BMP Program during the fourth management period. Based on this information, the BMP Advisory Committee may recommend changing or terminating the program, and may also recommend the structure of a BMP Program for subsequent management periods.

4.5.4.2 BMP Technical Standards Assistance

During 2013, ADWR established a new partnership with the US Department of Agriculture Natural Resource Conservation Service (NRCS) to assist with the technical standards of the BMPs included in the Agricultural BMP program. The NRCS is available to provide technical and financial assistance to farmers in implementing the BMPs. The NRCS has established specific technical standards for each BMP including yield increase and water savings. In addition, the NRCS is providing matching funds which will result in additional technical personnel available to assist farms in implementing the program requirements at local agricultural conservation assistance offices.

The NRCS has made recommendations to the ADWR director intended to improve the implementation of the BMP program during the fourth management period. These recommendations will be presented to the BMP Advisory Committee for consideration and approval.

4.6 IRRIGATION DISTRIBUTION SYSTEM REQUIREMENTS

For the fourth management period, the director may establish "additional economically reasonable conservation requirements for the distribution of groundwater by cities, towns, private water companies and irrigation districts within their service areas." (A.R.S. § 45-567(A)(4)). Establishment of these conservation requirements was required by the 3MP (A.R.S. § 45-566(A)(5)).

The irrigation distribution system requirements as well as the monitoring and reporting requirements for irrigation districts and private water companies have been modified in the 4MP

to apply to irrigation districts and private water companies distributing any amount of water for irrigation use. This is a change from the 3MP which applied the irrigation distribution system requirements as well as the monitoring and reporting requirements to only those irrigation districts and private water companies distributing 20 percent or more of their total water deliveries for irrigation use. These irrigation districts and private water companies are required to reduce their irrigation distribution system lost and unaccounted for water by lining all their canals, or by operating their delivery systems so that the total quantity of lost and unaccounted for water is 10 percent or less of the total quantity of water withdrawn, diverted, or received during a year. These requirements are effective upon the commencement of operation, or by the first compliance date of the 4MP, whichever is later.

If a private water company or irrigation district has economic circumstances which prevent timely compliance with the irrigation distribution system conservation requirements, a variance of up to five years may be requested as provided by A.R.S. § 45-574. Information submitted in support of the variance request must include a complete water loss reduction plan prepared by a registered civil engineer that contains:

- A complete construction design document showing specifications for repairing or modifying the irrigation distribution system. The document must include material specifications, proposed design specifications, installation and construction specifications, and any other engineering information or specifications necessary to complete the proposed rehabilitation of the distribution system.

- A detailed list of engineering costs and the proposed financing options to complete the system improvements.

- The final completion date for the rehabilitation.

- If applicable, a system operating guide to minimize lost and unaccounted for water. This guide may be modified as the rehabilitation progresses.

The procedures for obtaining a variance are described in Chapter 10.

4.7 AGRICULTURAL CONSERVATION REQUIREMENTS AND MONITORING AND REPORTING REQUIREMENTS

4-701. Definitions

In addition to the definitions set forth in Chapters 1 and 2 of Title 45 of the Arizona Revised Statutes, the following words and phrases used in sections 4-701 through 4-707 of this chapter shall have the meanings set forth below, unless the context otherwise requires:

1. *"4MP" means the Fourth Management Plan for the Prescott Active Management Area.*
2. *"5MP" means the Fifth Management Plan for the Prescott Active Management Area.*
3. *"ADWR" means the Arizona Department of Water Resources.*
4. *"Assigned Irrigation Efficiency" means the irrigation efficiency used to compute an irrigation water duty for the fourth management period pursuant to A.R.S. §§ 45-567 and 45-567.02.*
5. *"Canal" means a waterway constructed for the purpose of transporting water to a point of delivery, including main canals and lateral canals.*
6. *"Farm" has the same definition as prescribed in A.R.S. § 45-402.*
7. *"Farm Unit" has the same definition as prescribed in A.R.S. § 45-402.*
8. *"Flexibility Account" is an account maintained under A.R.S. § 45-467.*
9. *"IGFR" means an Irrigation Grandfathered Right.*
10. *"Irrigation Acre" has the same definition as prescribed in A.R.S. § 45-402.*
11. *"Irrigation Distribution System" means a system of canals, flumes, pipes, or other works that are owned or operated by an irrigation district or private water company and used to deliver water for irrigation use.*
12. *"Irrigation Water Duty" has the same definition as prescribed in A.R.S. § 45-567 which, for the 4MP, is the total irrigation requirement to produce the crops historically grown divided by the assigned irrigation efficiency.*
13. *"Lost Water" means water from any source, including reclaimed water, which enters an irrigation distribution system and is lost from the system during transportation or distribution due to seepage, evaporation, leaks, breaks, phreatophyte use, or other causes.*
14. *"Maximum Annual Groundwater Allotment" means the maximum amount of groundwater that may be used per year for the irrigation of each irrigation acre in the farm that is calculated pursuant to A.R.S. § 45-465.*

15. *"On-farm Seasonal Irrigation Efficiency" means the total water requirements to produce a crop divided by the total quantity of water actually applied to that crop during one growing season.*

16. *"Reclaimed water" has the same definition as "effluent" in A.R.S. § 45-101.*

17. *"Total Quantity of Lost and Unaccounted for Water" means the total quantity of water from any source, including reclaimed water, that enters an irrigation district's or private water company's irrigation distribution system during a calendar year less the total deliveries of water made by the irrigation district or private water company through its irrigation distribution system during the calendar year that are measured or estimated based on a generally accepted method of estimating water use.*

18. *"Water Duty Acres" has the same definition as prescribed in A.R.S. § 45-461.*

4-702. Base Agricultural Conservation Program Requirements

A. *Unless the owner of a Certificate of Irrigation Grandfathered Right ("IGFR") has applied and been approved for regulation under the Historic Cropping Program described in section 4-703 or the Best Management Practices Program described in section 4-704, the IGFR owner and any person who is entitled to use groundwater pursuant to that IGFR shall comply with this section.*

B. *The IGFR owner and any person entitled to use groundwater pursuant to that IGFR shall comply with the irrigation water duty and maximum annual groundwater allotment assigned for the IGFR beginning January 1, 2017, and during each calendar year thereafter until the first compliance date for any substitute conservation requirement established in the 5MP. The irrigation acres, water duty acres, assigned irrigation efficiency, irrigation water duty and maximum annual groundwater allotment for each IGFR in the PRAMA are set forth in the document entitled "Supplement I to the 4MP for the PRAMA," which is incorporated herein by reference and which is available for inspection and copying at ADWR.*

C. *The IGFR owner and any person entitled to use groundwater pursuant to that IGFR may use the maximum annual groundwater allotment assigned for the right in Supplement I to irrigate only the irrigation acres to which the right is appurtenant.*

D. *The IGFR owner and any person entitled to use groundwater pursuant to that IGFR shall not use water for irrigation purposes during a calendar year in an amount which exceeds the maximum annual groundwater allotment assigned for the right in Supplement I, except as provided by the flexibility account provisions of A.R.S. § 45-467 and any rules adopted by the director.*

E. *Pursuant to A.A.C. R12-15-1013, the IGFR owner and any person using groundwater pursuant that IGFR shall keep and maintain, for at least three calendar years following the filing of an annual report required by A.R.S. § 45-632, all records which may be necessary to verify the information and data contained in the annual report.*

4-703. Historic Cropping Program

A. *Application for Regulation under the Historic Cropping Program*

Only an owner of an IGFR may apply to be regulated under the Historic Cropping Program. An application may be filed by an IGFR owner at any time prior to the first compliance date for the agricultural conservation requirements established in the 5MP. An application for regulation under the Historic Cropping Program shall be on a form prescribed and furnished by the director and shall include the following information:

1. *The name, address, and phone number of the IGFR owner.*

2. *The number of the Certificate of IGFR.*

3. *The name, address, and phone number of any person entitled to use groundwater under the IGFR.*

4. *For each of the three previous years, the number of acres and types of crops planted, and the amount of water used to irrigate the planted acres.*

5. *For each of the three previous years, the type of irrigation system which has been used, including percent of slope, length of runs, and method of field application.*

6. *For each of the three previous years, a description of all water conservation practices used on the farm, including the name of any conservation program or irrigation water management service used on the farm.*

B. *Criteria for Approval of Application*

The director shall approve an application for regulation under the historic cropping program if all of the following requirements are satisfied:

1. *The application is found to be complete and correct.*

2. *Any negative flexibility account balance in the farm's flexibility account does not exceed 25 percent of the maximum annual groundwater allotment in effect at the time that the application is made.*

3. *Any positive flexibility account balance in the farm's flexibility account does not exceed 75 percent of the maximum annual groundwater allotment in effect at the time that the application is made. In order to satisfy this requirement, the IGFR owner may sell or convey any excess credits as provided by A.R.S. § 45-467 or the IGFR owner may relinquish any excess credits.*

4. *The IGFR owner demonstrates that the average on-farm seasonal irrigation efficiency achieved on the farm's irrigation acres during the previous three years was 70 percent or greater. If the IGFR owner cannot demonstrate that an average on-farm seasonal irrigation efficiency of at least 70 percent has been achieved during the previous three years, the IGFR owner shall agree in writing to develop and implement at least one of the following:*

    a. *Enroll in an ADWR-sponsored or private irrigation management services program at all times while regulated under the Historic Cropping Program, or*

until the IGFR owner can demonstrate to the director's satisfaction that an average on-farm seasonal irrigation efficiency of at least 70 percent has been achieved during the previous three years.

b. Implement water conveyance system or farm irrigation system improvements, approved by the director, designed to enable the IGFR owner to achieve an on-farm seasonal irrigation efficiency of at least 70 percent.

C. Historic Cropping Program Requirements

An IGFR owner whose application has been approved for regulation under the Historic Cropping Program and any person using groundwater pursuant to that IGFR shall comply with all of the following:

1. The irrigation water duty and maximum annual groundwater allotment established by the director under this section, beginning with the calendar year in which the IGFR owner is accepted into the Historic Cropping Program, and continuing thereafter until the first compliance date for any substitute conservation requirement established in the 5MP. The director shall establish the irrigation water duty and maximum annual groundwater allotment in the same manner that the director established the irrigation water duty and maximum annual groundwater allotment assigned for the IGFR in the Base Agricultural Conservation Program described in section 4-702, except that the director shall use an assigned irrigation efficiency of 70 percent.

2. The IGFR owner may use the maximum annual groundwater allotment assigned for the IGFR to irrigate only the irrigation acres to which the IGFR is appurtenant.

3. Not use water for irrigation purposes during a calendar year in an amount which exceeds the maximum annual groundwater allotment assigned to the right, except as provided in the flexibility account provisions of A.R.S. § 45-467, as modified in subsection D of this section, and any rules adopted by the director.

D. Flexibility Account Provisions

Under the Historic Cropping Program, the flexibility account provisions of A.R.S. § 45-467 shall apply to the IGFR owner, and any person entitled to use groundwater under that IGFR, with the following modifications:

1. If the amount of water used to irrigate the farm in any year is less than the maximum annual groundwater allotment established for the farm pursuant to subsection C, paragraph 1 of this section, the amount of any credit registered to the farm's flexibility account pursuant to A.R.S. § 45-467 shall not exceed the difference between the existing balance in the account and a positive account balance of 75 percent of the maximum annual groundwater allotment. The director shall not register a credit to the farm's flexibility account in any year in which the account has an existing positive account balance equal to 75 percent of the maximum annual groundwater allotment.

2. *The IGFR owner, and any person entitled to use groundwater under that IGFR, regulated under the Historic Cropping Program shall not:*

    a. *Purchase flexibility account credits from, or convey or sell flexibility account credits to, another IGFR owner, or any other person entitled to use groundwater under another IGFR, regardless of whether they are regulated under the Historic Cropping Program.*

    b. *Transfer credits from the flexibility account of one farm to another farm even if the farms are owned by the same IGFR owner.*

3. *The maximum excess amount of groundwater that may be used pursuant to A.R.S. § 45-467 shall not exceed 25 percent of the maximum annual groundwater allotment established for the farm pursuant to subsection C, paragraph 1 of this section. The IGFR owner, and any person entitled to use groundwater under that IGFR, violates this section if the flexibility account maintained for the IGFR is in arrears at any time in excess of this amount.*

E. Reporting Requirements

1. *In addition to the information required to be submitted in the annual report required by A.R.S. § 45-632, the IGFR owner, or any person entitled to use groundwater pursuant to that IGFR, shall submit the following information on a form prescribed by the director, regardless of whether an irrigation district files the annual report on behalf of the IGFR owner:*

    a. *The name, address, and phone number of any person entitled to use groundwater under the IGFR.*

    b. *The number of acres and types of crops planted and the amount of water used to irrigate the planted acres.*

    c. *The type of irrigation system which has been used, including percent of slope, length of runs, and method of field application.*

    d. *A description of all water conservation practices used on the farm, including the name of any conservation program or irrigation water management service used on the farm.*

2. *Pursuant to A.A.C. R12-15-1013, the IGFR owner, and any person using groundwater pursuant the IGFR shall keep and maintain, for a minimum of three calendar years following the filing of the form, all records which may be necessary to verify the information and data contained therein.*

F. Duration of Regulation under Historic Cropping Program

1. *Except as provided in paragraph 2 of this subsection, after the director approves an application for regulation under the Historic Cropping Program, the IGFR owner and any person entitled to use groundwater pursuant to that right shall be regulated under the Historic Cropping Program until the first compliance date for any substitute agricultural conservation requirement established in the 5MP.*

2. *After the director approves an application for regulation under the Historic Cropping Program, a subsequent owner of the IGFR may file with the director a written request to withdraw from the Historic Cropping Program within 90 days after acquiring an ownership interest in the IGFR. The director shall grant the request unless the director determines that the transfer of ownership was made solely for the purpose of circumventing the provisions of paragraph 1 of this subsection, in which case the request shall be denied.*

4-704. Best Management Practices Program

A. Application for Regulation under the Best Management Practices Program

An owner of an IGFR, or any person using groundwater pursuant to that IGFR, may apply to be regulated under the Best Management Practices ("BMP") Program at any time prior to the first compliance date for the agricultural conservation requirements established in the 5MP. One application may be filed for multiple IGFRs if the IGFRs are contiguous or in close proximity to each other and are within the same farm unit. An application for regulation under the BMP Program shall be on a form prescribed and furnished by the director and shall include the following information:

1. *The name, address, and phone number of the applicant.*

2. *The certificate number(s) of the IGFR(s) for which the application is filed.*

3. *The name of the farm or farm unit (if applicable).*

4. *The current balance in the flexibility account for the farm.*

5. *If the applicant is not the owner of an IGFR for which the application is filed, a signed affidavit from the owner of that IGFR stating that the owner agrees to regulation under the BMP Program until the effective date of any substitute conservation requirements established in the 5MP, except as provided in subsection I, paragraph 2 of this section.*

6. *A current farm plan map showing all existing improvements to the farm unit's water conveyance system and farm irrigation systems.*

7. *An identification of those BMPs described in Appendix 4B that the applicant selects to implement on the farm while regulated under the BMP Program. In selecting BMPs:*

    a. *The applicant shall select at least one BMP from each of the four BMP Categories described in Appendix 4B: Category 1 (water conveyance system improvements), Category 2, (farm irrigation systems), Category 3 (irrigation water management practices), and Category 4 (agronomic management practices). The total number of points for all BMPs selected by the applicant shall be at least ten points, using the point values assigned to each BMP in Appendix 4B, subject to the following:*

        i. *The maximum number of points allowed in any category is three points.*

ii. The applicant shall select a BMP or BMPs in BMP Category 2 that have a total of at least two points.

b. A BMP may be selected in BMP Category 1 or BMP Category 2 only if the BMP has already been installed and is being used on the farm at the time the application is filed. A BMP may be selected in BMP Category 3 or BMP Category 4 only if the BMP will be implemented on the farm annually while water use on the farm is regulated under the BMP Program.

c. If the applicant selects a substitute practice in BMP Category 3 or BMP Category 4 as described in Appendix 4B, the applicant shall describe the substitute practice in detail and demonstrate that the practice will likely achieve water savings on the farm at least equivalent to the water savings that would result from implementation of an approved BMP in that category.

B. Criteria for Approval of Application

The director shall approve an application for regulation under the BMP program if all of the following requirements are satisfied:

1. The application is found to be complete and correct, and the BMPs selected by the applicant under subsection A paragraph 7 of this section meet the requirements of that paragraph.

2. The applicant is not currently out of compliance with any agricultural conservation requirement in this chapter. This paragraph does not apply to a violation of a conservation requirement if the violation has been resolved by ADWR through a stipulation and consent order or other mechanism, and the applicant is not in violation of that stipulation and consent order or other mechanism.

3. If the BMPs selected by the applicant under subsection A, paragraph 7 of this section include a substitute practice in BMP Category 3 or BMP Category 4 as described in Appendix 4B, the applicant has demonstrated to the satisfaction of the director that the substitute practice will likely achieve water savings on the farm at least equivalent to the water savings that would result from implementation of an approved BMP in that category.

C. Exemption from Maximum Annual Groundwater Allotment Conservation Requirements

After the director approves an application for regulation under the BMP Program, the owner of an IGFR included in the application, and any person using groundwater pursuant to that IGFR, are exempt from the maximum annual groundwater allotment conservation requirements set forth in section 4-702 beginning on January 1 of the first calendar year after the application for enrollment into the BMP Program is approved, unless the director approves an earlier date.

D. BMP Program Requirements

After the director approves an application for regulation under the BMP Program, the owner of an IGFR included in the application, and any person using groundwater pursuant to that IGFR, shall comply with all of the following:

1. *The IGFR owner and any person entitled to use groundwater pursuant to that IGFR shall implement all selected BMPs in the application approved by the director under this section, beginning on January 1 of the first calendar year after the application for enrollment into the BMP Program is approved, unless the director approves an earlier date, and, except as provided in subsection I, paragraph 2 of this section, continuing thereafter until the first compliance date for any substitute conservation requirement established in the 5MP. If a selected BMP has been replaced with a new BMP pursuant to subsection E of this section, the IGFR owner and any person entitled to use groundwater pursuant to that IGFR shall implement the new BMP in lieu of the selected BMP.*

2. *The IGFR owner, and any person entitled to use groundwater under that IGFR, may use groundwater to irrigate only the irrigation acres to which the IGFR is appurtenant.*

E. Replacement of an Existing BMP with a New BMP after Acceptance into BMP Program

After the director approves an application for regulation under the BMP Program, the owner of an IGFR included in the application, or any person using groundwater pursuant to that IGFR, may:

1. *Replace a BMP selected in BMP Category 3 or BMP Category 4 in the application approved by the director with an approved BMP in the same category, as described in Appendix 4B, if the applicant notifies the director in writing of the replacement within thirty days after the replacement occurs.*

2. *Apply to the director to replace a BMP selected in BMP Category 3 or BMP Category 4 in the application approved by the director with a substitute practice in the same category as described in Appendix 4B. The director shall approve the application if the director determines that implementation of the substitute practice will likely result in water savings on the farm at least equivalent to the water savings that would result from implementation of the BMP selected in the application approved by the director.*

F. Requirement of New Lessee to Apply for Participation in BMP Program

1. *After the director approves an application for regulation under the BMP Program under subsection B of this section, any person who subsequently acquires a leasehold interest in the land enrolled in the program shall file with the director an application to participate in the BMP Program prior to using water on the land. The application shall be on a form prescribed and furnished by the director and shall contain the following information:*

   a. *The applicant's name, address and telephone number.*

   b. *The certificate number(s) of the IGFR(s) for which the application is filed.*

   c. *A certification that the applicant agrees to be regulated under the BMP Program*

while leasing the land, and identification of all BMPs the applicant agrees to implement while leasing the land. The BMPs shall meet the requirements set forth in subsection A, paragraph 7 of this section.

d. Any other information required by the director.

2. The director shall approve an application to participate in the BMP Program filed under paragraph 1 of this subsection if the application meets all of the requirements set forth in subsection B of this section. If the director denies the application, the applicant shall file a new application to participate in the BMP Program within thirty days after receiving notice of the director's decision or, if the applicant files a timely notice of appeal of the decision and the appeal is denied, within thirty days after receiving notice of the denial of the appeal. In the new application, the applicant shall make a good faith effort to correct the deficiencies that the director identifies with the first application. If the director denies the new application, both the owner of the IGFR and the applicant shall be regulated under the Base Agricultural Conservation Program in section 4-702.

G. Flexibility Account Provisions

Under the BMP Program, the flexibility account provisions of A.R.S. § 45-467 shall not apply to the IGFR owner and any person entitled to use groundwater pursuant to that IGFR. Upon acceptance into the BMP Program, the balance in the farm's flexibility account at the time of acceptance into the BMP Program shall remain unchanged until water use on the farm is no longer regulated under the BMP program.

H. Reporting Requirements

In addition to the information required to be submitted in the annual report required by A.R.S. § 45-632, the IGFR owner, or any person entitled to use groundwater pursuant to that IGFR, shall submit the following information on a form prescribed by the director by the date the annual report is due, regardless of whether an irrigation district files the annual report on behalf of the IGFR owner:

1. The name, address, and phone number of any person entitled to use groundwater on the farm unit.

2. Certification that all required BMPs have been implemented during the previous calendar year. Pursuant to A.A.C. R12-15-1013, the person submitting the form shall keep and maintain, for a minimum of three calendar years following the filing of the form, current and accurate records verifying that the BMPs were implemented.

I. Duration of Regulation under BMP Program

1. Except as provided in paragraph 2 of this subsection, after the director approves an application for regulation under the BMP Program, the IGFR owner, and any person entitled to use groundwater pursuant to that right, shall be regulated under the BMP Program until the first compliance date for any substitute agricultural conservation requirement established in the 5MP.

2. After the director approves an application for regulation under the BMP Program:

a. The owner of an IGFR included in the application may file with the director a written request to withdraw from the BMP Program. The director shall grant the request if the owner demonstrates to the satisfaction of the director that both of the following apply:

1) The owner of the IGFR desires to lease the land to which the IGFR is appurtenant to a lessee for a term of at least one year, but has been unable to find a lessee willing to be regulated under the BMP Program, after making a good faith effort to find such a lessee.

2) The owner of the IGFR has found a person that will lease the land for a term of at least one year if the owner is allowed to withdraw from the BMP Program, and that person did not previously lease the land while the owner was regulated under the BMP Program.

b. A subsequent owner of the IGFR may file with the director a written request to withdraw from the BMP Program within 90 days after acquiring an ownership interest in the IGFR. The director shall grant the request unless the director determines that the transfer of ownership was made solely for the purpose of circumventing the provisions of paragraph 1 of this subsection, in which case the request shall be denied.

4-705. Conservation Requirements for Irrigation Distribution Systems

A. Applicability

The irrigation distribution system conservation requirements set forth in subsection B below apply to irrigation districts and private water companies that distribute water for irrigation uses.

B. Conservation Requirements

By January 1, 2017 or upon commencement of operation, whichever is later and continuing thereafter until the first compliance date of any substitute requirement in the 5MP, each irrigation district and private water company owning or operating an irrigation distribution system shall either:

1. Line all canals used to deliver water for irrigation use with a material that allows no more lost water than a well-maintained concrete lining, or

2. Operate and maintain its irrigation distribution system so that the total quantity of lost and unaccounted for water is 10 percent or less of the total quantity of water from any source, including reclaimed water, that enters its irrigation distribution system, calculated on either a calendar year basis or a three-year average basis based on that calendar year and the two preceding calendar years.

4-706. Monitoring and Reporting Requirements for Irrigation Districts and Private Water Companies

A. Applicability

The monitoring and reporting requirements set forth in subsection B below apply to irrigation districts and private water companies that distribute water for irrigation uses.

B. Monitoring and Reporting Requirements

Beginning with calendar year 2017 or the calendar year in which the irrigation district or private water company commences service, whichever is later, and for each calendar year thereafter until the first compliance date for any substitute requirement in the 5MP, each irrigation district and private water company owning or operating an irrigation distribution system shall submit in its annual report required by A.R.S. § 45-632, the following information as it applies to the irrigation district or private water company:

1. *A map showing the irrigation distribution system, including those portions which have lined canals and those portions which have unlined canals, unless a current map is on file with ADWR.*

2. *The number of miles of lined canals and the number of miles of unlined canals in the irrigation distribution system.*

3. *The total quantity of water from any source, including reclaimed water, that entered the irrigation district's or private water company's irrigation distribution system during the calendar year.*

4. *The total quantity of water from any source, including reclaimed water, delivered by the irrigation district or private water company through its irrigation distribution system to all water users during the calendar year.*

5. *An estimate of the irrigation district's or private water company's total quantity of lost and unaccounted for water for the calendar year. This quantity shall be determined by a generally accepted engineering method.*

6. *The total quantity of water ordered by a municipal provider from the irrigation district and released by the irrigation district from a storage or distribution facility but not accepted by the municipal provider or delivered to any other person.*

4-707. Remediated Groundwater Accounting for Conservation Requirements

A. Accounting

Groundwater withdrawn pursuant to an approved remedial action project under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) or Title 49, Arizona Revised Statutes, and used by a person subject to a conservation requirement established under this chapter, shall be accounted for consistent with the accounting for surface water for purposes of determining the person's compliance with the conservation requirement, subject to the provisions of subsections B through D of this section.

B. Amount of Groundwater Eligible for Accounting

For each approved remedial action project, the annual amount of groundwater that is eligible for the remediated groundwater accounting is the project's annual authorized volume. The annual authorized volume for a remedial action project approved on or after June 15, 1999 is the maximum annual volume of groundwater that may be withdrawn pursuant to the project, as specified in a consent decree or other document approved by the United States Environmental Protection Agency (EPA) or the Arizona Department of Environmental Quality (ADEQ). The annual authorized volume for a project approved prior to June 15, 1999 is the highest annual use of groundwater withdrawn pursuant to the project prior to January 1, 1999, except that if a consent decree or other document approved by the EPA or ADEQ specifies the maximum annual volume of groundwater that may be withdrawn pursuant to the project, the project's annual authorized volume is the maximum annual volume of groundwater specified in that document. The director may modify the annual authorized volume for a remedial action project as follows:

1. *For an approved remedial action project associated with a treatment plant that was in operation prior to June 15, 1999, a person may request an increase in the annual authorized volume at the same time the notice is submitted pursuant to subsection C of this section. The director shall increase the annual authorized volume up to the maximum treatment capacity of the treatment plant if adequate documentation is submitted to the director demonstrating that an increase is necessary to further the purpose of the remedial action project and the increase is not in violation of the consent decree or other document approved by the EPA or ADEQ.*

2. *A person may request an increase in the annual authorized volume of an approved remedial action project at any time if it is necessary to withdraw groundwater in excess of the annual authorized volume to further the purpose of the project. The director shall increase the annual authorized volume up to the maximum volume needed to further the purpose of the project if adequate documentation justifying the increase is submitted to the director and the increase is not in violation of the consent decree or other document approved by the EPA or ADEQ.*

3. *The director shall modify the annual authorized volume of an approved remedial action project to conform to any change in the consent decree or other document approved by the EPA or ADEQ if the person desiring the modification gives the director written notice of the change within thirty days after the change. The notice shall include a copy of the legally binding agreement changing the consent decree or other document approved by the EPA or ADEQ.*

C. Notification

To qualify for the remediated groundwater accounting provided in subsection A of this section, the person desiring the accounting must notify the director in writing of the anticipated withdrawal of groundwater pursuant to an approved remedial action project under CERCLA or Title 49, Arizona Revised Statutes, prior to the withdrawal. At the time the notice is given, the person desiring the accounting must be using remediated groundwater pursuant to the approved remedial action project, or must have agreed to do so through a consent decree or other document approved by the EPA or ADEQ. The notice required by this subsection shall include all of the following:

1. *A copy of the document approved by ADEQ or the EPA, such as the Remedial Action Plan (RAP), Record of Decision (ROD,) or consent decree authorizing the remediated*

groundwater project. Unless expressly specified in the document, the person shall include in the notice the volume of groundwater that will be pumped annually pursuant to the project, the time period to which the document applies, and the annual authorized volume of groundwater that may be withdrawn pursuant to the project.

2. *The purpose for which the remediated groundwater will be used.*

3. *The name and telephone number of a contact person.*

4. *Any other information required by the director.*

D. Monitoring and Reporting Requirements

To qualify for the remediated groundwater accounting for conservation requirements as provided in subsection A of this section, groundwater withdrawn pursuant to the approved remedial action project must be metered separately from groundwater withdrawn in association with another groundwater withdrawal authority for the same or other end use. A person desiring the remediated groundwater accounting for conservation requirements shall indicate in its annual report, under A.R.S. § 45-632, the volume of water withdrawn and used during the previous calendar year that qualifies for the accounting.

APPENDIX 4A
CONSUMPTIVE USE OF WATER BY CROPS AND EFFECTIVE PRECIPITATION
PRESCOTT ACTIVE MANAGEMENT AREA

Crop	Consumptive Use		Effective Precipitation (inches/acre)
	acre-inches	acre-feet	
Grain Crops			
Barley	23.0	1.92	6.6
Oats for Grain	26.0	2.17	3.7
Sorghum, Grain	22.0	1.83	4.8
Wheat, Winter	23.0	1.92	6.6
Pinto Beans	15.7	1.31	6.1
Corn, Grain	24.0	2.00	6.6
Forage Crops			
Alfalfa	41.0	3.42	7.2
Clover	37.0	3.08	7.2
Corn, Ensilage	22.0	1.83	4.8
Oats for Hay	20.0	1.67	3.7
Sorghum, Ensilage	21.0	1.75	6.6
Sudan/Sudex Grass	18.0	1.50	6.6
Permanent Pasture (fescue or tall wheat grass)	51.0	4.25	7.2
Native Pasture	18.0	1.50	7.2
Vegetable Crops			
Beets, Table	25.4	2.12	3.7
Carrots	15.8	1.31	3.7
Chili Peppers	32.7	2.72	6.1
Corn, Sweet	18.6	1.55	4.8
Cucumbers	19.4	1.61	6.1
Garlic	25.4	2.12	6.1
Onions, Dry	22.1	1.84	6.1
Onions, Green	16.6	1.39	3.7

APPENDIX 4A
CONSUMPTIVE USE OF WATER BY CROPS AND EFFECTIVE PRECIPITATION
PRESCOTT ACTIVE MANAGEMENT AREA

Crop	Consumptive Use		Effective Precipitation (inches/acre)
	acre-inches	acre-feet	
Potatoes	23.1	1.92	6.1
Tomatoes	25.4	2.12	6.1
Truck Crops	22.5	1.87	6.1
Fruit Crops			
Apricots	32.0	2.67	7.2
Peaches	32.0	2.67	7.2
Plums	32.0	2.67	7.2
Cherries	37.0	3.08	7.2
Apples	37.0	3.08	7.2
Grapes	29.0	2.42	7.2
Miscellaneous Crops			
Christmas Trees-Nursery Stock (Mondel and Scotch Pine)	27.0	2.25	7.
Cut Flowers	22.1	1.84	

Sources: (Food and Agriculture Organization of the United Nations, 1977)
(United States Department of Agriculture, 1982)

APPENDIX 4B
BEST MANAGEMENT PRACTICES PROGRAM
APPROVED BEST MANAGEMENT PRACTICES

BMP CATEGORY 1. WATER CONVEYANCE SYSTEM IMPROVEMENTS

Description: 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.

Approved Water Conveyance Improvements

BMP 1.1 Concrete-lined ditch

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

BMP 1.2 Pipelines

Any type of low or high-pressure pipeline (closed conduit) 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.

Point Value Determination for BMP Category 1

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 Category 1: Water Conveyance System – Point 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 three and the minimum number is one.

Category 1: Water Conveyance System – Point Table

Percentage of the farm's total irrigated acreage served by the approved BMPs	Point Value
50-54	1.0
55-59	1.2
60-64	1.4
65-69	1.6
70-74	1.8
75-79	2.0
80-84	2.2
85-89	2.4
90-94	2.6
95-99	2.8
100	3.0

APPENDIX 4B
BEST MANAGEMENT PRACTICES PROGRAM
APPROVED BEST MANAGEMENT PRACTICES

BMP CATEGORY 2. FARM IRRIGATION SYSTEMS **Description:** 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.
Approved Farm Irrigation Systems
BMP 2.1 Slope systems without uniform grades with tailwater reuse - (1 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 - (1 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 - (2 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 - (2 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 - (3 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 - (3 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).

Point Value Determination for BMP Category 2
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 three and the minimum number is two.

BMP CATEGORY 3. IRRIGATION WATER MANAGEMENT PRACTICES
Description: 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.
Approved Irrigation Water Management Practices
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.

APPENDIX 4B
BEST MANAGEMENT PRACTICES PROGRAM
APPROVED BEST MANAGEMENT PRACTICES

Approved Irrigation Water Management Practices (BMP Category 3 cont.)
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 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. Must participate in such a program throughout the entire crop season annually.
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. Must participate in such a program throughout the entire crop season annually.
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. Must participate in such a program throughout the entire crop season annually.
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 Irrigation Water Management Practices
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.

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 three and the minimum number is one.

BMP CATEGORY 4. AGRONOMIC MANAGEMENT PRACTICES **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.

Approved Agronomic Management Practices (BMP Category 4 cont.)
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 Agronomic Management Practices
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.
Point Value Determination for Category 4
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 three and the minimum number is one.

Bibliography

Food and Agriculture Organization of the United Nations. (1977). *FAO Irrigation and Drainage Paper #24*.

United States Department of Agriculture. (1982). *Consumptive Use of Water by Major Crops in the Southwestern United States*.