Berrenda Mesa
Water District

2020 Agricultural Water Management Plan

Prepared Pursuant to Water Code Section 10826
and Executive Order B-29-15

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Adopted on April 8, 2021

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Section I: Preparation and Adoption

This Agricultural Water Management Plan (AWMP) for the year 2020 was prepared by the Westside Water Authority on behalf of the Berrenda Mesa Water District to comply with the requirements of the 2018 Water Conservation Legislation (AB 1668 and SB 606). The District has, however, been involved in other water management efforts, as itemized below.

A. Description of Previous Water Management Activities

On October 12, 2004, the District Board of Directors (Board) adopted a Water Management Plan (WMP) prepared in compliance with AB 3616 Agricultural Water Suppliers Efficient Water Practices Act of 1990, in accordance with the January 1, 1999 Memorandum of Understanding Regarding Efficient Water Management Practices by Agricultural Water Suppliers in California. The WMP was endorsed by the Agricultural Water Management Counsel on August 17, 2005.

In 2012, the District prepared and submitted the "2012 Agricultural Water Management Plan" in compliance with SB X7-7. The objectives of the AWMP were to evaluate the District's current water management practices and identify areas where significant improvements have been made, identify areas to improve the efficiency of water use within the District, and consider past and future water management strategies to increase the reliability of water deliveries to the District. The 2012 report concluded that the District had fully implemented all of the critical and the applicable conditional EWMPs.

In 2015, an update was made to the 2012 AWMP to incorporate the requirements from the Governor's April 1, 2015 Executive Order (B-29-15) to include in the AWMP a detailed drought management plan in addition to quantification of water supplies and demands for the 2013, 2014, and 2015 years to the extent data is available. The update also included information that identified areas to improve the efficiency of water use within the districts and to continue to evaluate the District's water management practices. The 2015 update also considered past and future water management strategies to increase the reliability of water deliveries to the Districts.

This 2020 AWMP is being written in response to the 2018 Water Conservation Legislation (AB 1668 and SB 606). Additionally, it will provide updated information regarding water management practices in the District.

The Westside Water Authority was officially formed in April of 2020 to aide in the joint management of operations, contracts, administration, and water transactions for the Lost Hills Water District, Belridge Water Supply District, Dudley Ridge Water District, and the Berrenda Mesa Water District. Although the WWA manages aspects of the districts, the 4 districts will submit their own AWMP's to capture the various intricacies of each district. In the future they may be combined to use AWMP as described in water code 10829.

B. Coordination Activities

1. Notification of AWMP Preparation

The Plan was prepared in cooperation with public entities including the Lost Hills Water District (LHWD) and the Belridge Water Storage District (BWSD). **Table 1.** summarizes the agencies and parties notified regarding the coordination, adoption, and submittal activities of the AWMP.

BMWD solicited public input by inviting oral and written comments prior to and during a public hearing on *April 8, 2021*. No comments were received during the public hearing.

Table 1. Summary of Coordination, Adoption, and Submittal Activities for BMWD						
Potential Interested Parties	**Notified of Plan Preparation**	**Requested Copy of Draft *(Optional)***	**Commented on Draft/Action Taken by Supplier *(Optional)***	**Notified of Public Meetings**	**Attended Public Meetings *(Optional)***	**Copy of Adopted Plan/ Amendment Sent**
Local County(s)						
Kern County						x
Groundwater Management Entity						
Urban Water Supplier(s)						
Lost Hills UD						
City or County Library						x
Local Agency Formation Commission						
DWR	x					x
Local Newspaper/ Equivalent Process						
Bakersfield Californian						
Other Local Government Agency						
Other Special Districts						
Lost Hillls Water District (LHWD)	x					
Belridge Water Storage District (BWSD)	x					x
Dudley Ridge Water District (DRWD)	x					
Semitropic Water Storage District (SWSD)	x					
Regional Agency						
Kern County Water Agency (KCWA)	x					x
Environmental Citizen Group						
Land Use Agencies						
Business Group						
Social Citizen Group						
Other State Government Agency						
Federal Government Agency						
Other (*identify*)						
District Landowners /Water Users						
Ag Water Management Council						
Website						Plan to post by May 1, 2021

2. Public Participation

The District provided notice of public meeting to approve and adopt the AWMP in the Bakersfield Californian on March 15 and 22, 2021 (Appendix 1). This notice included the notification of preparation and the notification of the date of the public meeting to be held to review and consider adopting the AWMP.

The District received responses and comments from several landowners regarding the AWMP via email, phone calls, and at a landowner meeting held on April 7, 2021. This AWMP incorporates their input.

C. AWMP Adoption, Submittal, and Availability

1. AWMP Adoption

The District is submitting the AWMP included in this document in accordance with AB 1668 and SB 606 requirements and which has been adopted by the Board of Directors on April 8, 2021. Resolution of Plan Adoption by the Board is included in Appendix 2.

2. AWMP Submittal

Copies of the finalized AWMP have been sent to the following agencies:

- DWR
- Kern County
- California State Library
- Lost Hills UD

3. AWMP Availability

The AWMP will be posted on the District's web site on or before April 4, 2021 and can be viewed in the following link: http://www.bmwd.org.

D. AWMP Implementation

Plan implementation began with Board adoption on April 8, 2021 and will continue until the next update. Further details on water use efficiency implementation schedule and documentation are described in Sections VII and VIII.

Section II: Description of the Agricultural Water Supply and Service Area

A. Physical Characteristics

1. Size of service area

The BMWD was formed on September 3, 1963, pursuant to Division 13 of the California Water Code, for the purpose of providing irrigation water from the State Water Project (SWP) to land within the District. The water supply contract between the District and Kern County Water Agency (KCWA or Agency) was executed on March 9, 1967. After contract execution with the Agency, the District commenced water deliveries in 1968.

The location of the District is included in Appendix 3, and the current map of the District is included in Appendix 5. The overall District history and size is summarized in Table 2. BMWD owns and operates an irrigation distribution system that encompasses 55,440 acres of agricultural lands in western Kern County, California, as shown in Appendix 5. All but about 6,400 acres in the District are farmable, although not all this acreage is currently being farmed. The net cropped area in 2020 is 24,556 acres, of which 24,204 is irrigated. Cropping patterns have not changed significantly in the last 5 years, and some specific cropping data from 2016-2018 is missing. For these years, constant cropping pattern was assumed for the sake of water budget calculations.

Table 2. Water Supplier History and Size

District	BMWD
Date of Formation	3-Sep-63
Source of Water	Applicable sources
Local Surface Water	
Local Groundwater	Limited
Wholesaler	Kern County Water Agency (KCWA)
USBR	
SWP	Via California Aqueduct
Service Area Gross Acreage	55,440 acres
Service Area Acreage	37,421 acres
Non-Service Area Acreage	31,236 acres

There are two categories of landowners with a water supply in BMWD—those landowners with contracts and those without (i.e., Contract and Non-Contract). Of the District's 92,800 AF of SWP Table A, approximately 86,872 AF is under contract and 4,982 AF is allocated to Non-Contract landowners in the District. This represents the total amount of water available by the District to allocate to landowners when the supply from the State Water

Project (SWP) is 100%. In certain years, this amount is reduced in proportion to the allocation (supply made available) from the SWP (e.g., at a 60% supply the amounts would be reduced to 52,568 AF and 2,992 AF respectively except in a water short year. The District primarily supplies agricultural water to growers within its boundaries. All of the water delivered by the District is delivered through the California Aqueduct.

Table 3. Expected Changes to Service Area

Change to Service Area	Estimate of Magnitude	Effect on the Water Supplier
Reduced Service Area Size	0	None anticipated
Increased Service Area Size	0	None anticipated
Other		
- Cropping Changes	0	None anticipated
- Reduced Irrigated Land	0	None anticipated

2. Location of the service area and water management facilities

BMWD is located within the southern San Joaquin Valley about 50 miles northwest of the City of Bakersfield. BMWD is located in the northwestern corner of Kern County on the eastern edge of the Temblor Range. State Highways 46 and 33 traverse the District boundaries. A location map of the District and its proximity to neighboring districts is included as appendix 3. Adjacent districts include Devil's Den Water District to the north, part of Belridge Water Storage District to the south, and Lost Hills Water District to the east.

SWP water is conveyed from SWP facilities located north of the Delta at Lake Oroville. The water is pumped through the Banks Pumping Plant for delivery into the California Aqueduct, which diverts into San Luis Reservoir. The amount of water that exceeds SWP demands is stored in San Luis Reservoir. From San Luis Reservoir, Dos Amigos Pumping Plant redirects water back into the California Aqueduct, which then routes water into the Coastal Branch of the Aqueduct for delivery to BMWD. Before BWMD receives delivery of the water, it must be lifted through a series of pump stations, the DWR's Las Perillas and Badger Hill Pumping Plants and Berrenda Mesa's Pump Station A. Therefore, water operations that are affected by BMWD water use include Lake Oroville, Banks Pumping Plant, California Aqueduct, San Luis Reservoir, Dos Amigos Pumping Plant, Coastal Aqueduct, Las Perillas Pumping Plant, Badger Hill Pumping Plant and BMWD Pump Station A. Figure 1 shows State Water Project Facilities. (Kern Fan Element, Habitat Conservation Plan, 1994).

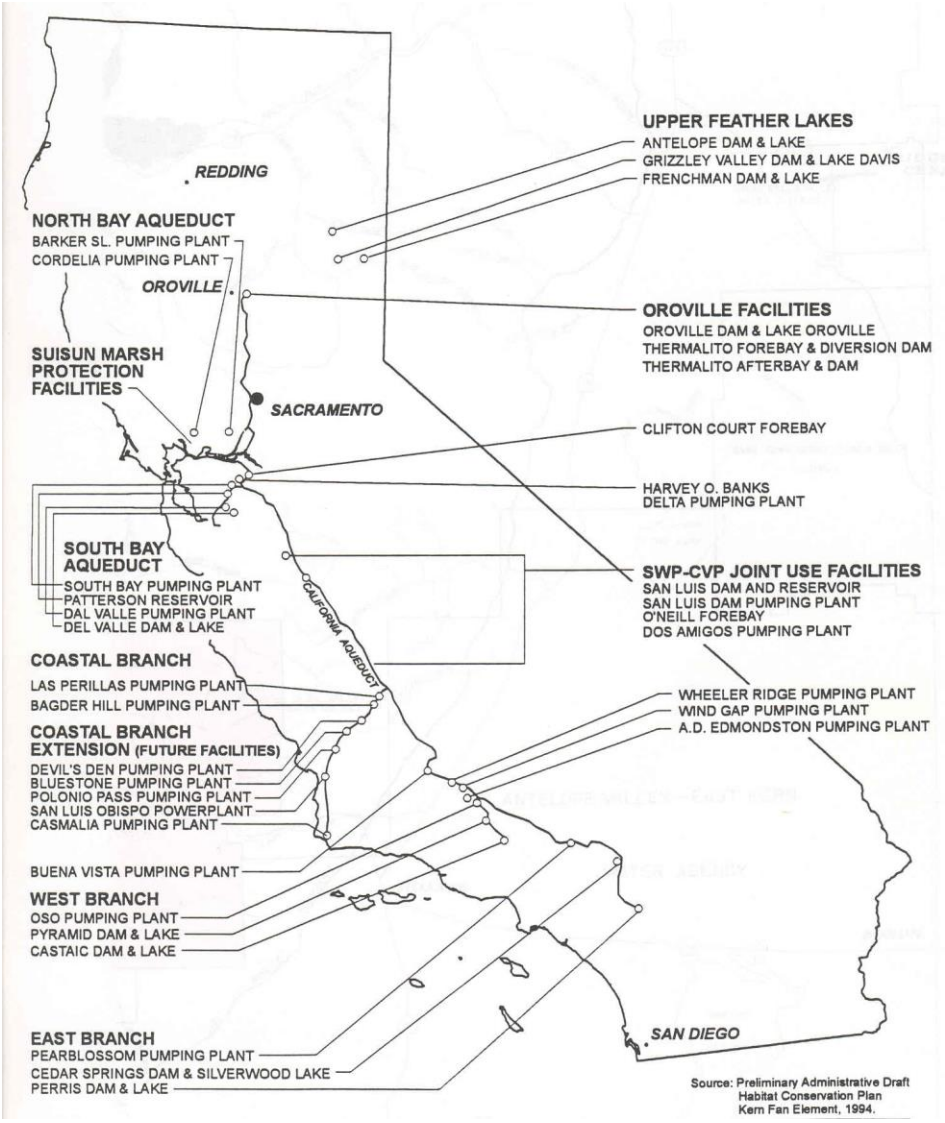

Figure 1. SWP Facilities

BMWD distributes SWP water via a network of storage facilities, a main canal, pipelines, pump stations, and control structures. BMWD 's first project as a public entity was the construction of Zone 1, the first phase of the distribution system completed on February 1968 in conjunction with the DWR. Construction of Zone 2, the second phase of distribution system, was completed in 1979. Table 4 provides a summary of existing irrigation facilities in BMWD.

Table 4. Water Conveyance and Delivery System	
System Used	**Number of Miles**
Unlined Canal	0
Lined Canal	15 mi
Pipelines	50 mi
Drains	0
Regulation Reservoirs	450 AF

BMWD's water conveyance and delivery system was designed mainly for gravity flow. Once water is pumped uphill 225 feet (by Pump Station A located at the terminus of Coastal Aqueduct), the water flows by gravity through a concrete lined canal. Gravity pipeline laterals feed lands that are lower in elevation than the canal. Since 2012, the District has installed automatic gate controls at canal check structures on its main canal. This equipment allows operators to (1) adjust water levels in the canals remotely via an internet connection (2) react more quickly to changes in water levels in the canals and (3) reduces the number of trips necessary to adjust the gates manually. All of which lead to more safe and efficient water management. There are portions of the District that are located on higher elevation than the canal. Water is delivered to higher elevation land with pump stations and pipelines.

The District owns and operates a total of seven reservoirs, two of the reservoirs are lined (Afterbay Reservoir and Still Reservoir), while the remaining five are unlined. Table lists the capacity of theses reservoirs. The District performed pond drop tests to determine the amount of seepage from the unlined reservoirs. The results indicated that the reservoir bottoms are sealed up because of the silts and small soil particles deposited over time.

Table 5. Water Supplier Reservoirs	
Number	7
BMWD Afterbay Reservoir	400 AF
Other end of system	50 AF
Total Capacity	450 AF

The District's main local surface storage is a 400 AF regulation reservoir (Afterbay Reservoir). This reservoir is used for short-term regulation of the District's main pump station (Pump Station A) and generally is not available for long-term storage of surplus waters. The Afterbay Reservoir provides the District enough capacity to curtail pumping during the peak energy period (noon to six), to minimize pumping costs and energy bills.

Other District facilities, located outside the District boundary, are groundwater banks that include the Pioneer Project and the Berrenda Mesa Project (Appendix 4). As a participant in these banking programs, BMWD has been actively banking SWP water when

supplies exceed demands or when other surplus water is made available. During drought years, when SWP allocations are minimal, BMWD can recover water in the groundwater banking facilities to supplement SWP supplies. Annually, the maximum amount BMWD can extract from both banking projects is 43,500 AF. Currently, they have banked a total of about 113,458 AF in these projects. In addition, individual landowners have the ability to store water in other banking projects to augment their overall supplies.

As stated before, the majority of BMWD's conveyance system operates as a gravity water conveyance system. Gravity systems are energy efficient but can result in unavoidable operational spills to the downstream end users. BMWD has an operational spill water return facility. At the end of the main canal there is a 10-mile gravity pipeline to serve a landowner. There is a spill reservoir just upstream of the 10-mile gravity lateral. Occasionally, the spill reservoir is utilized but the water is not lost. A gate and pipeline connects the spill reservoir and the 10-mile gravity lateral. All water diverted into the spill reservoir is recovered and gravity fed into the 10-mile gravity lateral. BMWD does an exceptional job managing water for delivery and very rarely do operators have to spill into the reservoir.

Table 6 summarizes the spill recovery system.

Table 6. Tailwater/Spill Recovery System

System	Yes/No
District Operated Spill Recovery	Yes
Grower Operated Tailwater Recovery	No

All turnouts are designed to serve 160 acres at a flow rate of up to two and one-half cubic feet per second (2.5-cfs). Lateral turnouts will deliver water at a higher rate of up to 5-cfs during low total demand periods.

The District's distribution system can be classified as a fixed duration-restricted arrangement system with deliveries arranged in advance and a normal duration in 24-hour time intervals.

Growers within BMWD utilize all three of the major irrigation system types: micro irrigation, sprinkler and to a much lesser extent furrow. As drip irrigation technology became available, drip irrigation systems were installed on permanent crop acreage. By the 1980's, most of the permanent crops were converted from furrow or sprinkler systems to micro irrigation systems, either drip or fan-jet irrigation. Currently, pressurized micro irrigation systems (drip and fan-jet systems) account for 100% of the irrigated permanent crop acreage. The permanent crop acreage irrigated with micro irrigation has decreased from 28,275 acres in 1990 to around 24,556 acres in 2020 because of the transfers and economic impacts discussed earlier.

SWP water is among the most expensive surface water supplies in the State. Landowners in BMWD have some of the highest costs for surface water given the District's location

and topography. Water delivered to BMWD must be pumped through two pump stations (Las Perillas and Badger Hill) on the Coastal Aqueduct as well as the District's own Pump Station A. When reduced water supplies are received, the costs increase dramatically. This alone is incentive enough for most growers to efficiently manage their water allocation. BMWD is a progressive district, and along with its landowners, uses the best available technology for conveying water to crops.

This Plan will describe BMWD's water conservation efforts currently being performed and practices they wish to incorporate into their existing system, policies, and management.

3. Terrain and soils

BMWD is located on the eastern edge of the Temblor Range. Topography is gentle, with foothills lying at the western edge. The western portion of BMWD is known as Antelope Valley, and is enclosed by the Temblor Range on three sides. The eastern portion of BMWD is known as Antelope Plain. Elevations range from 460 feet above sea level in the northeast to 1,200 feet in the southwest. Typical slopes range from 40 to 50 feet per mile in the central portion of BMWD. Table 7 summarizes the topography impacts to the irrigation of the land.

BMWD is mostly underlain with Quaternary alluvium, which in turn is underlain with the Tulare Formation of Pliocene/Pleistocene age.

The United States Department of Agriculture, Natural Resource Conservation Service (NRCS) (formerly the Soil Conservation Service), issued a soil survey of the northwestern portion of Kern County in the fall of 1988. This detailed soil survey included the Berrenda Mesa Water District area. A general soils map of the District taken from the NRCS soil survey is included as Appendix 6.

Table 8 gives the general characteristics of the major soil types within the District and accompanies Appendix 6. Three soil types exist in BMWD: Kimberlina fine sandy loam, Milham sandy loam, and Lewkalb saline alkali/Milham-Kimberlina complex (Appendix 6). All three-soil types are formed in alluvium derived primarily from sedimentary and granitic rock. Kimberlina fine sandy loam and Milham sandy loam are both deep, well-drained soils found on alluvial fans and plains. Milham sandy loam is found on low terraces, as well. Kimberlina fine sandy loam and Milham sandy loam are classified as prime farmland soils by the U.S. Department of Agriculture. Approximately 90 percent of the soils within BMWD are considered prime for agricultural activities and well drained. Noticeable erosion has not occurred on the irrigated and non-irrigated lands.

Land use within the BMWD consists primarily of agricultural lands. Approximately 24,556 acres are in agricultural production with the most common crops being pistachios, grain, carrots, pomegranates, and almonds. Other crops include carrots, hay citrus and grapes. Some livestock grazing also occurs on previously farmed land (fallow). Table 7 below shows the land use in the District. A majority of non-irrigated land (approximately 6,440 acres) in the service area is within non-farmable land (oilfields, mountain slopes, low (yield) producing land).

One rural community, Blackwell's Corner, is located within BMWD. Blackwell's Corner is the most developed community consisting of a restaurant, gas station, church, family residences, and the BMWD field office. No intensified urban areas are located within BMWD.

Table 7. 2020 Water Year Land Use

Crop	Acreage
Pistachios	16,390
Almonds	8,158
Citrus	3
Lavender	4
Total Irrigated Acreage	24,556
Fallow/Pasture	33,174
Total	57,730

Table 8. Landscape Characteristics

Topography Characteristic				% of the District				Effect on Water Operations and Drainage
Gently sloping land				100% Irrigated land				Land is adaptable to sprinkler and micro irrigation systems. There are no effects on water operations and drainage because of the existence of pressurized irrigation systems
Soil Unit	**Soil Name / Characteristic / Classification**	**Description**	**Total Area (acres)**	**Percent of District**	**Depth (in)**	**Clay (%)**	**Permeability (in/hr)**	**Effect on Water Operations and Drainage**
101	Aido clay, 9 to 30% slopes	Moderately deep, w ell drained soil is on hills and mountains. Formed in residuum derived dominantly from shale and sandstone.	16.3	0.03	10-26	40-60	0.06-0.2	No irrigation operations impact
					26-60	---	0.2 - 0.57	
102	Aido clay 30 to 50% slopes	Moderately deep, w ell drained soil is on hills and mountains. Formed in residuum derived dominantly from shale of fine grained and sandstone.	72.1	0.12	0-10	40-55	0.06-0.2	No irrigation operations impact
					10-26	40-60	0.06-0.2	
					26-60	---	0.2 - 0.57	
115	Bitterw ater sandy loam, 9 to 15% slopes	Deep, w ell drained soil is on foothills. Formed in residuum derived dominantly from sandstone.	178.9	0.31	0-23	5-10	1.98 - 5.95	No irrigation operations impact
					23-60	5-10	1.98 - 5.95	
					60-70	---	1.98 - 5.95	
118	Bitterw ater-Delgado association, 9 to 30% slopes	This unit is on foothills. This unit is 30% Delgado sandy loam. The Delgado soil is shallow and somew hat excessively drained. Formed in residuum derived dominantly from sandstone or shale.	465.0	0.80	0-2	8-20	1.98 - 5.95	No irrigation operations impact
					2-14	8-20	1.98 - 5.95	
					14-18	---	1.98 - 5.95	
		This unit is on foothills. This unit is 60% Bitterw ater sandy loam. The Bitterw ater soil is deep and w ell drained. Formed in residuum derived dominantly from sandstone.			0-23	5-10	1.98 - 5.95	
					23-60	5-10	1.98 - 5.95	
					60-70	---	1.98 - 5.95	
119	Bitterw ater-Delgado association, 30 to 75% slopes	This unit is on foothills. This unit is 60% Bitterw ater sandy loam. The Bitterw ater soil is deep and w ell drained. Formed in residuum derived dominantly from sandstone.	0.5	0.00	0-23	5-10	1.98 - 5.95	No irrigation operations impact
					23-60	5-10	1.98 - 5.95	
					60-70	---	1.98 - 5.95	
		This unit is on foothills. This unit is 25% Delgado sandy loam. The Delgado soil is shallow and somew hat excessively drained. Formed in residuum derived dominantly from sandstone or shale.			0-2	8-20	1.98 - 5.95	
					2-14	8-20	1.98 - 5.95	
					14-18	---	1.41+	
129	Carollo-Tw isselman saline alkali association, 2 to 15% slopes	Carollo (60% of area), clay loam, saline-alkali. Moderately deep and w ell drained soil is on hill tops. Formed in residuum derived dominantly from shale.	99.5	0.17	0-2	27-32	0 - 0.06	No irrigation operations impact
					2-15	40-60	0 - 0.06	
					15-30	30-40	0 - 0.06	
					30-60	---	0 - 0.06	
		Tw isselman (40% of area), clay, saline-alkali. Deep and w ell drained soil is on side slopes and drainagew ays. Formed in alluvium derived dominantely from sedimentary rock.			0-9	40-60	0 - 0.06	
					9-60	35-60	0 - 0.06	
144	Delgado sandy loam, 5 to 30 percent slopes	Shallow , somew hat excessively drained soil is on hills. Formed in residuum derived dominantly from sedimentary rock.	41.9	0.07	0-2	8-20	1.98 - 5.95	No irrigation operations impact
					2-10	8-20	1.98 - 5.95	
					10-14	---	0.2 - 1.98	
163	Hillbrick-Rock outcrop complex, 50 to 75% slopes	This map unit is on hills and mountains. This unit is 65% Hillbrick sandloam and 15% Rock outcrop. The Hillbrick soil is shallow and w ell drained. Formed in residuum derived dominantly from w eathered sandstone or shale.	1.4	0.00	0-15	8-18	1.98 - 5.95	No irrigation operations impact
					15-25	---	0.2 - 0.57	
166	Kecksroad silty clay loam, 5 to 15% slopes	This moderately deep, w ell drained soil is on hills. Formed in residuum derived dominantly from sedimentary rock.	26.6	0.05	0-11	30-40	0.2 - 0.57	No irrigation operations impact
					11-36	35-50	0.06-0.2	
					36-60	---	0.2 - 0.57	
167	Kecksroad silty clay loam, 15 to 50% slopes	This moderately deep, w ell drained soil is on hills. Formed in residuum derived dominantly from sedimentary rock.	13.7	0.02	0-11	30-40	0.2 - 0.57	No irrigation operations impact
					11-36	35-50	0.06-0.2	
					36-60	---	0.2 - 0.57	
168	Kettleman loam, 9 to 15% slopes	This moderately deep, w ell drained soil is on hills. Formed in residuum derived dominantly from sedimentary rock.	12.5	0.02	0-12	18-27	0.57 - 1.98	No irrigation operations impact
					12-22	18-30	0.57 - 1.98	
					22-60	---	0.2 - 0.57	
169	Kettleman loam, 15 to 50% slopes	This moderately deep, w ell drained soil is on hills. Formed in residuum derived dominantly from sedimentary rock.	106.1	0.18	0-12	18-27	0.57 - 1.98	No irrigation operations impact
					12-22	18-30	0.57 - 1.98	
					22-60	---	0.2 - 0.57	
171	Kettleman-Delgado-Rock outcrop complex, 15 to 50% slopes	Kettleman (45% of area) soil is moderately deep and w ell drained. Formed in residuum derived dominantly from sedimentary rock.	139.0	0.24	0-12	18-27	0.57 - 1.98	No irrigation operations impact
					12-22	18-30	0.57 - 1.98	
					22-60	---	0.2 - 0.57	
		Delgado (30% of area) soil is shallow and soemw hat excessively drained. Formed in residuum derived dominantly from sedimentary rock.			0-2	8-20	1.98 - 5.95	
					2-10	8-20	1.98 - 5.95	
					10-14	---	1.98 - 5.95	
172	Kilmer-Hillbrick complex, 15 to 50% slopes	This map unit is on hills and mountains. Kilmer (45% of area) loam soil moderately deep and w ell drained. Formed in residuum derived dominantly from shale or sandstone.	20.9	0.04	0-5	15-27	0.2 - 0.57	No irrigation operations impact
					5-14	27-35	0.2 - 0.57	
					14-32	18-35	0.2 - 0.57	
					32-36	---	0.2 - 0.57	
		This map unit is on hills and mountains. Hillbrick (40% of area) sandy loam soil is shallow and w ell drained. Formed in residuum derived dominantly from shale or sandstone.			0-15	8-18	1.98 - 5.95	
					15-25	---	0.2 - 0.57	
174	Kimberlina fine sandy loam, 0 to 2% slopes	Deep, w ell-drained soil on alluvial fans & plains. Formed in alluvium derived dominantly from granitic & sedimentary rock.	4826.8	8.31	0-9	6-18	1.98 - 5.95	No irrigation operations impact
					9-45	10-18	1.98 - 5.95	
					45-71	10-25	0.57 - 1.98	
175	Kimberlina sandy loam, 2 to 5% slopes	Deep, w ell-drained soil on alluvial fans & plains. Formed in alluvium derived dominantly from granitic & sedimentary rock.	625.3	1.08	0-9	6-18	1.98 - 5.95	No irrigation operations impact
					9-45	10-18	1.98 - 5.95	
					45-71	10-25	0.57 - 1.98	
177	Kimberlina gravelly sandy loam, 2 to 5% slopes	Deep, w ell-drained soil on alluvial fans and plains. Formed in alluvium derived dominantly from granitic and sedimentary rock.	68.0	0.12	0-25	6-18	1.98 - 5.95	No irrigation operations impact
					25-60	6-18	1.98 - 5.95	
185	Lew kalb, saline alkali-Milham-Kimberlina complex, 0 to 5% slopes	This map unit is on low terraces, alluvial fans, and plains. Kimberlina (20% of area) sandy loam is deep and w ell drained. Formed in alluvium derived dominantly from granitic and sedimentary rock.	1586.74	2.73	0-10	6-18	1.98 - 5.95	No irrigation operations impact
					10-60	10-18	1.98 - 5.95	No irrigation operations impact
		This map unit is on low terraces, alluvial fans, and plains. Lew kalb (40% of area) sandy loam is deep and w ell drained. Formed in alluvium derived dominantly from granitic and sedimentary rock.			0-23	6-18	1.98 - 5.95	No irrigation operations impact
					23-40	6-18	0.06-0.2	No irrigation operations impact
					40-65	6-18	0.06-0.2	No irrigation operations impact
		This map unit is on low terraces, alluvial fans, and plains. Milham (30% of area) sandy loam is deep and w ell drained. Formed in alluvium derived dominantly from granitic and sedimentary rock.			0-10	5-20	1.98 - 5.95	No irrigation operations impact
					10-49	20-35	0.2 - 0.57	No irrigation operations impact
					49-60	5-25	0.57 - 1.98	No irrigation operations impact
186	Lodo variant clay loam, 15 to 50% slopes	Shallow , somew hat excessively drained soil is on hills and mountains. Formed in residuum derived dominantly from sandstone or shale.	11.8	0.02	0-9	27-35	0.57 - 1.98	No irrigation operations impact
					9-13	---	0.2 - 0.57	
196	Milham sandy loam, 0 to 2% slopes	Deep, w ell-drained soil on alluvial fans, plains, & low terraces. Formed in alluvium derived dominantly from granitic & sedimentary rock.	7328.0	12.62	0-10	5-20	1.98 - 5.95	No irrigation operations impact
					10-49	20-35	0.2 - 0.57	
					49-60	5-25	0.57 - 1.98	
197	Milham sandy loam, 2 to 5% slopes	Deep, w ell drained soil on alluvial fans, plains, & low terraces. Formed in alluvium derived dominantly from granitic & sedimentary rock.	1259.1	2.17	0-10	5-20	1.98 - 5.95	No irrigation operations impact
					10-49	20-35	0.2 - 0.57	
					49-60	5-25	0.57 - 1.98	
206	Nacimiento-Kilmer complex, 30 to 50% slopes	This map unit is on hills and mountains. Kilmer (25% of area) loam soil is moderately deep and w ell drained. Formed in residuum derived dominantly from calcareous sandstone or shale.	38.45	0.07	0-5	15-27	0.2 - 0.57	No irrigation operations impact
					5-14	27-35	0.2 - 0.57	
					14-32	18-35	0.2 - 0.57	
					32-36	---	0.2 - 0.57	
		This map unit is on hills and mountains. Nacimiento (40% of area) silty clay loam soil is moderately deep and w ell drained. Formed in residuum derived dominantly from calcareous sandstone or shale.			0-13	27-35	0.2 - 0.57	No irrigation operations impact
					13-26	20-35	0.2 - 0.57	
					26-30	---	0.2 - 0.57	
211	Panoche clay loam, 0 to 2% slopes	Deep, w ell-drained soil on alluvial fans & plains. Formed in alluvium derived dominately from granitic or sedimentary rock.	26206.7	45.12	0-16	27-35	0.57 - 1.98	No irrigation operations impact
					16-60	18-35	0.57 - 1.98	
212	Panoche clay loam, 2 to 5% slopes	Deep, w ell-drained soil on alluvial fans & plains. Formed in alluvium derived dominately from granitic or sedimentary rock.	4179.2	7.20	0-16	27-35	0.57 - 1.98	No irrigation operations impact
					16-60	18-35	0.57 - 1.98	
213	Panoche clay loam, 5 to 9% slopes	Deep, w ell-drained soil on alluvial fans & plains. Formed in alluvium derived dominately from granitic or sedimentary rock.	85.4	0.15	0-16	27-35	0.57 - 1.98	No irrigation operations impact
					16-60	18-35	0.57 - 1.98	
	Pits		47.7					
219	Polonio loam, 2 to 9% slopes	Deep, w ell-drained soil on alluvial fans. Formed in calcareous alluvium derived dominately from sedimentary rock.	288.6	0.50	0-16	18-27	0.57 - 1.98	No irrigation operations impact
					16-60	18-30	0.2 - 0.57	
220	Pottinger very shaly clay loam, 2 to 9% slopes	Deep, w ell-drained soil on alluvial fans and terraces. Formed in alluvium derived dominately from shale.	23.4	0.04	0-23	25-35	0.2 - 0.57	No irrigation operations impact
					23-60	25-35	0.2 - 0.57	
235	Tw isselman clay, 0 to 2% slopes	Deep, w ell-drained soil on alluvial fans. Formed in alluvium derived dom-inantly from sedimentary rock.	7714.4	13.28	0-14	40-60	0.06-0.2	No irrigation operations impact
					14-60	35-60	0.06-0.2	
236	Tw isselman clay, 2 to 5% slopes	Deep, w ell-drained soil on alluvial fans. Formed in alluvium derived dom-inantly from sedimentary rock.	761.7	1.31	0-14	40-60	0.06-0.2	No irrigation operations impact
					14-60	35-60	0.06-0.2	
239	Typic Gypsiorthids-Kimberlina association, 0 to 5% slopes	Deep and w ell drained. Formed in alluvium derived dominantly from sedimentary rock.	126.5	0.22	0-9	6-18	1.98 - 5.95	No irrigation operations impact
					9-45	10-18	1.98 - 5.95	
					45-71	10-25	0.57 - 1.98	
251	Yribarren loam, 0 to 2% slopes	Deep, w ell drained soil on alluvial fans & plains. Formed in alluvium derived dominantly by sedimentary rock.	198.5	0.34	0-7	20-27	0.57 - 1.98	No irrigation operations impact
					7-19	35-55	0 - 0.06	
					19-22	15-35	0 - 0.06	
					22-60	15-30	0.2 - 0.57	
252	Yribarren clay loam, 0 to 2% slopes	Deep, w ell-drained soil on alluvial fans and plains. Formed in alluvium derived dominately from sedimentary rock.	446.2	0.77	0-7	20-27	0.57 - 1.98	No irrigation operations impact
					7-19	35-55	0 - 0.06	
					19-22	15-35	0 - 0.06	
					22-60	15-30	0.2 - 0.57	
253	Yribarren clay loam, 2 to 5% slopes	Deep, w ell-drained soil on alluvial fans & plains. Formed in alluvium derived dominantly by sedimentary rock.	1150.6	1.98	0-7	20-27	0.57 - 1.98	No irrigation operations impact
					7-19	35-55	0 - 0.06	
					19-22	15-35	0 - 0.06	
					22-60	15-30	0.2 - 0.57	
257	Water		67.4		---	---	---	

4. Climate

BMWD is characterized by a Mediterranean-type climate with dry, hot summers and mild, semi-arid winters with little rainfall and normally low humidity. Average daily maximum temperature in BMWD ranges from 91 to 97 degrees Fahrenheit in the summer, and from 58 to 69 degrees in the winter. The area is classified as a hot desert where precipitation is less than half of the potential evaporation. The rain season typically occurs from November to April, and ranges from 2.9 to 9.3 inches per year, with an average of 5.1 inches per year, where about nine-tenths of the rainfall occurs from November through April. The rainfall is sufficient for grazing purposes, but not sufficient for intensive agricultural purposes. Historical average climatology is presented in Table 9 and Table 10.

The growing season runs from May through October, although various crops are grown year-round. Reference evapotranspiration ranges from 52.4 to 62.8 inches per year with an average of 58.3 inches per year. The length of the growing season (frost-free period) is about nine months, or around 250 days per year that are available for growing most agricultural crops. The crops must be sustained by irrigation during the hot, dry summers.

Table 9. Summary Climate Characteristics

	#054 Blackwells Corner, 2006-2020
Climate Characteristic	**Value**
Average Annual Evapotranspiration (inches)	5.5
Average Annual Precipitation (inches)	0.4
Annual Minimum Precipitation (inches)* (2016)	(0) 0
Annual Maximum Precipitation (inches)* (2018)	(1.98) 1.8
Average Annual Minimum Temperature (ºF)	49.1
Average Annual Maximum Temperature (ºF)	76.7
Average Minimum Temperature (ºF) (January)	34.4
Average Maximum Temperature (ºF) (July)	97.2
Average Minimum Temperature Range (ºF) (November-April)	39.3
Average Maximum Temperature Range (ºF) (May-October)	89.3
Note:	
* Annual minimum and maximum precipitation correspond to the total minimum and maximum value recorded in the corresponding years.	

Table 10. Detailed Climate Characteristics				
	CIMIS Station #054 - Blackwells Corner, 2006-2020			
Month/Time	**Average Precipitation, Inches**	**Average Reference Evapotranspiration (ET_o), Inches**	**Average Minimum Temperature, °F**	**Average Maximum Temperature, °F**
January	1.09	1.71	34.39	56.25
February	0.71	2.52	35.87	61.86
March	0.99	4.28	42.41	67.85
April	0.51	6.11	46.55	74.72
May	0.44	8.20	52.86	82.56
June	0.01	9.19	60.46	91.67
July	0.02	9.90	66.15	97.21
August	0.02	8.78	64.58	95.83
September	0.08	6.49	59.45	90.03
October	0.14	4.32	50.19	78.69
November	0.44	2.42	41.17	66.79
December	0.67	1.60	35.30	57.01
Wet Season* (Nov-Apr)	0.74	3.13	39.33	64.17
Dry Season* (May-Oct)	0.71	46.89	58.95	89.33
Extreme Conditions (if applicable) [e.g., 100-year event]	NA	NA	NA	NA
Other	NA	NA	NA	NA
Notes:				
Wet season is defined for November through April. Dry season is defined for May through October.				
NA = Not applicable				

B. Operational characteristics

1. Operating rules and regulations

The District Board of Directors has adopted policies for allocation and delivery of water for agricultural use to lands within the District. Berrenda Mesa Water District Operating Rules and Regulations (April 5, 2000 revision) are used as a guideline for the operation and delivery of water to the water users (Appendix 8). The rules contain procedures to distribute irrigation water in a fair and equitable manner to the water users. As a complement, copies of the Water Supply Contract Standard Provisions (Appendix 7) and the Permanent Entitlement Transfer Policy (Appendix 9) are included.

As a Member Unit of the KCWA, a State Water Contractor, the District can only be as flexible with deliveries as the State DWR allows. Irrigation deliveries within the District can be classified as a fixed duration-restricted arranged schedule (Table 11). Most of the constraints placed on the District by DWR are passed on to the water user. BMWD is also a new to the WWA, who manages SGMA compliance and its land owners participation in WWQC who manages compliance with ILRP.

Table 11. Supplier Delivery System		
Type	**Check if Used**	**Percent of System Supplied**
On Demand		
Modified Demand		
Rotation		
Other (fixed duration-restricted arranged schedule)	x	100

Table 12. Water Allocation Policy					
	(Check if applicable)			**Allocation**	
Basis of Water Allocation	**Flow**	**Volume**	**Seasonal Allocations**	**Normal Year**	**Percent of Water Deliveries (%)**
Area within the service area					
Amount of land owned					
Riparian rights					
Other (Water supply contract amount)	*	x		2020	20% SWP Table A
Note: * Some turnouts can be prorated on some days based upon delivery capacity of facilities serving them. Available delivery capacities of distribution facilities are shared in proportion to water supply contract amounts held by turnout operators.					

As indicated on 12, the Board of Directors has adopted a water allocation policy, which establishes the amount of water available to the landowners and the cost of the water. The allocation is based on statewide water storage, yearly rainfall, snowpack, SWP and Delta operations restrictions, and other complex factors. The allocation is not finalized and adopted until after the rainy season and when the DWR has made runoff information available.

BMWD follows the same procedure for water ordering with its landowners that KCWA requires of its Member Units, as well as what the DWR requires of KCWA. Annual applications for a water supply must be submitted no later than September 1 of the preceding year. After reviewing all landowner applications, the District allocates to each based on total amount requested for the year, amount requested during any given month of the peak season, and the maximum pumping rate requested during the peak months of June, July, and August, if there is limited peaking capacity available. Applications may be submitted after the September 1 deadline; however, an allocation will be made to fill the late order only after satisfying all water requests submitted prior to September 1.

Water users are required to submit weekly orders showing the delivery rate (a 24-hour continuous uniform flow in cfs), required at each of the designated turnouts. Landowners schedule their own water. For example, a particular farmer requests water on Friday and needs his turnout to be open (2.5 cfs) from Monday to Friday (the following week); on

Monday between 6 am to 8 am the turnout is opened and on Saturday between 6 am to 8 am the turnout must be closed. Change orders must be requested 48 hours in advance. Table 13 shows the variation of water orders and shut-off lead times.

Table 13. Actual Lead Times

Operations	Hours/Days
Water orders	0-48 hours
Water shut-off/changes	0-48 hours

Water users with pressurized irrigation systems (drip/micro) may request irrigation water on an arranged demand (availability of water on request as consumed by the crop - typically from daily to every 2-3 days). Therefore, water order lead times may vary depending on the time of year, system capacity to move the water, and where water is needed in the system.

BMWD operates a decentralized water ordering and shut-off system**.** The canal operator (personnel who manage the water delivery to the water users) takes water orders from water users and coordinates deliveries based on demand and water flow capacity of the distribution system.

2. Water delivery measurements or calculations

BMWD employs a variety of water measurement methods. DWR maintains the flow measurement devices at each of Districts three SWP delivery points. Measurements are recorded daily. DWR has venturi flowmeters installed on the District's Pump Station A and Coastal Pump Station discharge pipelines (Table 14). Deliveries from District facilities are metered at each lateral and measured at each individual turnout by propeller flowmeters (Table 14). The propeller meters read in both instantaneous flow and totalizer readings for volume. The District flowmeters are read monthly and correlated to the monthly total measured by DWR for the same time period.

The District has utilized and continued to improve water orders and billing software since 2003 that helps calculate water costs and provide for a standardized billing process. The software has a database of landowner information including cropping patterns, water transfers, water usage, property ownership, water contract information, and historical water use.

The District has installed and continues to upgrade a SCADA system on its pump stations. SCADA is an acronym for **S**upervisory **C**ontrol **A**nd **D**ata **A**cquisition, a computer system used to monitor and control a plant or equipment. The SCADA system gathers information, such as if a motor failure occurs on a pump, transfers the information back to a central site, alerting the home station that a failure has occurred, carries out necessary analysis and control, such as determining if the pump operation is critical, and displays the information in a logical and organized fashion. The SCADA system also allows district staff to view water levels in forebays and afterbays. An added benefit is

collecting, displaying, and storing real time pump efficiency (kwh/AF) and motor information (temperature, vibration, etc). The District also is working to add SCADA on its canal system.

The DWR-owned California Irrigation Management Information System (CIMIS) weather station located at Blackwell's Corner (CIMIS station (#54), gives landowners real time and historical data reports. Data is retrieved each day including reference Evapotranspiration (ETo), solar radiation, net radiation, air temperature, soil temperature, vapor pressure/relative humidity, precipitation, and wind speed which can be viewed at anytime. Station #54 has been operational since October 19, 1986 and continues to gather data. CIMIS has helped farmers with irrigation scheduling, duration, quantity and other important factors since its development.

Table 14. Water Delivery Measurements

Measurement Device	Frequency of Measurement (Days)	Frequency of Calibration (Months)	Frequency of Maintenance (Months)	Estimated Level of Accuracy (%)
Orifices (meter gates)				
Propeller Meters	cfs twice a week /AF monthly	As needed	As needed	<4%
Weirs				
Flumes				
Venturi Meters (i.e, DWR)	cfs and AF daily	As needed	As needed	<2%
Pump, Run Time				
Pump, KWH				
Other (e.g., some land owner operators)	cfs and AF daily	As needed	As needed	<4%

The District maintains daily delivery records for each turnout being used and maintains records of daily water orders from the SWP. A grower's water use to date and remaining allocation is calculated and maintained using the District's water management software (aka Latis).

DWR maintains records of daily diversions to the District and records of all diversions, water quality, and storage operations related to the SWP. Operational reports are distributed weekly and monthly to the District and published annually in DWR Bulletin 132.

3. Water rate schedules and billing

As discussed under Section II.B.1, the BMWD Board of Directors has established an irrigation water allocation policy. Water tolls are split into two categories, the base toll and the incremental toll.

The base water toll rate is established for each acre-foot of water under landowner contract or reserved for lands not under contract, regardless of location in the District.

Base water toll revenue pays for all District costs other than power and SWP variable costs. Current base water toll rate is $166.27 per acre-foot. This is not the true on farm cost however, since most years farmers receive less than 100% of their supply even though they are obligated to pay for their full supply.

An incremental water toll is charged for each acre-foot of water ordered each year and includes District power costs for pumping and SWP variable costs. These costs vary depending on the pumping plants serving an area, and the turnout location from State facilities. For 2020; State power costs totaled $34.69 per acre-foot foot (combined Dos Amigos and Las Perillas/Badger Hill on table 15 below); District incremental pumping cost range from $40 to $52 per acre-foot; and SWP water costs were $267.76 per acre-foot in the California Aqueduct. A Standby charge ($21.97/ac in 2020) is collected on all acres in the Service Area. Table 16 and Table 17 show BMWD has a uniform water allocation followed by an incremental water toll pricing structure.

Table 15. 2020 BMWD Water Toll/Pumping Rates

2020 Water Tolls	
DWR	$132.50
BMWD	$33.77
Base Water Toll	$166.27
Dos Amigos	$22.49
Total	$355.03

Main Aqueduct			**Total**
Aqueduct	$79.00		$267.76
Aqueduct Booster	$59.00	$79.00	$326.76

Coastal Branch				
LP/BH	$12.20	Incremental Charges		**Total**
Coastal	$34.00	Incremental Pumping	Incremental Rate Total	$234.96
Station A	$34.00			$234.96
Sec. 17		$-	$-	$-
Sec. 20-4		$52.00	$86.00	$286.96
Sec. 30-1		$40.00	$74.00	$274.96
Sec. 35		$-	$-	$-
Still		$-	$103.00	$303.96

2020 Standby Charge =	$21.97

Table 16. Water Rate Basis			
Water Charge Basis	**Check if Used**	**Percent of Water Deliveries (%)**	**Description**
Volume of Water Delivered	x	100	Per acre and per AF basis
Rate and Duration of Water Delivered			
Acre			
Crop			
Land Assessment			
Other			
Landowner contract	x	x	Per AF of water contract

Table 17. Rate Structure		
Type of Billing	**Check if Used**	**Description**
Declining		
Uniform	x	$/AF
Increasing Block Rate		
Other		

No later than December 1, the District calculates the base uniform water toll and the incremental water toll rate for the ensuing year based upon the costs and charges the District expects to incur in delivering water (Table 17). Upon receiving water toll statements, landowners must immediately pay 25% of the statement and will be considered delinquent on January 2. On or before February 1, the District will re-estimate actual costs of delivering water based upon updated estimates and shall adjust the incremental water tolls accordingly. The adjusted statements will be sent to each applicant. 25% of the water tolls, as adjusted, are considered delinquent on March 1 and 50% are considered delinquent July 1. The remaining balance of the water tolls, as adjusted, shall be delinquent on March 1. On or before February 1, the following year, the District makes final adjustments to the incremental water tolls for water delivered during the prior year, based upon actual costs incurred, and appropriate credits or additional charges are issued.

Table 18. Frequency of Billing	
Frequency	**Check if Used**
Weekly	
Biweekly	
Monthly	
Bimonthly	
Other Water Tolls collected: 25% January 1, 25% March 1, and 50% July 1	x
Annually Standby May 25	x

4. Drought Management Plan and Water Shortage Allocation Policy

As described in Section IV the District relies on water transfers, supplemental water purchases, and groundwater banking programs as its primary mechanism for enduring periods of drought. Unlike farmers in other areas who can fallow lands during periods of drought, farmers in the District have permanent plantings (trees and vines) that require a minimum water supply to keep alive. In water short years these farmers use deficit irrigation (the application of water below full crop-water requirements) to reduce irrigation water use. This can result in reduced crop yields and, if taken to the extreme, no crop yield and long-term damage.

Determining Drought Severity

The District's primary water source is imported surface water supplies from the SWP. In the fall of each year, DWR operations staff review current Project storage and projected deliveries through the end of the year, and develop allocation projections for the following year based on a range of forecasted hydrology. DWR declares the initial allocation forecast for the following year at the end of November; this allocation is adjusted up or down as hydrology dictates.

District management maintains a close relationship with Kern County Water Agency and DWR operations staff and uses these allocation projections to determine water supply availability and level of drought severity. These projections are conveyed to District landowners for use in planning their farming operations and projecting supplemental water needs.

Water Shortage Allocation

During water short years, the District allocates water according to District policy as follows: the District will first provide water to holders of entitlement that have planted permanent crops based on the ratio of gross acreage of each landowner to the aggregate of gross acreage of all landowners (in permanent crops), up to 1.5 AF per acre. Once landowners of permanent crops have been supplied with at least 1.5 AF per acre, the District will provide water to owners of land not planted to permanent crops based on the ratio of gross acreage of each landowner to the aggregate of gross acreage of all landowners not planted in permanent crops, also up to 1.5 AF per acre. Table 19 summarizes how decreased water supplies are allocated.

Table 19. Decreased Water Supplies Allocations	
Allocation Method	**Check if used**
By crop	
Area in district	
Other	
Decrease Allocated Water	x
Restrict Water to Certain Crops	x
No specific policy	

Alternative Water Supplies

As discussed in Section IV, the District relies on banking, transfers, and exchanges to supplement its annual water supply. At all but the higher SWP water allocations, the District is proactive in seeking and securing supplemental water supplies. Since 2009, the District has collaborated in securing additional water with four other agricultural water districts that also rely heavily on the SWP for their water supplies. The other districts are Belridge Water Storage District, Dudley Ridge Water District, Lost Hills Water District, and Wheeler Ridge–Maricopa Water Storage District. Due to their common location on the Westside of the southern San Joaquin Valley, the five districts are informally referred to at the Westside Districts or Westside 5.

Coordination and Collaboration

In addition to the Westside 5, the District coordinates with neighboring local districts where there are common landholders to utilize limited supplies in the most beneficial manner.

Revenues and Expenditures

The majority of the District's expenses are DWR charges that are due regardless of the amount of water delivered. As the SWP allocation gets reduced, the actual cost of the water to the water users increases proportionately. For example, the District was expected to spend $13,190,844 million for its 2020 SWP water supply. At 100% allocation, this would equate to approximately $157.66/AF, but at the 2020 allocation of 20%, the unit charge rises to over $712.25/AF.

In addition, at lower SWP allocations, the market for supplemental water becomes more active, which results in higher unit costs to the water users.

BMWD has not had to enforce any wasteful water practices. As stated before, the price of water to BMWD landowners is of the highest anywhere in the state. Landowners are aware of this and use the water wisely. If necessary, the District would shut off service to any landowner deemed to be wasting water (Table 20).

Table 20. Enforcement Methods of Allocation Policies	
Enforcement Method	**Check if used**
Fines	
Water Shut-off	x
Other	
No specific policy	

Section III: Description of Quantity of Water Uses

Water year 2020 is chosen as the representative year for this plan (Table 21), because SWP allocation was 20% (which is close to long term expected SWP reliability). For planning purposes, data starts in January and ends December (to include a full year of historic data). This "water year" will be the basis to reference the water supplies and water uses that define the water budget in the sections that follow.

Table 21. Representative Year	
	Description
Representative year(s) based upon	2020
First month of representative year	Jan-20
Last month of representative year	Dec-20

A. Agriculture Water Use

BMWD provides only surface water (Table 22) for irrigation supplies of the many crops grown in the District as listed in Table 22. Because of the advent of SGMA, the District began collecting groundwater extraction data in 2020. Due to poor water quality, the quantity of groundwater extraction has been historically low, which is reflected in the very small amount in 2020. 2016-2019 shows "N/A" because quantity of groundwater extraction was not collected those years.

Table 22. Annual Agricultural Water Use (AF)					
Source	**2016**	**2017**	**2018**	**2019**	**2020**
Agricultural Water Supplier Delivered					
Surface Water	89,906	98,233	90,720	91,354	92,637
Groundwater	N/A	N/A	N/A	N/A	674
Subtotal	**89,906**	**98,233**	**90,720**	**91,354**	**93,311**

BMWD supplies irrigation water to many crops, as listed in Table 23. The primary products grown within the BMWD service area are from trees (mostly almonds, pistachios, carrots,

and pomegranates). The evolution of irrigation and changing economic conditions has brought many crop changes to the District. Extensive agricultural cropping patterns of thousands of acres planted to a single crop were replaced with intensive agriculture cropping patterns of numerous smaller parcels planted to a wide variety of high-value specialty crops. Nuts such as almonds and pistachios have been the fastest growing crop types in the District. As the land was converted, pressurized irrigation systems such as drip and micro sprinkler replaced flood irrigation as the predominant method of irrigation. Similarly, the on-farm irrigation efficiencies improved as the irrigation system conversions happened.

The overall crop requirement also takes into consideration the leaching requirements and the effective precipitation. The following assumptions were used in the estimates for table 23.

- Crop evapotranspiration (ETc) was derived from the Irrigation Training and Research Centers (ITRC) ETc Table for Irrigation District Water Balances, Zone 16 for Typical Year.
- Leaching requirement was developed from Journal of Irrigation and Drainage Division data to maintain 100% yield potential.
- Effective Precipitation was calculated using a 50% effectiveness coefficient for the months of December and January, and a 100% effectiveness coefficient for the remaining months.

23.1-23.5 (2016-2020) illustrates the estimated crop water needs in the District for the representative year 2020.

Table 23.1 2020 Agricutural Crop Water Needs Etc (in)

Crop	Area (acres)	ET Crop (ac-ft/ac)	Leaching Reqmnt LR (ac-ft/ac)	Effective Precip'n Pe (ac-ft/ac)	Total Crop Water Needs (AF/Ac)	Total Crop Water Needs (ac-ft)
Almonds	8,158	3.72	0.26	0.42	3.56	29,063
Citrus	3	3.42	0.24	0.42	3.25	10
Lavender	4	2.93	0.29	0.42	2.80	12
Pistachios	16,390	3.44	0.21	0.42	3.23	52,915
Totals	24,556	**86,752.87**	**5,509.27**	**10261.74**		82,000

Table 23.2 2019 Agricutural Crop Water Needs Etc (in)						
Crop	**Area (acres)**	**ET Crop (ac-ft/ac)**	**Leaching Reqmnt LR (ac-ft/ac)**	**Effective Precip'n Pe (ac-ft/ac)**	**Total Crop Water Needs (AF/Ac)**	**Total Crop Water Needs (ac-ft)**
Almonds	7,992	3.51	0.25	0.34	3.41	27,248
Citrus	3	3.22	0.23	0.34	3.10	10
Grains	2,023	1.41	0.13	0.34	1.20	2,422
Lavender	4	2.70	0.27	0.34	2.62	11
Pistachios	16,014	3.23	0.19	0.34	3.08	49,322
Safflower	2	2.09	0.25	0.34	2.00	3
Totals	26,038	**82,631.40**	**5,338.63**	**8954.46**		79,013

Table 23.3 2018 Agricutural Crop Water Needs Etc (in)						
Crop	**Area (acres)**	**ET Crop (ac-ft/ac)**	**Leaching Reqmnt LR (ac-ft/ac)**	**Effective Precip'n Pe (ac-ft/ac)**	**Total Crop Water Needs (AF/Ac)**	**Total Crop Water Needs (ac-ft)**
Almonds	7,992	3.77	0.26	0.23	3.81	30,449
Citrus	0	0.00	0.00	0.23	0.00	-
Grains	2,350	1.34	0.13	0.23	1.24	2,925
Grapes	83	2.85	0.26	0.23	2.88	239
Pistachios	15,663	3.44	0.21	0.23	3.42	53,564
Safflower	2	2.25	0.27	0.23	2.29	3
Totals	26,090	**87,427.02**	**5,665.20**	**5911.88**		87,177

Table 23.4 2017 Agricutural Crop Water Needs Etc (in)						
Crop	**Area (acres)**	**ET Crop (ac-ft/ac)**	**Leaching Reqmnt LR (ac-ft/ac)**	**Effective Precip'n Pe (ac-ft/ac)**	**Total Crop Water Needs (AF/Ac)**	**Total Crop Water Needs (ac-ft)**
Almonds	7,992	3.86	0.27	0.24	3.88	31,024
Citrus	0	0.00	0.00	0.24	0.00	-
Grains	2,350	1.27	0.12	0.24	1.15	2,695
Grapes	83	2.85	0.26	0.24	2.87	238
Pistachios	15,663	3.58	0.21	0.24	3.55	55,621
Safflower	2	2.35	0.28	0.24	2.38	4
Totals	26,090	**90,112.60**	**5,826.94**	**6358.01**		89,578

Table 23.5 2016 Agricutural Crop Water Needs Etc (in)						
Crop	**Area (acres)**	**ET Crop (ac-ft/ac)**	**Leaching Reqmnt LR (ac-ft/ac)**	**Effective Precip'n Pe (ac-ft/ac)**	**Total Crop Water Needs (AF/Ac)**	**Total Crop Water Needs (ac-ft)**
Almonds	7,992	4.00	0.28	0.21	4.07	32,531
Citrus	0	0.00	0.00	0.21	0.00	-
Grains	2,350	1.42	0.13	0.21	1.34	3,159
Grapes	83	2.85	0.26	0.21	2.90	241
Pistachios	15,663	3.70	0.22	0.21	3.71	58,149
Safflower	2	2.47	0.30	0.21	2.56	4
Totals	26,090	**93,495.46**	**6,053.71**	**5465.75**		94,080

The District's service area encompasses 55,440 acres. As shown on Table 24, surface water was delivered to approximately 24,556 acres Table 25. A majority of non-irrigated land (approximately 30,884 acres) could be attributed to landowners opting not to plant certain row-crops given low prices for crops versus cost to farm, limited water availability in 2020, and dry land farming. Other non-irrigated land (approximately 6,000 acres) in the service area is within non-farmable land (oilfields, mountain slopes). Note: Total irrigated acreage for 2016-2018 is unknown, so we've assumed it was constant for those years for water budget calculations.

Table 24. Irrigated Acres					
Represented Year/District	**2020**	**2019**	**2018**	**2017**	**2016**
Total Irrigated Acres	24,556	18,043	18,098	18,098	18,098

Table 25. Multiple Crop Information					
Cropping System	**2020**	**2019**	**2018**	**2017**	**2016**
Single-Cropped Acres	24,556	18043	18098	18098	18098
Inter-cropping	0	0	0	0	0
Double Cropping	0	0	0	0	0

B. Environmental Water Use

BMWD does not provide water to any environmental uses.

C. Recreational Water Use

BMWD does not provide any water to recreational uses.

D. Municipal and Industrial Use

A small portion of the District's water supply is delivered to agricultural processors (Table 26) and is termed "industrial water".

Table 26. Municipal/Industrial Water Uses (AF)

Municipal/ Industrial Entity	2016	2017	2018	2019	2020 BMWD
Municipal Entity	0	0	0	0	0
None	0	0	0	0	0
Subtotal					
Industrial Entity					
Oil Producers	0	0	0	0	0
Ag Processing	2149	1843	2862	1920	2879
Subtotal	2149	1843	2862	1920	2879
Total	2149	1843	2862	1920	2879

E. Groundwater Recharge Use

No groundwater recharge resources within the District are supported by the District's water supplies. However, the District participates in the Pioneer and the Berrenda Mesa banking projects. In addition one landowner participates in the Kern Water Bank Authority (all outside of the District on the Kern River alluvial fan).

Table 27. Groundwater Recharge Water Uses (AF)

Groundwater Basin	Method of Recharge	2016	2017	2018	2019	2020
None	Recharge basins	0	0	0	0	0
Voluntary/Opportunistic						
Other (non-District projects)	Recharge basins	0	0	0	0	0
Pioneer	Recharge basins	0	0	0	0	0
Berrenda Mesa	Recharge basins	0	0	0	0	0
Total		**0**	**0**	**0**	**0**	**0**
Notes:						
Amounts shown correlate to 2020 recovery. Recharge occurs opportunistically. A 10% factor is applied to recharge account for banking losses.						

F. Transfer and Exchange Use

The District relies on transfers and exchanges to supplement its annual water supply. In recent years, common landowner transfers into the District account for most of the activity in this section.

G. Other Water Use

There are no other water uses in the District.

Section IV: Description of Quantity and Quality of the Water Resources of the Agricultural Water Supplier

A. Water Supply Quantity

1. Surface Water Supply

Under its enabling legislation, KCWA was granted the primary power to acquire and contract water supplies, control storm water, reclaim water, reclaim land, and protect groundwater quality in Kern County. The Agency is a State Water Contractor and obtains water from the SWP for delivery to its 13 member agencies (a.k.a., Member Units). BMWD is a Member Unit of the KCWA. SWP deliveries for KCWA were initiated in 1968 with a "build up" schedule that allowed for increasing amounts of "firm water" each year, and decreasing amounts of "surplus water" until the maximum "firm water" Table A amount was achieved in 1990. BMWD's original 1967 Table A water supply contract with KCWA provided for an annual contract of 105,100 Acre-Feet (AF) of water. In 1970, BMWD purchased an additional perpetual annual Table A water supply contract of 50,000 AF raising the annual Table A water supply contract to 155,100 AF. Since then, BMWD has transferred a total of 62,500 AF of Table A contract water to other agencies. BMWD chose to transfer a portion of their Table A contract to reduce their SWP costs for a SWP contract supply that exceeded demand in BMWD. BMWD's annual Table A contract water presently stands at 92,600 AF of which only 18,520 was delivered in 2020 (water supply). The current water demands are approximately 99,885 AF per year.

BMWD also has the ability to purchase water through various State and locally operated pools several of which serve as important supplies for groundwater recharge. The availability of these supplies, however, has become scarcer over time.

Table 28. Surface Water Supplies (AF)						
Source	**Diversion Restriction**	**2016**	**2017**	**2018**	**2019**	**2020**
Pre-1914 water rights	NA	0	0	0	0	0
CVP class I water contract	NA	0	0	0	0	0
SWP water contract	ESA & Delta BIOps	55,560	78,710	32,410	69,450	18,520
Other Surface Water	ESA & Delta BIOps	-10,173*	60,595	52,090	6,437	26,673
Banked water recovery	NA	24,722	-73198**	13846	1,763	15,797
Upslope drain water	NA	0	0	0	0	0
Carryover		19797	32126	-5,932	14,459	31,647
Other		0	0	0	0	0
Total		**89906**	**98233**	**92414**	**92109**	**92637**
Notes:						
ESA = Endangered Species Act						
NA = Not Applicable						
BiOps = Smelt and Salmon Biological Opinions						
*Other Surface water is Imported Surface Waters – Future Year Carroyver, and may be negative in some instances						
**A Negative number indicates a recharge year						

Table 29. Restrictions on Water Sources			
Source	**Restrictions***	**Name of Agency Imposing Restrictions**	**Operational Constraints**
SWP	Delta Diversions	NMFS and SWRCB	ESA and Water Quality
Notes: *ESA = Endangered Species Act protection measures *NMFS = National Marine Fisheries Service *SWRCB = Sate Water Resources Control Board *Water Quality = restrictions relate to maintenance of Delta salinity standards.			

2. Groundwater Supply

A few private groundwater wells have historically supplied limited amounts of water for blending with SWP water, usually during shortage years. The District does participate in the Berrenda Mesa and Pioneer groundwater banking projects to supplement dry-year water supplies. Annually, the maximum amount BMWD can recover from both banking projects varies depending on demand downstream in the California Aqueduct. In very

dry years, it can be as low as 35,000-40,000 AF. Currently, they have banked a total of 113,458 AF in these projects. Both banking projects are operated and maintained by KCWA.

Individual landowners participate in other groundwater banking projects which allows them to deliver a significant amount of banked groundwater for and on their behalf.

Deep percolation amounts are unknown in BMWD. Estimates of District wide deep percolation from water balance calculations included later show negative deep percolation (obviously in error due either to widespread deficit irrigation and/or inaccurate crop coefficient factors). Deep percolation estimates from USDA soil moisture monitoring demonstration projects in the District show very low percent of applied water.

3. Sustainable Groundwater Management Act (SGMA)

Berrenda Mesa Water District is located within the Kern Subbasin. Berrenda Mesa's SGMA compliance is handled through the Westside District Water Authority (WDWA), which is a member of the Kern Groundwater Authority (KGA), a Groundwater Sustainability Agency in the Kern Subbasin. An initial plan was submitted in early 2020, and the WDWA has been employing the management actions since then. The Management Area Plan (MAP) outlined three management actions to be completed over the course of SGMA implementation. All the management actions identified in the WDWA chapter GSP continue to progress. The three current management actions as stated in the WDWA chapter GSP are:

- Collection and analysis of representative hydrogeologic data to remedy a documented lack of groundwater data in the Westside.
- Water resource coordination – due to poor groundwater quality, Westside landowners rely primarily on surface water. As such to further reduce groundwater use and increase drought resiliency, WDWA Districts and their landowners will continue to work cooperatively in pursuing supplemental surface water opportunities, including trades and purchases both between themselves and with parties outside of the WDWA.
- Conjunctive reuse of brackish water as a new source of water supply is in the feasibility study and economic assessment phase. Sources of brackish water under study for treatment and beneficial reuse include groundwater with TDS above 2,000 mg/L and oilfield produced water.

For more information on Berrenda Mesa Water District's compliance with SGMA, please see the Kern Groundwater Authority Groundwater Sustainability Plan, and reference the WDWA Management Area Plan.

4. Delta Plan Consistency

To provide "the expected outcome for measurable reduction in Delta reliance", baseline historic Delta supplies delivered to DRWD were compared to supplies delivered over the past decade. Additionally, Delta supply reduction projections were made for comparison and future planning. For the purposes of comparison, the historic baseline period selected begins in 1996 and ends in 2010 because it is consistent with the typical historic water budget reporting period included in the recently completed Groundwater Sustainability Plans. This period provides a reasonable time frame for assessing average current conditions and to demonstrate consistency with reduced Delta reliance after enactment of the Delta Reform Act (2009). The table below shows projected water supplies from the Delta. The California Water Commission CALSIM 2030 and 2070 climate change scenarios were used to project future water supplies under 2030 and 2070 climate change scenarios. The table and figure below demonstrate reduced Delta reliance. Over the 2015 AWMP period, a 30% reduction in Delta water supplies was observed when compared to the baseline condition discussed above. Over the past decade (combined 2015 and 2020 AWMP period), a 22% reduction was observed. Due to increasing environmental commitments and restrictions on Delta Flows, landowners in the District will continue to experience reductions in Delta supply, likely exceeding the 2030 and 2070 projections.

Table 30. Comparison of Historic Average Annual Delta Supplies vs. Projected Average Annual Delta Supplies

Value	Baseline Delta Supplies (1995-2010)	2015 Conditions Delta Supplies	2020 Conditions Delta Supplies	2030 Climate Conditions Delta Supplies	2070 Climate Conditions Delta Supplies
Average Annual Supplies	94,000	66,000	73,000	72,000	67,000
Percent of Baseline Supply	n/a	70%	78%	77%	71%
Percent Reduction in Supplies		30%	22%	23%	29%

Figure 2. Historic, 2015 & 2020 AWMP and Projected Delta Supplies

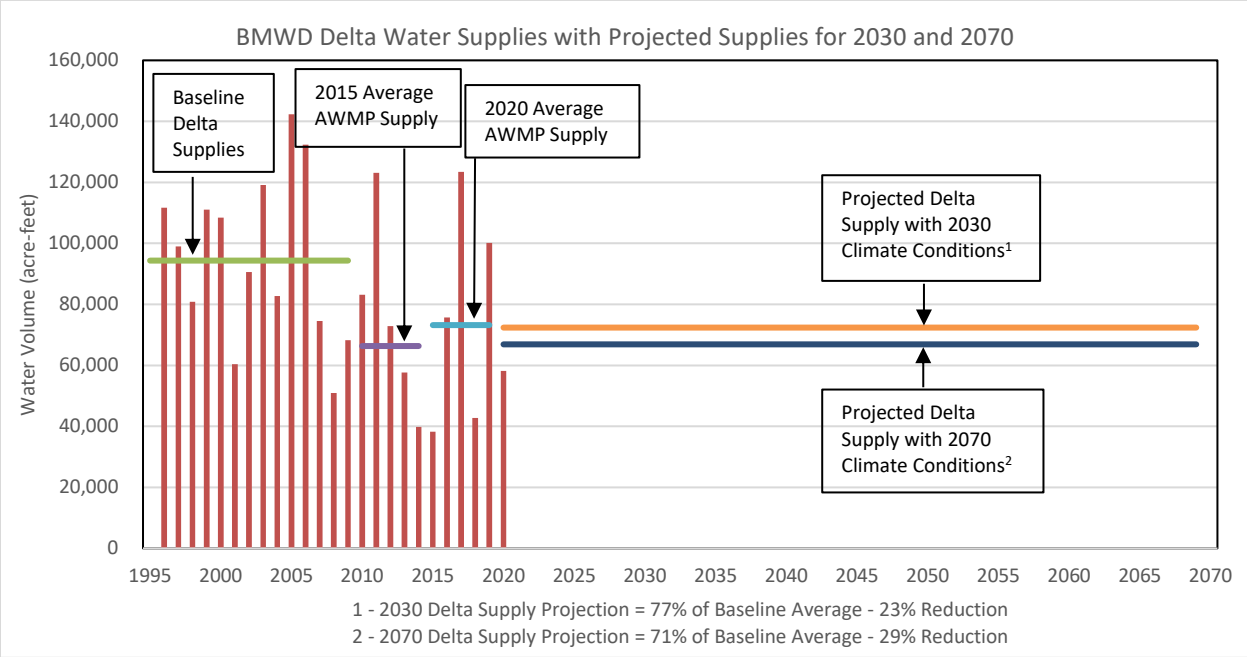

Table 31. Groundwater Basins			
Basin Name	**Size (Sq. Mi.)**	**Usable Capacity (AF)**	**Safe Yield (AF/Yr)**
BMWD portion of Kern sub-basin of Tulare Lake basin	87	Unknown and limited	Unknown and limited
Note: Area of main Tulare Lake Hydrologic Region: 5,149,000 acres = 8,045 sq. mi. Area of Kern County sub-basin: 1,950,000 acres = 3,047 sq. mi. (37.9% of Tulare Lake Hydrologic Region) Area of BMWD: 55,440 acres = 87 sq. mi. (2.8% of Kern County Sub-basin)			

Table 32. Groundwater Management Plan	
Written By	None in BMWD
Year	Not Applicable
Is Appendix Attached?	No

Table 33. Groundwater Supplies (AF)						
Groundwater Basin	**Diversion Restriction**	**2016**	**2017**	**2018**	**2019**	**2020**
Water Supplier Direct Pumping	None	N/A	N/A	N/A	N/A	0
Private Pumping	None	N/A	N/A	N/A	N/A	674
Transfers / Exchanges	None	N/A	N/A	N/A	N/A	0
TOTAL						**674**

5. Other Water Supplies

BMWD has no other water supplies besides those described before.

6. Drainage from the Water Supplier's Service Area

The land serviced by BMWD does not have a subsurface drainage water problem. There are no on-farm subsurface tile drains (Table 34).

On-farm tail water (surface) drainage within the District's service is also minimal due to the use of pressurized irrigation systems (Table 34). In the cases where on-farm tailwater is generated, the water users typically contain it within the property, as stated in the District's Operating Rules and Regulations.

Table 34. Drainage Discharge (AF)						
Surface/ Subsurface Drainage Path	**2020**	**2019**	**2018**	**2017**	**2016**	**Inside/ Outside Service Area**
Subsurface drainage into evaporation pond	0	0	0	0	0	Inside

B. Water Supply Quality

1. Surface Water Supply

There have been no water quality problems that limit the use of the SWP water within the District. The District does not monitor the surface water quality since all of the water delivered by the District is from the SWP and other agencies are already analyzing this water. The DWR has an on-going monitoring program where the quality of the SWP water is monitored on a monthly basis. The water is sampled at several locations along the Aqueduct and analyzed for electrical conductivity, standard minerals, selected trace elements and chemical residue. Table 3-3 presents historical water quality data for the months of January and June for the years 2010 through 2020. The water quality data shown in Table 35 was collected by DWR at Check 21 in the Aqueduct near Kettleman City, just upstream of the District.

Table 35. Surface Water Supply Quality

Station Name/NR	KETTLEMAN CK-21 (KA017226)													
		Sample Date												
Parameter	Units	1/12/2010	6/15/2010	1/18/2011	6/14/2011	1/17/2012	6/19/2012	1/15/2013	6/18/2013	1/14/2014	6/17/2014	1/20/2015	6/16/2015	1/14/2020	6/16/2020
Alkalinity as CaCO3	mg/L	78	76	47	40	77	73	72	72	89	93	95	92	71	76
Aluminum	mg/L	N/A	N/A	N/A	0.173,0.175**	0.077	0.092	0.124	0.048	r	r	0.015	r	0.0441	0.063
Dissolved Ammonia	mg/L	0.04	0.01	0.05	<0.01	0.02	0.01	0.05	r	0.002	0.02	0.08	0.04	<0.05	<0.05
Dissolved Arsenic	mg/L	0.002	0.002	0.001	0.001	0.002	0.002	0.001	0.002	0.001	0.003	0.004	0.002	<0.001	0.002
Arsenic	mg/L	N/A	N/A	N/A	0.001	0.002	0.002	0.002	0.002	0.002	0.003	0.004	0.003	0.0023	0.002
Barium	mg/L	N/A	N/A	N/A	<0.05	0.039	0.033	0.033	0.037	0.031	0.026	0.045	0.039	0.037	0.032
Dissolved Beryllium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	r	r	r	r	r	r	<0.001	<0.001
Beryllium	mg/L	N/A	N/A	N/A	<0.001	<0.001	<0.001	r	r	r	r	r	r	<0.001	<0.001
Dissolved Boron	mg/L	0.2	0.2	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.1	0.151
Dissolved Bromide	mg/L	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.18	0.193
Dissolved Cadmium	mg/L	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<0.001	<0.001
Cadmium	mg/L	N/A	N/A	N/A	<0.001	<0.001	<0.001	r	r	r	r	r	r	<0.001	<0.001
Dissolved Calcium	mg/L	22	21	15	12	22	20	22	22	25	25	26	25	18	19
Dissolved Chloride	mg/L	75	70	28	24	109	62	74	76	107	110	116	109	59.5	68
Dissolved Chromium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	r	r	r	r	r	r	<0.001	<0.001
Chromium	mg/L	N/A	N/A	N/A	0.001	0.003	0.001	r	r	r	r	r	r	<0.001	<0.001
Conductance (EC) µS/cm	µS/cm	496	449	259	223	630	426	474	469	624	648	671	645	415	450
Dissolved Copper	mg/L	0.002	0.002	0.008	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.001	0.001	<0.001	0.001
Copper	mg/L	N/A	N/A	N/A	0.002	0.002	0.001	0.002	0.002	0.001	0.002	0.002	0.002	0.003	<0.001
Dissolved Hardness as CaCO3	mg/L	112	105	68	53	114	98	113	111	132	135	137	136	93	95
Dissolved Iron	mg/L	<0.005	<0.005	0.017	0.016	0.019	<0.005	0.034	r	0.005	r	r	r	<0.005	0.0132
Iron	mg/L	N/A	N/A	N/A	0.389,0.395**	0.131	0.12	0.14	0.08	0.017	0.017	0.017	0.023	0.099	0.076
Kjeldahl Nitrogen as N	mg/L	0.4	0.4	0.6	0.4	0.4	0.3	0.5	0.5	0.4	0.5	0.5	0.5	0.4	0.3
Dissolved Lead	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	r	r	r	r	r	r	<0.001	<0.001
Lead	mg/L	N/A	N/A	N/A	<0.001	<0.001	<0.001	r	r	r	r	r	r	<0.001	<0.001
Dissolved Lithium	mg/L	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dissolved Magnesium	mg/L	14	13	8	6	15	12	14	14	17	18	18	18	11	11.6
Dissolved Manganese	mg/L	<0.005	<0.005	0.006	<0.005	<0.005	<0.005	r	0.005	r	0.005	0.01	r	<0.005	<0.005
Manganese	mg/L	N/A	N/A	N/A	0.049,0.05**	0.014	0.021	0.007	0.015	0.008	0.015	0.023	0.017	0.013	0.018
Dissolved Mercury	mg/L	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<0.0002	<0.0002
Dissolved Molybdenum	mg/L	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dissolved Nickel	mg/L	0.001	0.001	0.002	<0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.001	<0.001	0.002
Nickel	mg/L	N/A	N/A	N/A	0.002	0.001	0.001	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Dissolved Nitrate	mg/L	3.7	2.5	2.9	2.4	3.8	1.8	4.6	1.6	2.4	0.4	0.2	2	4.6	0.7
Dissolved Nitrate + Nitrite as N	mg/L	0.69	0.54	0.65	0.41	0.87	0.4	1	0.32	0.57	0.09	r	0.49	1.06	0.156
Dissolved Ortho-phosphate as P	mg/L	0.05	0.08	0.08	0.05	0.06	0.06	0.07	0.05	0.05	0.05	0.08	0.08	0.085	0.054
Dissolved Organic Carbon	mg/L	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3.5	3.3
Total Organic Carbon	mg/L	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3.7	3.2
Phosphorus	mg/L	0.09	0.1	0.12	0.11	0.08	0.08	0.09	0.08	0.07	0.08	0.09	0.1	0.08	0.07
Dissolved Selenium	mg/L	0.001	0.001	0.001	<0.001	<0.001	0.001	r	r	0.001	0.001	0.001	0.001	<0.001	0.001
Selenium	mg/L	N/A	N/A	N/A	<0.001	<0.001	0.001	0.001	0.001	0.002	0.001	0.001	0.001	<0.001	0.001
Silver	mg/L	N/A	N/A	N/A	<0.001	<0.001	<0.001	r	r	r	r	r	r	<0.001	<0.001
Dissolved Sodium	mg/L	52	50	24	21	68	46	56	54	76	80	79	71	45	48
Total Dissolved Solids	mg/L	275	274	151	124	347	236	270	261	345	367	370	357	230	249
Total Suspended Solids	mg/L	2	11	7	20	2	11	1	3	1	1	r	1	1	2.3
Volatile Suspended Solids	mg/L	1	<1	1	2	<1	3	r	1	1	r	r	r	<1	<1
Dissolved Strontium	mg/L	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dissolved Sulfate	mg/L	42	43	26	25	45	35	44	40	52	52	47	52	31	36
Dissolved Zinc	mg/L	<0.005	<0.005	0.005	<0.005	<0.005	<0.005	r`	r	r	r	r	r	<0.005	<0.005
Zinc	mg/L	N/A	N/A	N/A	<0.005	<0.005	<0.005	0.005	r	r	r	r	0.007	<0.005	<0.005
pH		8	8.2	7.6	7.7	7.8	8.1	7.6	7.8	8.6	8.7	8	8.2	7.7	8.6999

http://www.water.ca.gov/waterdatalibrary/waterquality/station_county/select_station.cfm?URLStation=KA017226&source=map
mg/L = milligrams per liter
µS/cm = microSiemens per centimeter

The SWP water quality is generally very good for irrigation purposes, although even good quality water contains some salt. The evapotranspiration (ET) process returns water to the atmosphere but leaves the salts behind in the soil. To avoid damaging buildup of salt in the crop root zone, water in excess of the crops' ET is required. The amount of excess water needed, known as the leaching requirement, varies with the crop, soil, climate and quality of the applied water and is used as an indicator of the minimum amount of water needed to flush salts from the root zone.

2. Groundwater Supply

Groundwater aquifers in the BMWD area are considered to be unconfined or semi-confined. Shallow groundwater is naturally recharged by infiltration from runoff in intermittent stream channels and natural depressions which has a significant impact on quality. However, this is a minor, local effect that does not affect the deeper aquifer in the Tulare/alluvium formation as significantly as recharge from the adjacent Temblor Range which is comprised of mainly of tilted and folded marine sediments. Groundwater quality in the deeper aquifer (Tulare Formation) beneath the District is by nature of poorer quality, because of its recharge source (Temblor Range). Because of its limited lateral and vertical extent, poor quality and relatively low permeability, neither the shallow nor deeper aquifers provide an adequate groundwater supply to irrigate lands extensively in the District.

Groundwater quality has not been monitored on a consistent basis in BMWD because historically this water has not been considered a reliable water supply. The limited data and historical use indicate that the groundwater is saline. Total dissolved solids (TDS) concentrations have ranged from 500 to over 6,000 mg/L. The groundwater quality of most wells in the District is not generally considered suitable for most agricultural applications unless it is blended with better quality water. By comparison, TDS concentrations in SWP water provided to BMWD generally ranges from 150 to 500 mg/L. In portions of BMWD, the groundwater also contains high boron and sulfate concentrations, which further reduces its suitability for agricultural purposes. Until recently, use of groundwater as a supplemental water supply was thought to be uneconomical. However, because recent reliability studies from DWR indicate reliable supplies on the SWP around 20% of Table A amounts, and given the tolerance of some crops, namely pistachios and some cotton varieties, to higher concentrations of salts, two landowners have blended a limited amount of groundwater with surface water to supplement their supplies. However, the viability of these sources as long-term supplies is still in question, as the quality has been declining.

BMWD does participate in groundwater banking projects outside of the District boundaries just southwest of the City of Bakersfield. Appendix 4 shows the location of the banking facilities location with respect to the District boundary. The Pioneer Project and Berrenda Mesa Project are discussed in the groundwater recharge section.

3. Other Water Supplies

BMWD relies on surface water and very limited groundwater supplies. There are no other water supplies used in BMWD.

4. Drainage from the Water Supplier's Service Area

BMWD has no drainage water and therefore there is no drainage reuse.

C. Water Quality Monitoring Practices

1. Source Water

BMWD's main water supply is the SWP. DWR maintains records of all water diversions, water quality, and storage operations related to the SWP. Operational reports are distributed weekly and monthly to the District and published annually in Bulletin 132. DWR maintains water quality standards for its downstream urban users (Metropolitan Water District of Southern California and Central Coast Water Authority). BMWD is located at the terminus of the Coastal Aqueduct and thus there are no potential downstream agencies. TDS concentrations in the SWP water provided to BMWD generally ranges from 150 to 500 mg/L, suitable for agricultural use.

DWR maintains an automated sampling station at Check 21 (just upstream from the District turnouts) that records electrical conductivity, water temperature, and turbidity on a daily basis. In addition, grab samples are taken on monthly intervals.

Table 36 summarizes sampled constituents and sampling frequency.

Table 36. Water Quality Monitoring Practices

Water Source	Monitoring Location	Measurement/ Monitoring Method or Practice	Frequency
Surface water	DWR California Aqueduct (Kettleman City) Check 21 Station KA017226	See DWR standards	DWR standards
Groundwater	Various	As required by ILRP	As Required by ILRP
Subsurface drainage water	Pond influent sumps and pond itself	Grab sampling of drainwater at influent sumps and evaporation pond	Quarterly

37. Water Quality Monitoring Programs for Surface/Sub-Surface Drainage

Table 37. Water Quality Monitoring Programs for Surface/Sub-Surface Drainage

Constituent	Units	Standard
Total Alkalinity as CaCO3	mg/L	Std Method 2320 B
Total Aluminum	mg/L	EPA 200.8 (T)
Dissolved Ammonia as N	mg/L	EPA 350.1
Dissolved Arsenic	mg/L	EPA 200.8 (D)
Total Arsenic	mg/L	EPA 200.8 (T)
Total Barium	mg/L	EPA 200.8 (T)
Dissolved Beryllium	mg/L	EPA 200.8 (D)
Total Beryllium	mg/L	EPA 200.8 (T)
Dissolved Boron	mg/L	EPA 200.7 (D)
Total Cadmium	mg/L	EPA 200.8 (T)
Dissolved Calcium	mg/L	EPA 200.7 (D)
Dissolved Chloride	mg/L	EPA 300.0 28d Hold
Dissolved Chromium	mg/L	EPA 200.8 (D)
Total Chromium	mg/L	EPA 200.8 (T)
Conductance (EC)	µS/cm	Std Method 2510-B
Dissolved Copper	mg/L	EPA 200.8 (D)
Total Copper	mg/L	EPA 200.8 (T)
Dissolved Hardness as Ca	mg/L	Std Method 2340 B
Dissolved Iron	mg/L	EPA 200.8 (D)
Total Iron	mg/L	EPA 200.8 (T)
Total Kjeldahl Nitrogen a:	mg/L	EPA 351.2
Dissolved Lead	mg/L	EPA 200.8 (D)
Total Lead	mg/L	EPA 200.8 (T)
Dissolved Lithium	mg/L	EPA 200.8 (D)
Dissolved Magnesium	mg/L	EPA 200.7 (D)
Dissolved Manganese	mg/L	EPA 200.8 (D)
Total Manganese	mg/L	EPA 200.8 (T)
Dissolved Mercury	mg/L	EPA 200.8 (Hg Dissolved)
Dissolved Molybdenum	mg/L	EPA 200.8 (D)
Dissolved Nickel	mg/L	EPA 200.8 (D)
Total Nickel	mg/L	EPA 200.8 (T)
Dissolved Nitrate	mg/L	EPA 300.0 28d Hold
Dissolved Nitrate + Nitrit	mg/L	Method 4500-NO3-F (28Da
Dissolved Ortho-phospha	mg/L	EPA 365.1 (DWR Modified)
Total Phosphorus	mg/L	EPA 365.4
Dissolved Selenium	mg/L	EPA 200.8 (D)
Total Selenium	mg/L	EPA 200.8 (T)
Total Silver	mg/L	EPA 200.8 (T)
Dissolved Sodium	mg/L	EPA 200.7 (D)
Total Dissolved Solids	mg/L	Std Method 2540 C
Total Suspended Solids	mg/L	EPA 160.2
Volatile Suspended Solid	mg/L	EPA 160.4
Dissolved Strontium	mg/L	EPA 200.8 (D)
Dissolved Sulfate	mg/L	EPA 300.0 28d Hold
Dissolved Zinc	mg/L	EPA 200.8 (D)
Total Zinc	mg/L	EPA 200.8 (T)
pH	pH	Std Method 2320 B
Source of data:		
http://www.water.ca.gov/waterdatalibrary/waterquality/station_county/select_station.cfm?URLStation=KA017226&source=map		

Water Accounting and Water Supply Reliability

D. Quantifying the Water Supplier's Water Supplies

1. Agricultural Water Supplier Water Quantities

Table 38.1-38.5 (2016-2020) shows typical water diversions from the CA Aqueduct during the representative water year 2020.

Table 38.1 Surface and Other Water Supplies for 2020

Source	Supply	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
CVP Class 1 Contracts	0													0
Pre-1914 Rights	0													0
SWP water contract	18,520													18,520
Other Surface Water	26,673													26,673
Banked water recovery	15,797													15,797
Carryover	31,647													31,647
Recycled Water	0													0
Other	0													0
Total Supply														92,637
Monthly Deliveries		**2081**	**4695**	**3670**	**5306**	**11341**	**15862**	**18127**	**15533**	**9841**	**5693**	**141**	**347**	**92637**

Notes:
The District doesn't track monthly deliveries by individual water type. The Agency does.
Carryover balance is water from 2019

Table 38.2 Surface and Other Water Supplies for 2019

Source	Supply	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
CVP Class 1 Contracts	0													0
Pre-1914 Rights	0													0
SWP water contract	69,450													69,450
Other Surface Water	6,437													6,437
Banked water recovery	1,763													1,763
Carryover	14,459													14,459
Recycled Water	0													0
Other	0													0
Total Supply														92,109
Monthly Deliveries		**1992**	**5030**	**2071**	**6504**	**11981**	**16000**	**17768**	**15424**	**9278**	**5756**	**212**	**93**	**92109**

Table 38.3 Surface and Other Water Supplies for 2018

Source	Supply	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
CVP Class 1 Contracts	0													0
Pre-1914 Rights	0													0
SWP water contract	32,410													32,410
Other Surface Water	0													52,090
Banked water recovery	13846													13846
Carryover	-5932													-5932
Recycled Water	0													0
Other	0													0
Total Supply	40,324													92,414
Monthly Deliveries		**229**	**5922**	**2743**	**6694**	**11900**	**15837**	**17097**	**16317**	**9560**	**5741**	**220**	**154**	**92414**

Table 38.4 Surface and Other Water Supplies for 2017

Source	Supply	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
CVP Class 1 Contracts	0													0
Pre-1914 Rights	0													0
SWP water contract	78,710													78,710
Other Surface Water	61,541													60,595
Banked water recovery	-73,198													73,198
Carryover	32126													32126
Recycled Water	0													0
Other	0													0
Total Supply	99179													98233
Monthly Deliveries		**857**	**6939**	**4948**	**6840**	**12012**	**15566**	**17329**	**15142**	**10257**	**5808**	**553**	**1982**	**98233**

Table 38.5 Surface and Other Water Supplies for 2016														
Source	**Supply**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Total**
CVP Class 1 Contracts	**0**													0
Pre-1914 Rights	**0**													0
SWP water contract	55,560													55,560
Other Surface Water	14,549													14,549
Banked water recovery														
Carryover	19,797													19,797
Recycled Water	**0**													0
Other	**0**													0
Total Supply	**89,906**													89,906
Monthly Deliveries		**585**	**3611**	**5840**	**7078**	**10697**	**15290**	**17231**	**14682**	**9547**	**4867**	**453**	**25**	**89906**

Table 39 summarizes groundwater pumped by BMWD from groundwater banking projects located outside the District's boundaries during the representative year when SWP allocations were normal.

Table 39 Groundwater Supplies Summary for 2020 (AF)							
Month	**Pumped by the Water Supplier**			**Pumped within Service Area by Customers**			**TOTAL**
	Basin 1	**Basin 2**	**Basin 3**	**Basin 1**	**Basin 2**	**Basin 3**	
TOTAL	0	0	0				**674**

2. Other Water Sources Quantities

Effective precipitation is accounted for as a water source within the cropped irrigated area (Table 40).

Table 40. Effective Precipitation Summary (AF)

Month	2020		2019		2018		2017		2016	
	Gross (in)	Effective (AF)*	Gross (in)	Effective (AF)*	Gross (in)	Effective (AF)*	Gross (in)	Effective (AF)*	Gross (in)	Effective (AF)*
January	0.15	153	1.78	1338	1.83	1380	2.09	1576	2.27	1712
February	0	0	1	1504	0.19	287	1.6	2413	0.04	60
March	1.91	3908	1.45	2180	1.55	2338	0.53	799	0.77	1161
April	2.43	4973	0.21	316	0.08	121	0	0	0.81	1222
May	0.01	20	0.71	1068	0.02	30	0	0	0.02	30
June	0	0	0	0	0.02	30	0	0	0	0
July	0	0	0	0	0	0	0	0	0	0
August	0.04	82	0	0	0	0	0	0	0.23	347
September	0	0	0	0	0	0	0.75	1131	0	0
October	0	0	0	0	0	0	0.14	211	0	0
November	0.38	778	1.03	1549	1	1508	0.06	90	0.04	60
December	0.34	348	1.33	1000	0.29	219	0.18	136	1.16	875
Total	5.26	10262	7.51	8954	4.98	5912	5.35	6357	5.34	5467

Note:
*Assumes an effectiveness coefficient of 50% for the months of December and January and 100% for the remaining months. Volumes in AF result from multiplying the effective precipitation depth in a given year and the irrigated acreage.

E. Quantification of Water Uses

Table 41 shows the volume of water charged to BMWD's irrigation water customers in 2020 for delivery into the Service Area. The water charged is based on the field personnel water measurements to the customers. During 2020, the volume of water charged to the customers is within an estimated plus or minus 2% of the actual deliveries. The difference between the applied water versus the allocated water is the amount of water that was carried over for use the following year (Table 41).

Table 41. Applied Water (AF)

	2020	2019	2018	2017	2016
Applied Water (fromTable 38)	92,637	92,109	92,414	98,233	89,906

Table 42 summarizes the crop water use within the BMWD service area in 2020.

Table 42. Quantify Water Use (AF)					
Water Use	**2020**	**2019**	**2018**	**2017**	**2016**
Crop Water Use (from Table 23)					
1. Crop Evapotranspiration*	86753	82631	87427	90113	93495
2. Leaching*	5509	5339	5665	5827	6054
3. Cultural practices	0	0	0	0	0
Conveyance & Storage System					
4. Conveyance seepage	0	0	0	0	0
5. Conveyance evaporation	0	0	0	0	0
6. Conveyance operational spills	0	0	0	0	0
7. Reservoir evaporation	0	0	0	0	0
8. Reservoir seepage	0	0	0	0	0
Municipal and Industrial					
13. Municipal (from Table 26)	0	0	0	0	0
14. Industrial (from Table 26)	2149	1843	2862	1920	2879
Outside the District					
15. Transfers or Exchanges out of the service area (not included)	0	0	0	0	0
Conjunctive Use					
16. In-District Groundwater recharge (from Table 32)*	0	0	0	0	0
Other (from Table 33)	0	0	0	0	0
Subtotal	**94,411**	**89,813**	**95,954**	**97,860**	**102,428**
Note:					
* Recharge outside District boundary is not accounted here.					

There is no water leaving the District (Table 43) and irrecoverable water losses (Table 44).

Table 43. Quantify Water Leaving the District (AF)					
	2020	**2019**	**2018**	**2017**	**2016**
1. Surface drain water leaving the service area	0	0	0	0	0
2. Subsurface drain water leaving the service area	0	0	0	0	0
Subtotal	0	0	0	0	0

Table 44. Irrecoverable Water Losses (Optional) (AF)					
	2020	**2019**	**2018**	**2017**	**2016**
Flows to saline sink	0	0	0	0	0
Flows to perched water table	0	0	0	0	0
Subtotal	0	0	0	0	0

F. Overall Water Budget

Table 45 and Table 46, respectively indicate the representative year water supplies and water budget for the District.

Table 45. Quantify Water Supplies (AF)					
Water Supplies	2020	2019	2018	2017	2016
1. Surface Water (summary total from Table 38)	92,637	92,109	92,414	98,239	89,906
2. Groundwater (summary total from Table 39)	674	0	0	0	0
3. Annual Effective Precipitation (summary total from Table 41)	10,262	8954	5912	6357	5467
4. Water purchases	0	0	0	0	0
Subtotal	**103,573**	**101,063**	**98,326**	**104,596**	**95,373**

Table 46. Budget Summary (AF)					
Water Accounting	**2020**	**2019**	**2018**	**2017**	**2016**
1. Subtotal of Water Supplies (Table 45)	103,573	101,063	98,326	104,596	95,373
2. Subtotal of Water Uses (Table 42)	94,411	89,813	95,954	97,860	102,428
3. Drain Water Leaving Service Area (Table 43)	-	-	-	-	-
Excess Deep Percolation*	9,162	11,250	2,372	6,736	(7,055)
(Deficit Irrigation)					
Note:					
*Calculated from lines 2 and 3 subtracted from line 1					

The District as a whole appears to be very efficient with its water supply. Data from Table 46 for year 2020 suggests a Total Water Use Efficiency (TWUE) for the District of approximately 96% under the assumptions used in the calculations (see Table 46 for details). Excess deep percolation and TWUE values vary accordingly with the year type. Crop water use estimates may appear high. These results are due to uncertainties in the crop coefficient (might be high) values to estimate crop evapotranspiration and the salt tolerance threshold values to estimate the leaching requirement. These results though suggest that growers are very efficient with their limited, unreliable, and expensive water supply. These results also collaborate mobile lab results which indicate distribution uniformities (DU) for District Water Users ranged between 91% and 97% from 2006 to 2020.

In addition, it is probable that the growers are deficit irrigating in response to multiple years of insufficient water supplies. In 2012, the Table A allotment of 50% yielded a corresponding 96% TWUE. At Table A allotments of 35% in 2013 and 5% in 2014, growers would have been forced to abandon (some 3,000 acres have been taken out of production since 2010) or to under-irrigate their remaining crop.

G. Water Supply Reliability

BMWD's utilizes water from groundwater banking projects to supplement SWP supplies, primarily in years of SWP delivery deficiencies. Annually, the maximum amount BMWD can extract from both banking projects is 30,000-40,000 AF, although this varies when downstream demand is limited. Currently, they have banked a total of 113,458 AF in these projects. Additional surface storage would be one means to improve water reliability.

Another source of reliable water for certain landowners is through access to other groundwater banking projects located outside the District's boundaries.

The water supply reliability for the District is parallel to that of the SWP and is best described by DWR in the following excerpts from "The State Water Project Final Delivery Reliability Report 2011", dated June 2012.

"The 2011 Report shows that the SWP continues to be subject to reductions in deliveries similar to those contained in the State Water Project Delivery Reliability Report 2009 (2009 Report), caused by the operational restrictions of biological opinions (BOs) issued in December 2008 and June 2009 by the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) to govern SWP and Central Valley Project operations. Federal court decisions have remanded the BOs to USFWS and NMFS for further review and analysis. We expect that the current BOs will be replaced sometime in the future. The operational rules defined in the 2008 and 2009 BOs, however, continue to be legally required and are the rules used for the analyses supporting the 2011 Report."

Regulatory Restrictions on SWP Delta Exports

"*Multiple needs converge in the Delta: the need to protect a fragile ecosystem, to support Delta recreation and farming, and to provide water for agricultural and urban needs throughout much of California. Various regulatory requirements are placed on the SWP's Delta operations to protect special-status species such as delta smelt and spring- and winter-run Chinook salmon. As a result, as described below, restrictions on SWP operations imposed by State and federal agencies contribute substantially to the challenge of accurately determining the SWP's water delivery reliability in any given year."*

Biological Opinions on Effects of Coordinated SWP and CVP Operations

"*Several fish species listed under the federal Endangered Species Act (ESA) as endangered or threatened are found in the Delta. The continued viability of populations of these species in the Delta depends in part on Delta flow levels. For this reason, the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) have issued several BOs since the 1990s on the effects of coordinated SWP/CVP operations on several species.*

These BOs affect the SWP's water delivery reliability for two reasons. Most obviously, they include terms that specifically restrict SWP pumping levels in the Delta at certain times under certain conditions. In addition, the BOs' requirements are based on physical and biological phenomena that occur daily while DWR's water supply models are based on monthly data.

The first BOs on the effects of SWP (and CVP) operations were issued in February 1993 (NMFS BO on effects of project operations on winter-run Chinook salmon) and March 1995 (USFWS BO on project effects on delta smelt and splittail). Among other things, the BOs contained requirements for Delta inflow, Delta outflow, and reduced export pumping to meet specified incidental take limits. These fish protection requirements imposed substantial constraints on Delta water supply operations. Many were incorporated into the 1995 Water Quality Control Plan for the San Francisco Bay/Sacramento–San Joaquin

Delta (1995 WQCP), as described in the "Water Quality Objectives" section later in this chapter.

The terms of the USFWS and NMFS BOs have become increasingly restrictive in recent years. In December 2008, USFWS issued a new BO covering effects of the SWP and CVP on delta smelt, and in June 2009, NMFS issued a BO covering effects on winter-run and spring-run Chinook salmon, steelhead, green sturgeon, and killer whales. These BOs replaced BOs issued earlier by the federal agencies.

The USFWS BO includes additional requirements in all but 2 months of the year. The BO calls for "adaptively managed" (adjusted as necessary based on the results of monitoring) flow restrictions in the Delta intended to protect delta smelt at various life stages. USFWS determines the required target flow, with the reductions accomplished primarily by reducing SWP and CVP exports. Because this flow restriction is determined based on fish location and decisions by USFWS staff, predicting the flow restriction and corresponding effects on export pumping with any great certainty poses a challenge. The USFWS BO also includes an additional salinity requirement in the Delta for September and October in wet and above-normal water years, calling for increased releases from SWP and CVP reservoirs to reduce salinity. Among other provisions included in the NMFS BO, limits on total Delta exports have been established for the months of April and May. These limits are mandated for all but extremely wet years.

The 2008 and 2009 BOs were issued shortly before and shortly after the Governor proclaimed a statewide water shortage state of emergency in February 2009, amid the threat of a third consecutive dry year. NMFS calculated that implementing its BO would reduce SWP and CVP Delta exports by a combined 5% to 7%, but DWR's initial estimates showed an impact on exports closer to 10% in average years, combined with the effects of pumping restrictions imposed by BOs to protect delta smelt and other species. The 2008 USFWS and 2009 NMFS BOs have been subject to considerable litigation. Recent decisions by U.S. District Judge Oliver Wanger changed specific operational rules for the fall/ winter of 2011–2012, and both the USFWS BO and NMFS BO have been remanded to the agencies for further review and analysis. However, the operational rules specified in the 2008 and 2009 BOs continue to be legally required and are the rules used in the analyses presented in Chapters 5, 6, and 7 of this report. Chapter 5 presents a comparison of monthly Delta exports as estimated for this 2011 Report with those estimated for the 2005 Report, illustrating how the 2008 and 2009 BOs have affected export levels from the Delta.

The California Department of Fish and Game (DFG) issued consistency determinations for both BOs under Section 2080.1 of the California Fish and Game Code. The consistency determinations stated that the USFWS BO and the NMFS BO would be consistent with the California Endangered Species Act (CESA). Thus, DFG allowed incidental take of species listed under both the federal ESA and CESA to occur during SWP and CVP operations without requiring DWR or the U.S. Bureau of Reclamation to obtain a separate State-issued permit.

Specific restrictions on Delta exports associated with the USFWS and NMFS BOs and their effects on SWP pumping levels are described further in Chapter 5, "SWP Delta Exports," of this report."

Water Quality Objectives

"*Because the Delta is an estuary, salinity is a particular concern. In the 1995 WQCP, the State Water Board set water quality objectives to protect beneficial uses of water in the Delta and Suisun Bay. The objectives must be met by the SWP (and federal CVP), as specified in the water right permits issued to DWR and the U.S. Bureau of Reclamation. Those objectives—minimum Delta outflows, limits on SWP and CVP Delta exports, and maximum allowable salinity levels— are enforced through the provisions of the State Water Board's Water Right Decision 1641 (D-1641), issued in December 1999 and updated in March 2000.*

DWR and Reclamation must monitor the effects of diversions and SWP and CVP operations to ensure compliance with existing water quality standards. Monitoring stations are shown in Figure 4-1.

Among the objectives established in the 1995 WQCP and D-1641 are the "X2" objectives. D-1641 mandates the X2 objectives so that the State Water Board can regulate the locations of the Delta estuary's salinity gradient during the months of February–June. X2 is the position in the Delta where the electrical conductivity (EC) level, or salinity, of Delta water is 2 parts per thousand. The location of X2 is used as a surrogate measure of Delta ecosystem health. For the X2 objective to be achieved, the X2 position must remain downstream of Collinsville in the Delta (shown in Figure 4-1) for the entire 5- month period, and downstream of other specific locations in the Delta on a certain number of days each month from February through June. This means that Delta outflow must be at certain specified levels at certain times—which can limit the amount of water the SWP may pump at those times at its Harvey O. Banks Pumping Plant in the Delta. Because of the relationship between seawater intrusion and interior-Delta water quality, meeting the X2 objective also improves water quality at Delta drinking-water intakes; however, meeting the X2 objectives can require a relatively large volume of water for outflow during dry months that follow months with large storms.

The 1995 WQCP and D-1641 also established an export/inflow (E/I) ratio. The E/I ratio, presented in Table 3 of the 1995 WQCP (SWRCB 1995:18– 22), is designed to provide protection for the fish and wildlife beneficial uses in the Bay-Delta estuary (SWRCB 1995:15). The E/I ratio limits the fraction of Delta inflows that are exported. When other restrictions are not controlling, Delta exports are limited to 35% of total Delta inflow from February through June and 65% of inflow from July through January."

In addition to these potential reductions, the District's ability to deliver a reliable water supply to its landowners is further impacted by capacity issues on the Coastal Branch of the Aqueduct. Not only is DWR responsible for maintaining facilities, it is also responsible for controlling aquatic weed growth. Often during peak irrigation demand (May-September) the dense growth of aquatic weeds impacts DWR's ability to convey an

adequate supply through the Coastal Branch. This forces the District to allocate capacity and reduce the amount of water available to landowners during the most critical growing period.

Climate Change

Within the five year horizon of this Plan, the District is much more concerned regarding the current reliability (or lack thereof) of the State Water Project (SWP) than it is about climate change. However, the potential effects of climate change, which DWR projects to impact both the District's local area and result in statewide changes that could affect the State Water Project and its water supplies in the longer term, are a substantial concern beyond the planning horizon of this Plan.

DWR estimates indicate that by 2050 the Sierra Nevada snowpack, which provides 65 percent of California's water supply, will be significantly reduced. Much of the precipitation is expected to fall as rain instead of snow during winter and cannot be stored in our current water system for later use. The climate is also expected to become more variable and extreme, bringing more droughts and floods. Thus the District will need to be prepared to adapt to greater variability in weather patterns.

H. Potential Climate Change Effects

Within the next 20 years, DWR expects that water supplies, water demand, sea level, and the occurrence and increased severity of floods will be affected by climate change. Some of these potential changes are presented below.

The District will need to consider the following climate change effects, many of which are already documented in California, and reviewed in the latest State Water Project Reliability Report prepared by DWR.

1. Water Demand

Predicted results of climate change, such as, shorter winters, more hot days and nights, and a longer irrigation season could potentially increase water demand in the District, and increase competition for water by others, if the affects of climate change occur.

2. Water Supply and Quality

Reduced snowpack, shifting spring runoff to earlier in the year has the potential to impact water supply and quality, if they should occur.

3. Sea Level Rise

The Delta, which is in the hub of the SWP could be at greater risk to increased salinity should sea level rise occur. Sea level could continue to rise if warming of the oceans continues. This could also affect Delta levee stability in low-lying areas.

4. Disaster

Disasters may become more frequent if climate change continues as some scientists believe.

I. Specific Points to Consider

As the District continues to address near-term periods of water deficiency from the State Water Project during the five years of this planning cycle, it will consider the following potential climate change impacts projected by DWR in its longer term plans and work with DWR and State Water Contractors in planning for:

1. Irrigation Demand

Irrigation demand may increase if temperatures rise and rainfall becomes more variable.

2. Permanent Crops

Permanent crops, which make up the majority in the District, may be adversely affected by climate change and may be more difficult to shift to alternative crops, causing reduced flexibility for adapting to changing climatic conditions.

3. Flooding Risk

Flooding risk may increase as a result of more severe rainfall patterns and warmer winter rains. This could affect water supply and conveyance of State and local water distribution facilities.

4. Snowpack

Snowpack may significantly diminish if the climate warms. Diminished snowfall in the mountains and earlier runoff may result in reduced SWP water supply and other sources derived from Sierra Nevada Snowpack.

5. The Sacramento-San Joaquin River Delta

The Sacramento-San Joaquin River Delta could be vulnerable to impacts of climate change, if it occurs. One impact could be sea level rise. Higher sea levels could make it more difficult to export water from the Delta with the existing infrastructure and may result in reduced water deliveries over time.

Section V: Water Use Efficiency Information

A. EWMP Implementation and Reporting

1. Critical EWMPs

(1) Water Measurement (Measure the volume of water delivered to customers with sufficient accuracy to comply with subdivision (a) of Section 531.10 and to implement paragraph (2).)

All of the turnout deliveries within the District are fully metered with propeller flowmeters which register both instantaneous and totalized flows. Meters are repaired and/or replaced as necessary. The District staff is capable of repairing these meters when required.

The District maintains daily delivery records for each turnout being used and maintains records of daily water orders from the SWP. A grower's water use to date and remaining allocation is maintained by the District's comprehensive database system (Latis) that the District has used for nearly ten years.. The system helps manage water orders, water use, water supply, water contract information, and water delivery system information.

Staff measures all flow meters located at turnouts along distribution laterals from the canals. The operations superintendent generates a monthly Water Transaction Report from Latis for Water Users to view. This report shows deliveries and any other water related activity (i.e., transfers, exchanges, recharge, etc.) for water users to view. See Appendix 10 for an example of the monthly Water Transaction Report.

The District's obligation to measure water deliveries ends at the meter. The Latis system is proving to be very effective in assisting staff and management to manage and analyze a variety of water related data with the ultimate goal of efficiently managing District water supplies.

BMWD is confident its existing water measurement devices meet the ±12% accuracy standard, and replacement meters meet the ±5% accuracy standard.

This EWMP is being implemented at a satisfactory level.

(2) Volume-Based Pricing (Adopt a pricing structure for water customers based at least in part on quantity delivered.)

BMWD currently implements this EWMP, and will continue to implement it as follows:

Volumetric Rate Structure

BMWD's contracts with their landowners establish a fixed unit pricing (Volumetric Rate Structure - $/AF) payment structure for SWP water supplies. SWP fixed costs are charged on a contract basis (i.e. assuming that full contract amount is available in any year), while variable costs are based on volumetric ($/AF) deliveries. This methodology mirrors the

payment structure which KCWA uses to charge its Member Units and which DWR uses to charge its contractors. Full costs (unsubsidized) are recovered for SWP water supplies. . In addition any supplemental water acquired by the District to meet landowner needs is charged on a per acre-foot basis (volumetric).

The District has implemented volume-based pricing and plans to continue that practice.

2. Conditional EWMPs

(1) Alternate Land Use (Facilitation of alternative land use for lands with exceptionally high water duties or whose irrigation contributes to significant problems, including problem drainage.)

BMWD will consider requests for alternative land uses. Marginal land that was uneconomical to farm (high water cost) was permanently retired and the water entitlement from the land was transferred to other agencies. BMWD has agreed to allow the transfer of water entitlements from low producing lands to more productive lands.

The District has also participated in groundwater banking facilities that use land in a different alternative manner. Instead of growing crops, the District is banking water for future use.

Another aspect of the Monterey Agreement, which meets the criteria for this AWMP relates to the marketing of up to 130,000 AF of KCWA's SWP agricultural Table A contract water to other SWP urban contractors. To date, all of the 130,000 AF SWP Table A contract water has been permanently transferred to other SWP urban contractors.

Outside of the Monterey Agreement, other permanent transfers of SWP Table A contract water have occurred within Kern County. Generally, KCWA does not object to transfers of SWP Table A contract water among Member Units. (Kern County Water Agency Water Management Plan, October 2001)

Water Users within the District are free to transfer water amongst each other without the consent of the District. However, current BWSD policy requires that any request to transfer water for use outside of the District be submitted to the District in writing and that other Water Users in the District be offered a first-right-of-refusal to purchase said water at full-cost. Once these conditions are met, the transfer is approved.

In summary, the following types of water transfers are allowed by current BWSD policies once certain conditions are satisfied:

1) Between neighboring districts and the same owners in each district.
2) Between neighboring districts and the different owners in each district.
3) Between non-neighboring districts and the same owners in each district.
4) Between neighboring landowners within the District.

This EWMP has been implemented, and will continue to be implemented through the practices described in this section.

(2) Recycled Water Use (Facilitation of use of available recycled water that otherwise would not be used beneficially, meets health and safety criteria, and does not harm crops or soils.)

BMWD does not have access to any municipal recycled water source, but has been seeking to fund a feasibility study of reusing oil-field produced water. Current technology is too expensive for treatment (such as reverse osmosis) and waste disposal to be borne by BMWD customers. An arrangement between BMWD (Ag) and an urban agency would be required. A general plan would be for the urban agency pay to desalt brines and use oil produced water for agricultural purposes and in return BMWD would turn over SWP water to the urban agency.

As adequate funds nor urban partners are currently available, and are not expected to become available in this planning cycle, implementation of this EWMP is not planned during the term of this AWMP.

(3) On-Farm Irrigation Capital Improvements (Facilitate financing of capital improvements for on-farm irrigation systems)

BMWD is a progressive district and along with its landowners already have implemented the best available technology for conveying water to crops. The District could help farmers secure financing of new irrigation systems from a lending institution; however, most are already efficient in applying water to their fields. However as a result of high water costs and reduced SWP supplies District landowners have already invested millions of dollars installing and managing state of the art micro-irrigation systems at the highest attainable efficiency on all the permanent crop acreage in the District which accounts for 99.8% of the irrigated land in the District.

This EWMP is being implemented at a satisfactory level.

(4) Incentive Pricing Structure (Implement an incentive pricing structure that promotes one or more of the following goals: A. “More efficient water use at the farm level such that it reduces waste”; B. “Conjunctive use of groundwater”; D. “Reduction in problem drainage”.)

Water marketing and transfers already occur routinely within the District and frequently outside the District within the KCWA in accordance with adopted policies. Water marketing, transfers and exchanges offer an opportunity to achieve both the reliability of the water supply and costs at levels economically viable for District water users. Through water transfers and/or exchanges, row crop farmers may release their water entitlement in dry years to permanent crop needs.

The District facilitates transfers and exchanges in accordance with the following priorities: 1) in-District transfers, 2) transfers within KCWA, and 3) transfers outside the KCWA. The District relies on these transfers and exchanges with other water entities to provide the necessary flexibility to optimize beneficial use of the water supplies available to the District.

This EWMP has been implemented and will be continued with current practices.

(5) Infrastructure Improvements (Expand line or pipe distribution systems, construct regulatory reservoirs to increase distribution system flexibility and capacity, decrease maintenance, and reduce seepage)

BMWD's entire main canal is concrete lined. The entire District has lined canal or pipelines, and utilized regulation reservoirs. The Afterbay reservoir has been lined with a clay liner. Five of seven regulation reservoirs owned by the District are lined by virtue of sediment accumulation.

The District performed pond drop tests to determine the amount of seepage from the unlined reservoirs. The results indicated that the reservoir bottoms have sealed up because of the silts and clays deposited over time.

This EWMP has been implemented at a satisfactory level.

(6) Order/Delivery Flexibility (Increase flexibility in water ordering by, and delivered to, water customers within operational limits)

BMWD already has flexibility in water ordering and delivery. Most water orders and deliveries are based on an arranged demand system where the frequency and duration is flexible. The rate of flow is flexible to the extent that capacity of the delivery system allows. The storage capacities inherent in the Afterbay Reservoir, Coastal Aqueduct as well as the California Aqueduct allow BMWD to provide significant flexibility in water ordering and delivery.

The District's main local surface storage is a 400 AF regulation reservoir (Afterbay Reservoir). This reservoir is used for short-term regulation of the District's main pump station (Pump Station A) and generally is not available for long-term storage of surplus waters. As stated in previous sections the Afterbay Reservoir storage gives freedom to some landowners (that obey the District rules and regulations) to operate their own turnouts thus giving flexibility to the farmer.

The Afterbay Reservoir also provides the District enough capacity to curtail pumping during the peak energy period (noon to six), to minimize pumping costs and energy bills. If demands increase, BMWD is interested in additional regulation storage to expand load-shifting capability.

In 2003, the Dudley Ridge Water District (DRWD), with State grant funding and BMWD's cooperation, performed a reservoir feasibility study and found a prime location for a surface reservoir just upstream of Pump Station A, and near the terminus of the Coastal Aqueduct. BMWD had previously considered this property for potential storage given the area's topography and surveyed the site in 2001. DRWD and BMWD have discussed the project with Central Coastal Water Authority (CCWA) (given their proximity to the reservoir) and KCWA. If built, BMWD believes this reservoir (Forebay Reservoir) could bring tremendous benefits to the District, CCWA and KCWA. The Forebay Reservoir could be utilized to store available excess water such as Article 21 and carryover water, additional regulation storage (for operational variations and off-peak pumping curtailment), water quality enhancement, emergency storage, watershed runoff, and other more complex scenarios.

Currently, adequate funds (including funds from other beneficiaries of the AWMP) are not available, and cannot reasonably be expected to be made available, for implementation of the EWMP during the term of the AWMP. Proposition 50, a current State-funding source, specifically excludes funding for surface storage projects. The District is pursuing partners (urban and agricultural) to help fund the project. And, the project has been submitted to the Kern Integrated Regional Water Management Planning Group for possible future Prop 84 funding.

This EWMP has been implemented at a satisfactory level, and will continue to be implemented by continuing the practices discussed in this section.

(7) Supplier Spill and Tailwater Systems (Construct and operate supplier spill and tail-water systems)

Except in case of emergencies, BMWD does not experience operational spills from their main canal. Daily deliveries are matched with the ordered demand, utilizing the manual gate at the main canal headworks. In the worst case, such a spill may be gravity fed back into the distribution system for beneficial use.

A Net Benefit Analysis performed in the prior AWMP (Exhibit E) showed the implementation of the EWMP would not provide any significant financial benefits.

This EWMP has been implemented and will continue to be implemented with current practices.

(8) Conjunctive Use (Increase planned conjunctive use of surface water and groundwater with the supplier service area)

BMWD currently has an active conjunctive use program through groundwater banking outside the District. In dry years, the District can recover up to 43,500 AF of banked groundwater (excluding capacity in the Kern Water Bank) to supplement SWP shortages. Given the location of the District, an exchange with local agencies is required in order to divert SWP water for use into BMWD.

The District has practiced conjunctive use of water for many years. Due to the significant amount of acreage planted in permanent crops, demand within BMWD remains relatively constant from year to year. In dry years, when supplies from the SWP are low, supply deficits are augmented with banked supplies and/or through purchases and transfers.

This EWMP has been implemented at a satisfactory level, and will continue to be implemented by the practices described in this section.

(9) Automated Canal Controls (Automate canal control devices)

As the water is lifted from Pump Station A, it is discharged into the Afterbay canal, which leads into the Afterbay reservoir. Between the Afterbay reservoir and the main canal there is a canal gate that isolates the reservoir and canal. Just downstream of this gate is a canal gate that sets the flow delivered into the canal. This canal gate is manually operated to match the desired deliveries for the each day. Each revolution on the handle constitutes an appropriate flow rate. This main canal gate has been operational since its construction in 1963, and the District automated it using SCADA telemetry under the prior AWMP. This was the most important gate to automate, as it regulates flows for the entire distribution system.

All gates downstream from the canal headworks are manually operated. Each revolution on the handle constitutes an appropriate flow rate. Each gate‘s calibration is different from one another. The District has been getting quotes from automated gates companies to replace the manual gates, and evaluating benefits versus costs.

The benefits of automating the gates are very difficult to quantify. In theory, yields could increase due to a flexible supply. However, this increase is likely very small. From a manpower perspective, automated gates would eliminate the need to manually change gate openings. The current canal fluctuations during operations could result in water losses on farm due to changing flow rates, but this loss is likely small and difficult to quantify.

The benefit to cost ratio for replacing manually operated gates with automated gates has thus far been difficult to quantify. The District will continue to explore whether there are cost effective canal gate automation alternatives, and seek funding if alternatives are cost effective.

The District does not plan to implement this EWMP in this planning cycle because 1) it has previously implemented cost-effective and feasible automation, and 2) additional automation has not yet been found to be locally cost effective.

This EWMP has been previously been implemented at a satisfactory level.

(10) Customer Pump Test/Evaluation (Facilitate or promote customer pump testing and evaluation)

The District encourages the proper maintenance and operation of wells, pumps and other landowner owned equipment.

Customers do have many booster pumps on pressurized irrigation systems supplied with power by Pacific Gas and Electric (PG&E). PG&E provides subsidized pump tests to any customer requesting it through a program administered by Fresno State University (Center for Irrigation Technology).

The District will implement this EWMP by further publicizing PG&E's program by providing a link on the District's website to PG&E's website regarding the program.

(11) Water Conservation Coordinator (Designate a water conservation coordinator)

BMWD has designated the General Manager as water conservation coordinator for the purposes of the Memorandum of Understanding for Agricultural Water Suppliers, and this AWMP.

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BWSD considers that it has adequately implemented this EWMP, and will continue to implement it with Mark Gilkey serving as water conservation coordinators.

(12) Water Management Services to Customers (Provide for the availability of water management services to water users)

On-farm irrigation and drainage system evaluations

KCWA has been the single largest local contributor to the North West Kern Resource Conservation District's (NWKRCD), formerly the Pond-Shafter-Wasco Resource Conservation District's (PSWRCD) Mobile Lab program for many years, contributing at least $5,000 annually to the program. This contribution supports the cost to perform 15-20 irrigation evaluations per year. This program is designed to evaluate irrigation systems on-farm, offering recommendations to improve distribution uniformity and overall system improvements. BMWD will cooperate with NWKRCD to perform system evaluations in their District.

Many of the District's landowners already perform system evaluations in-house, along with irrigation scheduling and other management techniques for water conservation. Other landowners, if interested would be pointed to the NWKRCD or equivalent agency.

This EWMP has been implemented at a satisfactory level, and will continue to be implemented through support of NWKRCD activities.

Agricultural water management educational programs and materials for farmers, staff and the public

KCWA has conducted an in-school water education program for 15 years. The program has been approved by Kern County's Superintendent of Schools as meeting classroom science and history criteria. This program targets children in grades 1-6.

BMWD individually contributes and/or pays annual dues to the following organizations that target water awareness both locally and State-wide:

- Water Education Foundation
- California Water Awareness Campaign
- Kern Teacher Ag Seminar
- Water Association of Kern County

This EWMP has been implemented at a satisfactory level, and will continue to implement it through activities described in this section.

(13) Identify Institutional Changes (Evaluate the policies of agencies that provide the supplier with water to identify the potential for institutional change to allow more flexible water deliveries and storage)

BMWD's administrative and O&M office is located in the District. Water Users frequently visit the office to place water orders, discuss maintenance activities and administrative matters.

As previously noted, the District is nearly entirely dependent on the State Water Project (SWP) for its water supply. The SWP has historically been, and is expected to continue to be, subject to delivery deficiencies. Contractual obligations are 4.1 million acre-feet (MAF) per year while the average annual water supply is approximately 2.5 MAF. As environmental and urban water demands continue to increase, the reliability of the SWP decreases for all SWP contractors. Delivery deficiencies are related to both the reduced quantity of water available and the increased frequency that shortages are imposed. The District continues to look at ways to further stabilize, or firm up, the reliability of the water supply so that production agriculture can continue to flourish in the District.

One method of stabilizing the water supply that the District has initiated is groundwater banking. The District participates in the following groundwater banking/recovery programs:

- KCWA Pioneer Property
- Berrenda Mesa Spreading Grounds

Through 2020, the District and its water users had approximately 113,500 acre-feet (af) in storage in these projects. One District landowner also participates in groundwater banking activities through the Kern Water Bank.

BMWD has initiated and will continue efforts to develop programs with other agencies that would alleviate the aforementioned problems regarding water supply stability.

In addition as shown below, this EWMP has previously been implemented at a satisfactory level with the following practices, which will be continued:

Regular District Meetings

BMWD holds monthly meetings and distributes a meeting notice to each landowner. On average, about 90% of the majority landowners attend each monthly meeting.

Other Meetings

In addition to the monthly meetings, other meetings include:

- The District manager also attends monthly KCWA Member Unit Managers meetings, to discuss topics and issues.
- The District manager, superintendent, or board members attend the annual ACWA conferences.
- The District also holds meetings to discuss policies on an as needed basis.
- Any meeting (monthly, policy, others) can be translated for farmers that wish to hear information in Spanish.

BMWD web site

BMWD has a web site and will be updating it as needed. The web address is http://www.bmwd.org/

Links to KCWA and DWR

Contractually, the only institution to which BMWD is subject to is the KCWA. Similarly, contractually, the only institution to which KCWA is subject to is DWR. Nevertheless, policy differences arise nearly every year with respect to water supply and operations of the SWP. Generally, as policy issues arise, they are discussed among the State Water Contractors, Inc. (SWC), a non-profit organization of SWP contractors. Once agreement is reached by the SWC as a whole then DWR is engaged to seek changes in the subject policies.

SWC holds an annual retreat at which DWR and Contractor policies and issues are reviewed in depth. DWR management staff is invited to these retreats and participate in the discussions. This has been a valuable forum for resolution of issues.

BMWD, along with KCWA, considers the existing arrangement for resolution of policy issues to be successful. DWR and SWC policies are discussed and resolved as they arise, leading to a dynamic resolution process.

This EWMP will continue to be implemented by continuing current practices.

(14) Supplier Pump Improved Efficiency (Evaluate and improve the efficiencies of the supplier's pumps)

In 2001 and 2010, BMWD utilized State grant and PG&E rebates to assist in funding pump efficiency tests on all District-owned pumps and repair of selected pumps. The District intends to keep testing pumps periodically to ensure that these units are operating at peak efficiency. Pumps with low efficiencies will be re-evaluated to determine if newer more efficient units would replace existing less efficient units.

The District recently installed sensors in Pump Station "A" for remote control utilizing the SCADA system. A unique feature implemented by the District's electrical technician, displays on a screen each pump's electrical usage in kWh per AF. Over time, if this value (kWh/AF) begins to decrease, it is an indication that the pump or motor is beginning to deteriorate and thus the unit is running inefficiently and needs to be evaluated. The kWh/AF number can be correlated to an overall plant efficiency (OPE).

This EWMP has been implemented at a satisfactory level, and will be continued as described in this section.

Table 47 summarizes the EWMPs implemented and planned, Table 48 summarizes the EWMPs efficiency improvements, and Table 48 summarizes the schedule to implement EWMPs.

Table 49 includes estimates of Water Use Efficiency (WUE) Improvements that occurred since adoption of the prior Water Management Plan (2005). In most cases data was not available to allow quantification.

The prior Plan's water balance calculations indicated very high overall District WUE had been attained by 2005, with little room for improvement.

WUE improvements from EWMPs to continue and/or be implemented are also in Table 48. These also generally have no available data to allow for an estimate. Given the District's current WUE estimate of nearly 100%, little improvement is expected over the next 5-10 years. Rather, maintenance of high WUE is the expectation.

Table 47. Report of EWMPs Implemented/Planned
(Water Code §10608.48(d), §10608.48 (e), and §10826 (e))

EWMP No.*	Description of EWMP Implemented	Description of EWMPs Planned
Critical EWMPs		
1	Water Measurement	Continue current practices
2	Volume-Based Pricing	Continue current practices
Conditionally Required EWMPs (locally cost-effective and technically feasible EWMPs)		
1	Alternate Land Use	Continue current practices
2	Recycled Water Use	Currently not feasible
3	On-Farm Irrigation Capital Improvements	Implemented by District landowners
4	Incentive Pricing Structure	Continue current practices
5	Infrastructure Improvements	No plans for further improvements
6	Order/Delivery Flexibility	Continue current practices
7	Supplier Spill and Tailwater Systems	Continue current practices
8	Conjunctive Use	Continue current practices
9	Automated Canal Controls	No plans for further improvements
10	Customer Pump Test/Eval.	Publicize PG&E's program on the District's website
11	Water Conservation Coordinator	Continue current practices
12	Water Management Services to Customers	Continue current practices
13	Identify Institutional Changes	Continue current practices
14	Supplier Pump Improved Efficiency	Continue current practices
Other Optional EWMPs (as applicable)		

Notes:
*EWMP numbers correspond to (Water Code §10608.48(c)

Table 48. Report of EWMPs Efficiency Improvements
(Water Code §10608.48(d), §10608.48 (e), and §10826 (e))

Corresponding EWMP No.(s)*	EWMP	Estimate of Water Use Efficiency Improvements That Occurred Since Last Report *(Quantitative or Descriptive)*	Estimated Water Use Efficiency Improvements 5 and 10 years in future *(Quantitative or Descriptive)*
Critical 1	Water Measurement	No data available to estimate	0%
Critical 2	Volume-Based Pricing	No data available to estimate	0%
Conditional 1	Alternate Land Use	No data available to estimate	0%
Conditional 2	Recycled Water Use	No data available to estimate	0%
Conditional 3	On-Farm Irrigation Capital Improvements	No data available to estimate	0%
Conditional 4	Incentive Pricing Structure	No data available to estimate	No data available to estimate
Conditional 5	Infrastructure Improvements	No data available to estimate	0%
Conditional 6	Order/Delivery Flexibility	No data available to estimate	0%
Conditional 7	Supplier Spill and Tailwater Systems	No data available to estimate	0%
Conditional 8	Conjunctive Use	No data available to estimate	0%
Conditional 9	Automated Canal Controls	No data available to estimate	0%
Conditional 10	Customer Pump Test/Eval.	Not applicable (new EWMP)	No data available to estimate
Conditional 11	Water Conservation Coordinator	No data available to estimate	0%
Conditional 12	Water Management Services to Customers	No data available to estimate	No data available to estimate
Conditional 13	Identify Institutional Changes	No data available to estimate	No data available to estimate
Conditional 14	Supplier Pump Improved Efficiency	No data available to estimate	No data available to estimate

Notes:
*EWMP numbers correspond to (Water Code §10608.48(c).

Table 49. Schedule to Implement EWMPs
((Water Code §10608.56 (d))

EWMP	Implementation Schedule	Finance Plan	Budget Allotment	1999 AWMC MOU Demand Measures
Critical				
1. Water Measurement	NA	NA	(1)	C-1
2. Volume-Based Pricing	NA	NA	(1)	No equivalent
Conditional				
1. Alternate Land Use	NA	NA		B-1
2. Recycled Water Use	NA	NA		B-2
3. On-Farm Irrigation Capital Improvements	NA	NA		B-3
4. Incentive Pricing Structure	NA	NA	(1)	C-2
5. Infrastructure Improvements	NA	NA		B-5
6. Order/Delivery Flexibility	NA	NA	(1)	B-6
7. Supplier Spill and Tailwater Systems	NA	NA		B-7
8. Conjunctive Use	NA	NA	(1)	B-8
9. Automated Canal Controls	NA	NA		B-9
10. Customer Pump Test/Eval.	NA	NA		No equivalent
11. Water Conservation Coordinator	NA	NA	(1)	A-2
12. Water Management Services to Customers	NA	NA	(1)	A-3
13. Identify Institutional Changes	NA	NA	(1)	A-5
14. Supplier Pump Improved Efficiency	NA	NA	(1)	A-6
Other EWMPs:				
1999 AWMC MOU A-4: Improve communication and cooperation among water suppliers, users, and other agencies.				
1999 AWMC MOU B-4: Facilitate voluntary water transfers.				
Grand Total all EWMPs				

Note: There is no equivalent AWMC Critical EWMP #2 or Conditional EWMP #10
NA = Not Applicable
(1) Budget allocation within District's operation budget

B. Documentation for Non-Implemented EWMPs

The District has considered, but rejected three conditional EWMPs. The remainder have either been previously implemented, are continuing to be implemented, or will be implemented. Non-implemented EWMP justification/documentation was described previously and is summarized in Table 50.

Table 50. Non-Implemented EWMP Documentation
(Water Code §10608.48(d), §10608.48 (e), and §10826 (e))

Conditional EWMP #	Description	*(check one or both)*		Justification/Documentation*
		Technically Infeasible	Not Locally Cost-Effective	
2	Recycle Water Use	x		Salinity of industrial and other wastewater exceeds safe re-use limit.

Notes:
*Justification/Documentation can include summary cost-benefit analysis or engineering determination with reference to the specific study/agency/engineer responsible for making that determination.

Section VI: Supporting Documentation

A. Agricultural Water Measurement Regulation Documentation (as applicable)

The District receives its water deliveries through eight DWR turnouts off of the California Aqueduct. These turnouts have meters which record instantaneous flow rates as well as total quantities delivered. The duration and flow rates for all deliveries are scheduled in advance so that DWR can coordinate water flows to the District.

In addition to the DWR metered turnouts, all in-District deliveries are metered daily during use at individual Water User turnouts. These Water User meters are located at turnouts throughout the District. These turnouts include meter facilities that were originally designed by District consulting engineers who also oversaw construction of the facilities. District Water Users also schedule their deliveries (duration and flow rates) in advance so the District can accurately schedule deliveries from DWR.

District System Operators measure deliveries to individual turnouts daily when they are operating. The System Operators know the requested flow rate at various turnouts as well as the normal flow rate. If there is any variance in these rates or if there is any problem with the meter the O&M Superintendent is immediately notified and repair work is scheduled. The District primarily uses McCrometer flow meters and District maintenance

staff have received training at McCrometer's facility. Replacement meters are purchased from McCrometer and include a Certified Test Report (Appendix 11).

District staff compares DWR daily flow rates and deliveries with the sum of individual in-District flow rates and deliveries as another check of meter accuracy. This process enables District staff to document meter accuracy daily and to quickly identify variances and schedule repairs. In addition DWR total monthly deliveries are compared to the sum of individual in-District deliveries as another check of meter accuracy. During 2012 the sum of individual in-District meters was within about 1% of DWR meter readings.

1. Legal Certification and Apportionment Required for Water Measurement

Legal certification is not applicable.

2. Engineer Certification and Apportionment Required for Water Measurement

An engineer's certification is not provided because BMWD's water measurement practices as described above, demonstrate compliance with accuracy standards.

3. Description of Water Measurement Best Professional Practices

Best Professional Practices refer to:

- Collection of water measurement data: By staff members trained and supervised by the superintendent.
- Frequency of measurements: Daily while in use. All meters read monthly at a minimum.
- Method for determining irrigated acres: Provided by customers, checked by aerial photographs.
- Quality control and quality assurance procedures:
  - Cross check daily flowrate versus customer order. Sum all turnout reading monthly. Investigate and attempt to correct identified differences.
  - Sum all running meters daily and compare versus DWR meters by Service Area. Investigate and attempt to correct identified differences. Repair all meters found not functioning properly per manufacturer's recommendations.

All of the turnout deliveries within the District are fully metered with propeller flowmeters which register both instantaneous and totalized flows.

The District maintains daily delivery records for each turnout being used and maintains records of daily water orders from the SWP. A grower's water use to date and remaining allocation is maintained by the District's comprehensive database system (Latis). The system helps manage water orders, water use, water supply, water contract information, and water delivery system information.

4. Documentation of Water Measurement Conversion to Volume

All flowmeters used by BMWD register both instantaneous and totalized flows (volume accrued during a period of time).

5. Device Corrective Action Plan Required for Water Measurement

BMWD is confident its existing water measurement devices meet the ±12% accuracy standard, and replacement meters meet the ±6% accuracy standard. No corrective actions are planned.

B. Other Documents (as applicable)

Tables and appendices have been included as needed to support this AWMP document. Additional tables and appendices provide complementary information where needed.

Appendices

Appendix 1. Typical Notice of Preparation sent to Agencies listed in Table 1 and copy of Notice of Public Meeting published in the Bakersfield Californian on March 15, 2021

BERRENDA MESA WATER DISTRICT

14823 Hwy 33
Lost Hills, CA 93249-9734

Phone: (661) 797-2671
Fax: (661) 797-2849

March 10, 2021

NOTICE is hereby given that Berrenda Mesa Water District's (the "District") proposed Agricultural Water Management Plan prepared pursuant to Water Code § 10820 et. seq. is available for public inspection. Any person who desires to review the plan may arrange to do so by telephoning the District at (661) 633-9022 and asking to speak to Kris Lawrence, *Regulatory Manager*.
In addition, the District will hold a remote access public hearing on the proposed plan as part of its regularly scheduled Board meeting on April 8, 2021 at 9:30 a.m. After the hearing, the District will adopt the plan as drafted or as modified.

Respectfully,

Kris Lawrence
Regulatory Manager

NOTICE OF PREPARATION OF AND HEARING ON

BERRENDA MESA WATER DISTRICT

2020 AGRICULTURAL WATER MANAGEMENT PLAN

NOTICE is hereby given that Berrenda Mesa Water District's (the "District") proposed Agricultural Water Management Plan prepared pursuant to Water Code § 10820 et. seq. is available for public inspection. Any person who desires to review the plan may arrange to do so by telephoning the District at (661) 633-9022 and asking to speak to Kris Lawrence, *Regulatory Manager*.

In addition, the District will hold a remote access public hearing on the proposed plan as part of its regularly scheduled Board meeting on April 7, 2021 at 1:00 p.m. After the hearing, the District will adopt the plan as drafted or as modified.

Kris Lawrence, Regulatory Manager
Berrenda Mesa Water District

Appendix 2. Resolution of Plan Adoption

BERRENDA MESA WATER DISTRICT

Resolution 688

A RESOLUTION OF THE BOARD OF DIRECTORS OF BERRENDA MESA WATER DISTRICT ADOPTING THE 2020 UPDATE TO THE AGRICULTURAL WATER MANAGEMENT PLAN

WHERAS, pursuant to the Agricultural Water Management Planning Act and the Water Conservation Act of 2009, agricultural water suppliers, such as the Berrenda Mesa Water District, were required to prepare and adopt an Agricultural Water Management Plan by December 31, 2012; and

WHEREAS, the District prepared and adopted its original Plan on April 4, 2013; and

WHEREAS, agricultural water suppliers are required to update their respective Plans every five years;

WHEREAS, the District updated its original Plan and adopted the 2015 Plan Update on December 03, 2015; and

WHEREAS, the District must now update its 2015 Plan Update, adopt a 2020 Plan Update, and submit such updated plan to the California Department of Water Resources by May 1, 2021; and

WHEREAS, in preparing its 2020 Plan Update, the District scheduled and held a public hearing on April 08, 2021 to provide the public with an opportunity to offer comments to the District's Board of Directors on the proposed 2020 Plan Update; and

WHEREAS, the District provided notice of such public hearing as follows:

1. By publishing notice in the Bakersfield Californian on March 15, 2021 and March 22, 2021.

2. By posting a notice in a freely accessible location at the District's Bakersfield office located at 1405 Commercial Way Ste 125, Bakersfield, CA 93309 on March 10, 2021.

3. By mailing notice to local government agencies and other interested parties.

WHEREAS, the Board reviewed and considered all public comments received and incorporated such comments into the 2020 Plan Update as deemed appropriate by the Board; and

WHEREAS, the Board has reviewed the 2020 Plan Update and considers its adoption to be in the best interest of the District and its landowners.

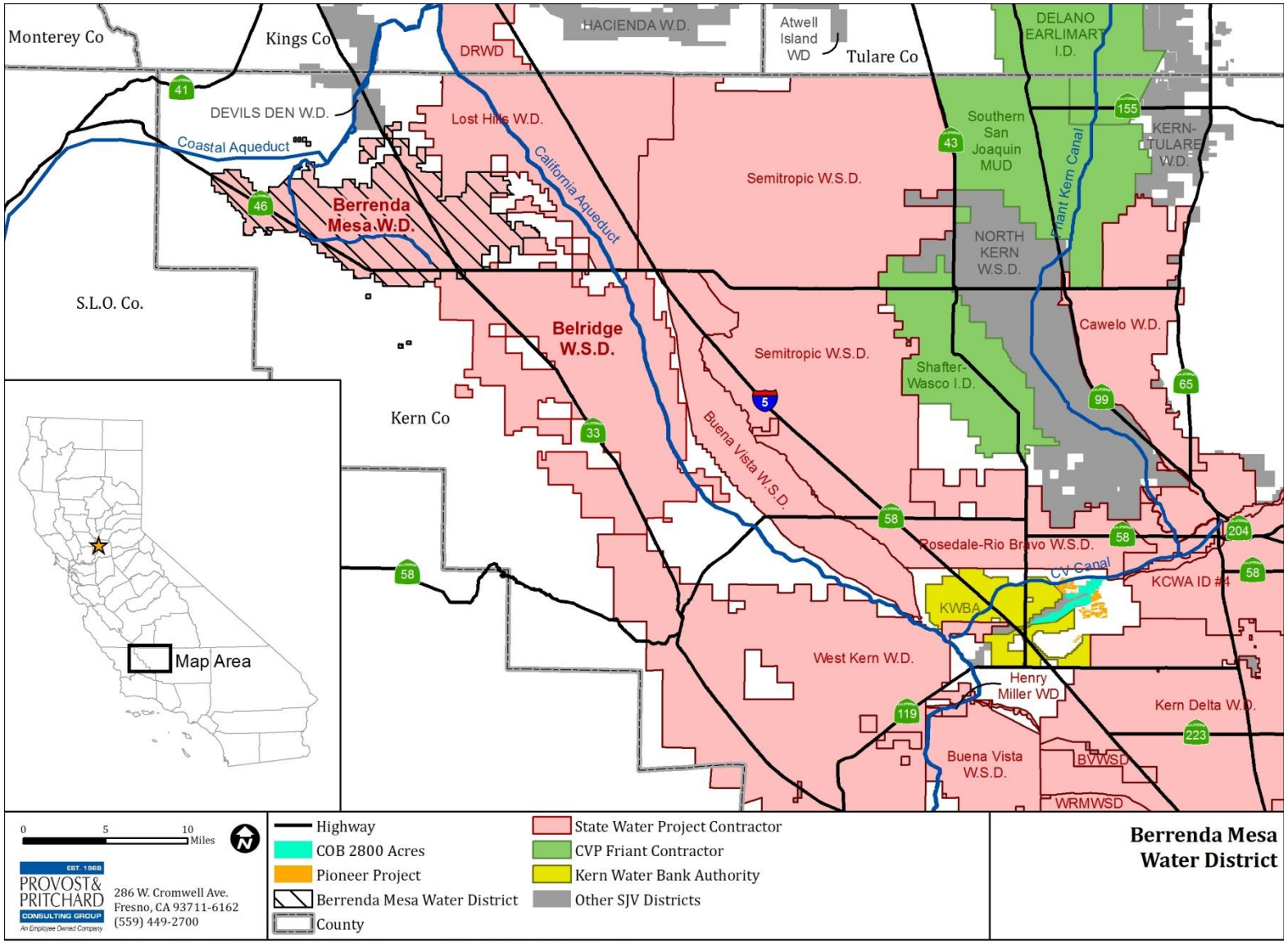
NOW, THEREFORE, BE IT RESOLVED by the Bord of Directors of the Berrenda Mesa Water District as follows:

1. The Board of Directors of the Berrenda Mesa Water District hereby adopt the 2020 Plan Update.

2. The General Manager, or designee, is hereby authorized and directed to prepare and submit the approved 2021 Update to the Agricultural Water Management Plan to the California Department of Water Resources.

Rob Goff, Board Chair

Appendix 3. Location Map



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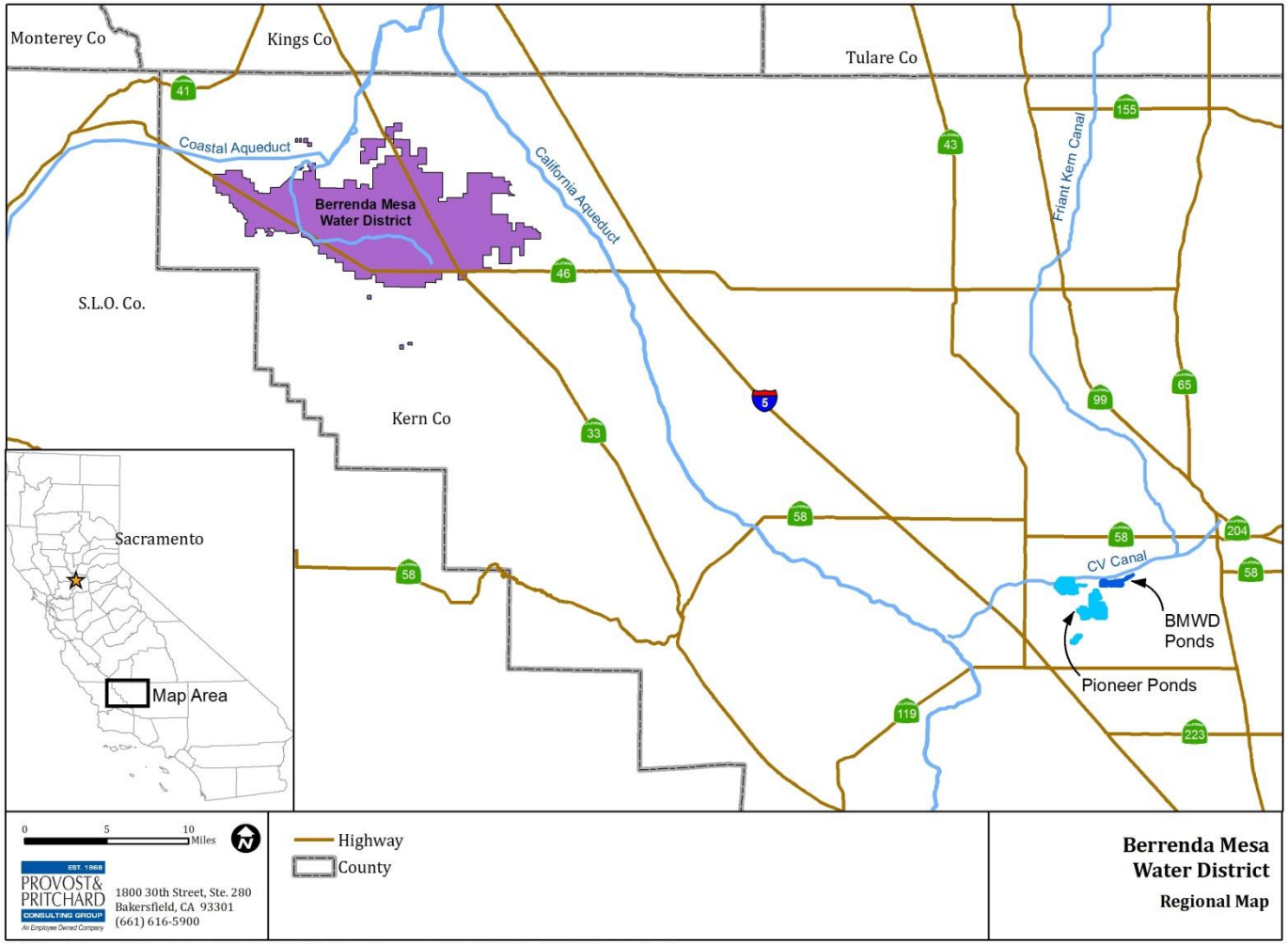
Appendix 4. Groundwater Recharge Facilities



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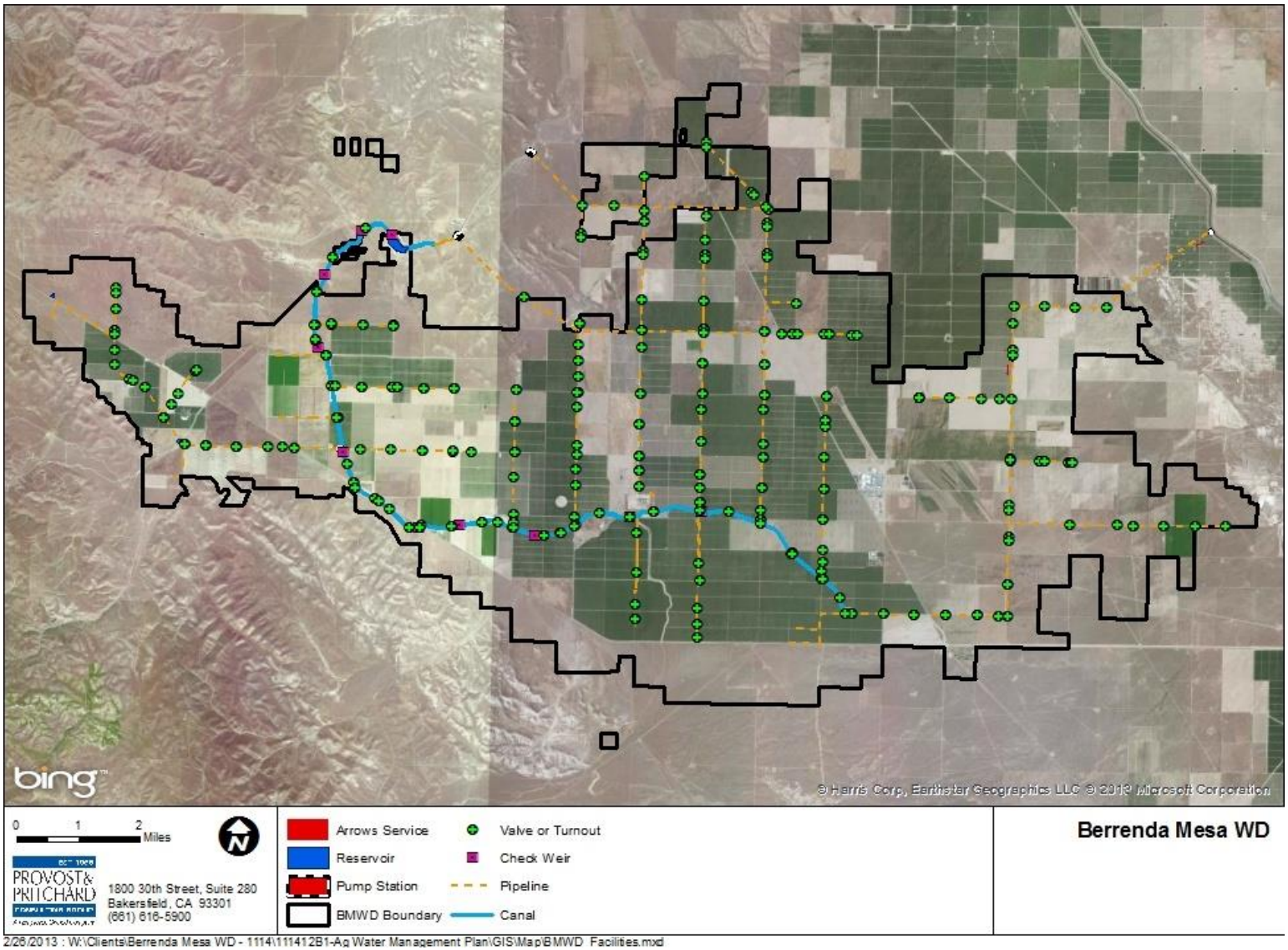
Appendix 5. Irrigation Facilities Map


bing
© Harris Corp, Earthstar Geographics LLC © 2013 Microsoft Corporation
0 1 2 Miles
PROVOST& PRITCHARD
1800 30th Street, Suite 280
Bakersfield, CA 93301
(661) 616-5900
Arrows Service
Reservoir
Pump Station
BMWD Boundary
Valve or Turnout
Check Weir
Pipeline
Canal
Berrenda Mesa WD
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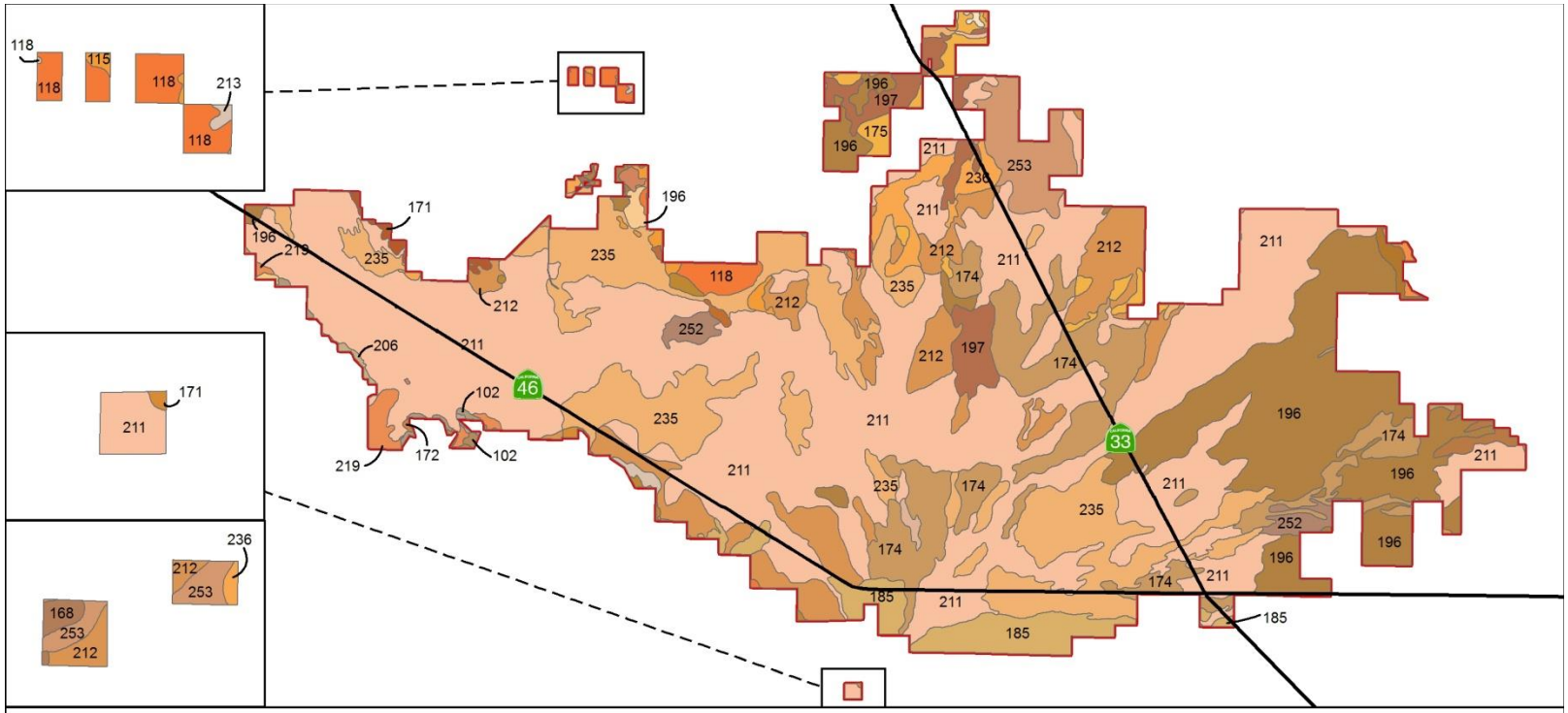
Appendix 6. Soils Map



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Appendix 7. Water Supply Contract Standard Provisions

LANDOWNERS CONTRACT

WITH

BERRENDA MESA WATER DISTRICT

FOR A WATER SUPPLY

This Contract, dated _____, 2001, between BERRENDA MESA WATER DISTRICT, a California Water District, organized and existing under and by virtue of Division 13 of the Water Code of the State of California, hereinafter called "District", and

hereinafter called "Buyer";

WITNESSETH:

WHEREAS, Buyer is the holder of title to the land in BERRENDA MESA WATER DISTRICT, Kern County, California, described in Exhibit "A" hereto attached; and

WHEREAS, Buyer desires to secure a water supply for agricultural use on Said Lands; and

WHEREAS, Water Code Section 35422.5 allows the District to enter into water supply contracts with its landowners; and

WHEREAS, District desires to make water available under terms and conditions which, are fair and equitable to all owners of land within District;

NOW, THEREFORE, IT IS AGREED between District and Buyer as follows:

ARTICLE 1. DEFINITIONS

When used in this contract, the following terms shall have the meaning hereinafter set forth:

(a) "Agency" shall mean the Kern County Water Agency.

(b) "Annual Entitlement" shall mean the total amount of water to be made available by District to Buyer during a year under the terms of this contract as set forth in Exhibit "A" hereto attached.

(c) "Buyer" shall mean the party or parties signatory hereto as Buyer and any successor in interest of Buyer as beneficial owner of the interest in the land described in Exhibit "A" hereto attached.

(d) "Contract Entitlement" shall mean the total amount of water to be made available by Agency to District during the particular year under the terms of the District Contract.

(e) "District" shall mean Berrenda Mesa Water District.

(f) "District Contract" shall mean the contract, hereinabove referred to, between Kern County Water Agency and Berrenda Mesa Water District, as such contract may hereafter be revised, amended, supplemented or replaced by a similar contract between the same parties.

(g) "Judgment" shall mean that judgment entered in consolidated cases numbers 144956 and 144957, Kern County Superior Court.

(h) "Master Contract" shall mean the contract entitled "Water

Supply Contract Between the State of California Department of Water Resources and Kern County Water Agency" dated November 15, 1963, and as it may hereafter be revised, amended, supplemented or replaced by a similar contract between the same parties.

(i) "Project Water" shall mean water made available to District by Agency pursuant to the terms of the District Contract.

(j) "Said Land" shall mean the land described in Exhibit "A" hereto attached.

(k) "Service Area" shall mean lands which were subject to the District's standby charges in the year 1996.

(l) "State" shall mean the State of California.

(m) "Water Users" shall mean Buyer and all other persons or entities with whom District shall have executed a contract for a water supply and all landowners in the service area who order water and are current in all payments to the district.

(n) "Year" shall mean the twelve (12) month period from January 1 through December 31, both dates inclusive.

ARTICLE 2. TERM OF CONTRACT.

This contract shall become effective on the date first above written and shall remain in effect throughout the term provided by ARTICLE 2 of the Master Contract, provided, however, that whenever the Master Contract or District Contract are terminated or suspended in the manner and for a cause specified in the Master Contract or District Contract, this contract similarly shall be terminated or suspended.

///

ARTICLE 3. RELATIONSHIP TO DISTRICT CONTRACT, MASTER CONTRACT AND JUDGMENT.

This contract is made subject to the obligations and limitations imposed by the District Contract which, in turn, is subject to the obligations and limitations imposed by the Master Contract. This contract is intended to be in conformance and harmony with the District Contract, the Master Contract and the Judgment. The District Contract, the Master Contract and Judgment are, by this reference, incorporated herein to the same extent and effect as though set forth here in full. Buyer expressly agrees to the provisions of the District Contract and of the Master Contract imposing obligations and limitations upon it, and further agrees that nothing in this contract shall be deemed to require District to perform any act in conflict with the District Contract or Master Contract. Buyer expressly waives all benefits conferred by the Judgment but recognizes that all parties to the Judgment are still bound by the duties set forth therein. District shall at all times keep and maintain at its office, available for examination by Buyer, copies of the District Contract, the Master Contract and Judgment and of all amendments thereto.

ARTICLE 4. AGRICULTURAL PURPOSE.

This contract is for a supply of Project Water for agricultural use, supplied by District to Buyer. As used herein, the term "agricultural use" shall mean any use of water primarily in the production of plant crops or livestock for market, including any use incidental thereto including but not limited to domestic,

stock watering, or processing purposes.

ARTICLE 5. ANNUAL ENTITLEMENT.

(a) Buyer's Annual Entitlement of Project Water.

District, each year, shall make available for delivery to Buyer in the Service Area, the amount of Project Water expressed in acre feet which is set forth in Exhibit "A" hereto attached, not to exceed 4 acre feet per acre per year for land in the Service Area and 2.8 acre feet per acre per year for non-Service Area lands. The total of all such amounts, for any year, is referred to in this Contract as Buyer's Annual Entitlement for such year.

(b) Deliveries in Excess of Annual Entitlement.

Buyer may at any time or times during the term of this Contract, by timely written notice to District, request that Project Water be made available to it in any year in amounts greater than Buyer's Annual Entitlement for such year. With the approval of District and subject to District's ability to obtain such additional Project Water, and subject further to the requirement for additional payment as provided in the rules and regulations of District, District shall deliver to Buyer such additional Project Water.

(c) Request for Delivery of Less than Annual Entitlement.

Buyer may at any time or times during the term of this Contract, by timely written notice to District, request that Project Water be made available to it in any year in amounts less than Buyer's Annual Entitlement for such year. District shall reduce deliveries to Buyer during such year by the amounts

requested and, subject to District's ability to dispose of such Project Water elsewhere, Buyers' obligation to make payments hereunder to District during the following year shall be reduced by the net amount received by District in disposing of such water.

(d) Designation

Buyer shall designate on Exhibit A, a specific Entitlement for each parcel of property. Exhibit A may be amended to change quantities between parcels subject to District approval and provided that no parcel shall have designated more than four acre feet of entitlement per acre.

ARTICLE 6. DELIVERY OF PROJECT WATER.

(a) Project Water made available to Buyer pursuant to this Contract shall be delivered to and accepted by Buyer through District owned facilities unless other delivery is specifically authorized by the District.

(b) Apportionment

Water and Capacity shall be apportioned as set forth in Sections 3&4 of Resolution #612 as they exist as of the date of this contract. Said sections are incorporated herein and made a part hereof as if set forth herein at length.

ARTICLE 7. DELIVERY SCHEDULES.

(a) Procedure for Determining Water Delivery Schedules.

The amounts, times and rate of delivery of Project Water to Buyer during any year shall be in accordance with a water delivery schedule for that year, which schedule shall be determined in the rules and regulations of the District.

ARTICLE 8. LIMITATIONS ON OBLIGATION OF DISTRICT TO FURNISH WATER.

(a) Notwithstanding any provisions of this contract to the contrary, the obligation of District to furnish Project Water hereunder shall be limited to the times and to the extent that Project Water and facilities necessary for furnishing the same are available to District pursuant to the District Contract.

(b) District shall not be liable for failure to perform any portion of this contract to the extent that such failure is caused by failure of State to perform any obligation imposed on State by the Master Contract, or by failure of Agency to perform any obligation imposed on Agency by the District Contract, provided, however, that the obligations of Buyer shall be reduced to the extent that District is prevented from performing as aforesaid and, provided, further, that District shall diligently and promptly pursue all rights and remedies available to it to enforce the rights of District and Buyer against State and/or Agency relative to such failure to perform.

ARTICLE 9. WATER SHORTAGES.

(a) No Liability for Shortages.

There may occur at times a shortage or shortages during any year or years in the quantity of Project Water available to District pursuant to the District Contract for furnishing to Buyer pursuant to this contract. In such event, no liability shall occur against District or any of its officers, agents or employees for any damage, direct or indirect, arising from such shortage or

shortages.

(b) Temporary Shortages.

Reduced allocations during shortages shall be equitably pro-rated pursuant to the rules and regulations of the District.

ARTICLE 10. CURTAILMENT OF DELIVERIES FOR MAINTENANCE PURPOSES.

State or Agency may temporarily discontinue or reduce the amount of Project Water to be furnished to District for the purposes of maintaining, repairing, replacing, investigating or inspecting any of the facilities necessary for the furnishing of water to District, which temporary discontinuance or reduction may result in a similar discontinuance or reduction in deliveries to Buyer. District may similarly temporarily discontinue or reduce the amount of Project Water to be furnished to Buyer for the purpose of maintaining, repairing, replacing, investigating or inspecting any of District's facilities necessary for the furnishing of Project Water to Buyer. Insofar as it is feasible, District will give Buyer notice in advance of any such temporary discontinuance or reduction, except in the case of emergency, in which case no notice need be given. In the event of such discontinuance or reduction, District will, upon resumption of service, deliver, as nearly as may be feasible and to the extent Project Water is furnished to it by Agency, the quantity of Project Water which would have been furnished to Buyer in the absence of such discontinuance or reduction.

///

ARTICLE 11. NON-RESPONSIBILITY FOR DELIVERY AND DISTRIBUTION OF PROJECT WATER.

Neither District nor its officers, agents or employees shall be liable for the control, carriage, handling, use, disposal or distribution of Project Water supplied to Buyer after such water has passed the delivery structure through which such water is delivered to Buyer, nor for claims of damage of any nature whatsoever including, but not limited to, property damage, personal injury or death arising out of or connected with the control, carriage, handling, use, disposal or distribution of such water beyond such delivery structure and Buyer shall indemnify and hold District and its officers, agents and employees harmless from any such damage or claim of damage.

ARTICLE 12. NON-RESPONSIBILITY FOR QUALITY OF WATER.

District assumes no responsibility with respect to the quality of water to be furnished pursuant to this contract. BUYER IS ADVISED THAT PROJECT WATER, AS DELIVERED BY DISTRICT, WILL BE UNFIT FOR HUMAN CONSUMPTION.

ARTICLE 13. PAYMENT FOR WATER.

Payment for water shall be as established by the rules and regulations of the District.

ARTICLE 14. OBLIGATION OF BUYER TO MAKE PAYMENTS.

(a) Character of Obligation.

The obligations of Buyer arising out of or pursuant or incidental to this Contract shall constitute a personal obligation of Buyer. Buyer hereby grants District a lien against Said Land

enforceable in the manner provided by the Water Code for the enforcement of District assessments to secure all Buyer's obligations hereunder. Buyer shall be relieved of all unaccrued obligations hereunder when and to the extent that Buyer transfers Said Land to a third party approved by District and such third party has assumed in writing the obligations of Buyer hereunder.

(b) Refusal of Project Water does not Affect Obligation.

Buyer's failure or refusal to accept delivery of Project Water to which it is entitled under this Contract shall in no way relieve Buyer of its obligation to make payments to District as herein provided for. District, however, shall make reasonable efforts to dispose of any Project Water made available to but not required by Buyer and, to the extent of Buyer's obligations hereunder, any net revenue from such disposal shall be credited to Buyer. In disposing of any such Project Water, District shall make every reasonable effort to obtain the maximum amount of credit for Buyer.

ARTICLE 15. ENTITLEMENTS HEREUNDER LIMITED TO USE ON SAID LAND.

Project Water delivered to Buyer under this Contract shall not be sold or otherwise disposed of by Buyer for use other than on said land except as provided for in Article 16(b).

ARTICLE 16. APPURTENANCE AND NON-ASSIGNABILITY.

(a) Appurtenance.

This Contract and Buyer's right to receive water hereunder is appurtenant to Said Land. Upon the transfer, whether by sale or by operation of law, of all Said Land, the transferee of Said Land

shall be substituted for Buyer hereunder to the same extent and effect as though said transferee had executed this Contract as Buyer, provided, however, that unless and until, after a lapse of ninety (90) days from the date of any such transfer, such transferee shall have executed a contract for a water supply for Said Land, identical in all provisions with this Contract, District may, pending execution of such a contract, suspend delivery of Project Water to Said Land, in which event, and notwithstanding such suspension, all charges and payments shall continue to accrue and shall constitute a charge against Said Land secured by the lien herein provided for. Upon the transfer, whether by sale or by operation of law, of less than all of Said Land, this Contract shall be deemed divided and the transferee of a portion of Said Land shall be entitled thereafter to receive that portion of Buyer's annual entitlements which bears the same relation to the amount of Buyer's total annual entitlements hereunder as the acreage transferred bears to the total acreage of Said Land, provided, however, that unless and until, after a lapse of ninety (90) days from the date of any such transfer, such transferee shall have executed a contract for a water supply for the portion of Said Land so transferred, identical in all provisions with this Contract, except as to annual entitlements and land descriptions, District may, pending execution of such a contract, suspend delivery of Project Water to the portion of Said Land so transferred, in which event, and notwithstanding such suspension, a pro rata share of all charges and payments required hereunder

shall continue to accrue and shall constitute a charge against the portion of Said Land so transferred secured by the lien herein provided for. The contract to be executed by the transferee of less than all of Said Land shall provide for annual entitlements which bear the same relation to Buyer's total annual entitlement hereunder as the acreage transferred bears to the total acreage of Said Land and "Said Land" under said contract shall be the land so transferred. Upon execution of such contract, covering less than all of Said Land, this Contract shall be deemed amended to eliminate from Said Land the land described in such contract and to reduce Buyers' annual entitlements by the amount of the annual entitlements provided in such contract. District may, in evidence of such amendment, execute and record in the Office of the County Recorder of Kern County, California, a declaration of such amendment.

(b) Assignment and Transfer

(i) Project water may be transferred from service area or non-service area lands for use on other lands owned by Buyer within the District.

(ii) Unused Project water shall not be transferred outside the District in water short years but may be returned to the District or sold directly to other land owners within the District at market prices. If no offers are made at market price by any District Landowner or by the District the water may be transferred outside the District.

(iii) In water excess years, Project water may be sold

or transferred inside or outside the District without limitation imposed by the District.

(iv) For the purposes of this Article 16, water short years shall mean a year when on April 20th, the water orders exceed the available supply. For the purposes of determining a water short year under this subdivision each Buyer shall be limited to ordering the amount of its contract or an accumulation of 2.8 acre feet per acre for non-contract lands.

ARTICLE 17. REMEDIES NOT EXCLUSIVE.

The use by either party of any remedy specified herein for the enforcement of this Contract is not exclusive and shall not deprive the party using such remedy of or limit the application of any other remedy provided by law.

ARTICLE 18. AMENDMENTS.

This contract may be amended at any time by mutual agreement of the parties except insofar as any proposed amendment is in any way contrary to applicable law or inconsistent with the provisions of the District Contract, the Master Contract, or the stipulated judgment. District shall make available to Buyer at all times during normal business hours, at the District offices, for Buyer's inspection, copies of all contracts now or hereafter executed by District with all other Water Users and of any amendments thereto.

ARTICLE 19. OPINIONS AND DETERMINATIONS.

Where the terms of this Contract provide for action to be based upon opinion, judgment, approval, review or determination of either party hereto, such terms are not intended to be and shall

never be construed as permitting such opinion, judgment, approval, review or determination to be arbitrary, capricious or unreasonable.

ARTICLE 20. WAIVER OR RIGHTS.

Any waiver at any time by either party hereto of its rights with respect to a default or any other matter arising in connection with this Contract shall not be deemed to be a waiver with respect to any other default or matter.

ARTICLE 21. NOTICES.

Any notice herein provided for to be given by District to Buyer shall be deemed given and delivered if delivered personally to Buyer or if enclosed in an envelope addressed to Buyer at the address hereafter set forth below Buyer's name and deposited in the United States mail for delivery by registered or certified mail. Any notice herein provided for to be given by Buyer to District shall be deemed given and delivered if delivered personally to an officer of District at District's office or if enclosed in an envelope addressed to District at 2100 "F" Street, Bakersfield, California, 93301, and deposited in the United States mail for delivery by registered or certified mail. Either party may at any time and from time to time, by proper notice to the other, change its address for receipt of notice.

ARTICLE 22. INSPECTION OF DISTRICT'S BOOKS AND RECORDS.

Buyer shall have full and free access at all reasonable times to the account books and official records of District with the

right at any time during normal business hours to make copies thereof.

IN WITNESS WHEREOF, the parties hereto have hereunto set their hands as of the day and year first hereinabove written.

BERRENDA MESA WATER DISTRICT

By: _____
President

By: _____
Secretary

"DISTRICT"

By: _____

_____

_____

_____

BUYER

Appendix 8. Rules and Regulations for Distribution and Use of Water

BERRENDA MESA WATER DISTRICT
OPERATING RULES AND REGULATIONS

Revised April 5, 2000

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BERRENDA MESA WATER DISTRICT

OPERATING RULES AND REGULATIONS

It is the policy of the Board of Directors of the Berrenda Mesa Water District to make every effort to satisfy the water requirements of each and every landowner within the District, in a fair and equitable manner. In order to carry out this policy, it is necessary that certain rules and regulations be adopted to control the distribution and sales of water to all of the District's landowners.

1. **Ordering Project Water**

   a. Applications: In order to receive project water for any given year, a landowner must submit an application to the District for an annual water supply on fully completed forms, to be provided by the District, no later than September 1 of the preceding year. After reviewing all landowner applications for water, the District will make an allocation to each landowner showing: a) the total amount of water that he may take during the given year; b) the amount of water that he may take during any given month of the peak season; and c) the maximum pumping rate at which he may take delivery of water during the peak season months of June, July, and August if there is limited peaking capacity available. Other details of the method of allocation and the payment requirements for project water are included in the District's policy Resolution No. 612, copies of which are available at the District Administrative Office.

Landowners may submit water applications after the September 1 cut-off date, however, an allocation will be made to fill the late order only after satisfying all water requests submitted prior to September 1. Any additional allocation shall be paid for in full before delivery.

b. Weekly Orders: Water users will be required to submit a weekly water order showing the delivery rate for water, in c.f.s., required at each of the users' turnouts for each day of the week from Friday to Friday. This order shall be made on forms provided by the District and delivered or faxed to the District Operations and Maintenance Center by 2:00 p.m., each Tuesday. All water orders shall be for continuous, uniform flow for a minimum of 24 hours unless special arrangements can be made with the District's Dispatcher or System Operator. Special arrangements will only be made to meet extremely difficult or emergency conditions and must be approved by the District's Dispatcher or System Operator.

c. Change Orders: Any changes to the weekly water order must be requested 48 hours in advance of the desired change. Change orders must be delivered or faxed to the Operations and Maintenance Center during normal working hours (6:30 a.m. to 3:00 p.m.), Monday through Friday. In the event of an emergency change order, after hours and on weekends, the District's System Operator (Radio Call Sign #111) must be contacted by radio or telephone to explain the emergency change followed by a written request for the change order delivered to the District Mail Box or faxed to the District's Operations and Maintenance Center. All changes

must have the approval of the District's Dispatcher or System Operator before becoming effective.

2. **Authority of the District Superintendent and Employees**

   a. Superintendent. Under the general supervision of the District Manager. The Operation and Maintenance of the District's distribution system is under the management and control of the Superintendent of the District. No other person except the Superintendent or his designee shall operate any of the facilities of the distribution system.

   b. District Employees. The Superintendent shall supervise the activities of all District field employees in connection with the operation and maintenance of the distribution system. The authority of all the employees of the District, including the Superintendent, shall be designated by the Manager, and any controversy between a water user and a District employee that cannot be settled directly or by the Superintendent, shall be appealed to the District Manager. In the event the Manager is unable to reach a satisfactory decision, an appeal may be made to the Board of Directors. The decision of the Board of Directors shall be final.

3. **Turn-Ons and Turn-Offs.**

   All water turn-ons and turn-offs will be made between 6:00 a.m. and 8:00 a.m. on the date specified in the weekly water order. Changes at turnouts at other times will only be permitted in an emergency or by prior approval of the District's Dispatcher or System Operator.

Water users may operate their own turnout valves after first receiving instructions from the Superintendent on the proper operation of the valves. It is extremely important that valves be operated slowly to avoid pipe damage. The privilege of operating turnouts will be withdrawn from any water user who: Makes unauthorized turn-ons or turn-offs; sets the delivery rate at turnouts different from that approved by the dispatcher or System Operator; or makes changes, turn-ons or turn-offs, at times other than specified in these regulations. Improper operation of turnouts will result in the turnout being locked and operated only by District personnel. Water users should notify the District as soon as possible of any malfunctions of the District's valves or meters at the turnouts so that repairs may be made. Emergency turn-offs of water deliveries in excess of two hours will remain off until the following morning when normal turnout changes are made.

Change in schedules for chemical application on the various crops or other normal field operations does not constitute an emergency for which an emergency turn-on or turn-off will be approved. If it is necessary to make late changes in water orders due to changes in farming activities, water is to be rescheduled for another turn-out on the same lateral. The District Dispatcher or System Operator is to be notified of any late changes required due to changes in farming activities.

4. **Contacting the District**

During normal working hours, Monday-Friday, 6:30 a.m. to 3:00 p.m., District operating personnel may be contacted by telephone at (661) 797-2671. At other than normal hours, the District System operator can be reached on a mobile phone by

calling (661) 747-5984, or calling (661) 797-2671 and leaving a message on the answering machine.

Two-way radios are located within the District for the convenience of water users in contacting District personnel. Locations of the radio stations are:

1. Booster Pumping Plant
2. Paramount Farming Headquarters Office
3. Canal Terminal Reservoir
4. Blackwell Land Company Office

The radio call numbers for key District personnel are:

109 Superintendent

106 Dispatcher

111 System Operator

The District Operations personnel may also be contacted by Fax at (661) 797-2849.

The System Operator generally will patrol the canal and Pumping Plants between the hours of 6:00 a.m. to 8:00 a.m., 11:00 a.m. to 1:00 p.m., 3:00 p.m. to 5:00 p.m., 7:00p.m. to 9:00 p.m., 11:00 p.m. to 1:00 a.m., and 3:00 a.m. to 5:00 a.m.

An emergency notification list is attached to these regulations for use in contacting District personnel during normal off duty hours.

5. **Limitation of Turnout Capacity**

All turnouts are designed to serve 160 acres at a flow rate of two and one-half cubic feet per second or eleven hundred and twenty-five gallons per minute at a minimum head of five feet. The system is not designed to serve all lands along a lateral simultaneously. The lateral turnouts will deliver water at a higher rate of up to five cfs or twenty-two hundred and fifty gallons per minute, but only during periods of low total demand. If any of the water users on a given lateral are unable to receive the minimum design delivery rate out of a turnout, the flow rate of each turnout operating in excess of the minimum design delivery rate will be adjusted to the minimum design rate.

6. **Meter Reading**

All meters will be read on the first day of each month to determine the water use for the prior month. By the tenth of each month the District will mail a water use statement to each water user showing the amount of water used out of each turnout for the previous month. Any water user wishing to contest the amounts of water shown on the statement must do so in writing to the District within ten calendar days of the statement date. Monthly meter use figures will be considered correct unless such written notice is received. In addition, all meters at turnouts scheduled to be operating may be read daily to assure proper delivery rates are set by water users.

7. **Emergency Conditions**

An emergency condition is defined as any situation where there is risk of damage to the District's distribution system, life, or property. Since the District operating staff has the responsibility for protecting the District's distribution system, any actions taken to control or regulate the flow of water in the District's system during an

emergency condition, shall be under the direction of the District's Superintendent. No one shall be authorized to open, close, or regulate any of the District's valves or gates unless so directed by the District's Superintendent as outlined in 3 above. The District reserves the right to terminate water service to any water user during an emergency condition.

8. **Power Failures**

Power failures of varying magnitude and duration occur periodically in the District and do not generally result in emergency conditions. The District will generally have sufficient water stored in the regulating reservoirs to sustain operations for a maximum of two hours without any power at the District's pump stations. The District will not generally restrict the delivery of water or turn off water at turnouts, unless it appears that the duration of the power failure will exceed one hour. Water users are encouraged to restart pumping units as soon as possible after a power failure of less than one hour duration after first notifying the District.

If the outage exceeds one hour, it will generally be necessary for the District to shut down the entire system and shut off all water to users. When power is restored after being shut off for more than one hour, users are not to restart pumps or turnouts again until so advised by the District.

9. **Water Leaks**

When water users detect water leaks at District pipelines or turnouts, they are requested to notify the District as soon as possible. If a water user develops a serious leak in his own distribution system and is unable to take the water which has been

ordered, he should contact the District to make arrangements to take delivery of the water elsewhere in the District.

10. **Quality of Water**

The District assumes no responsibility with respect to the quality of project water. All water users are advised that project water as delivered by the District, is unfit for human consumption. All complaints concerning the quality of water should be referred to the District Superintendent or Manager.

11. **Storm Water Drainage**

Drainage control structures have been constructed along the District's canal to provide for the passage of flood waters across the District's right-of-way in the natural channels in which flood water historically flowed. These facilities include the canal protective dike, training dikes, pipe overchutes, and siphons. All of these facilities must be kept free from obstruction to protect the District's distribution system from flood damage.

12. **Irrigation Tail Water**

Each water user will be responsible for controlling and disposing of his own "tail water". Tail water must not be allowed to collect upon the District right-of-way. Storm water drainage facilities will not be diked off to prevent the flow of tail water across canal drainage facilities. Tail water will not be drained into the District's canal or distribution facilities under any circumstances.

13. **District Roads**

The District owns, operates, and maintains a service road along its canal for access to canal check gates, distribution laterals, and mainline valves. This road shall not be

used for anything but pickup trucks and automotive-type traffic. Landowners and water users are requested to refrain from using the service road during rainy periods when excessive traffic may make the road impassable. In addition to the canal service road, the District has obtained a right-of-way for a road along each of the District's pipelines and distribution laterals. Access to District facilities on pipelines and laterals is essential. All rights-of-way along District pipelines shall be kept open and free of obstructions, fences, or buildings. Water users shall also insure that irrigation water and tail water is not applied or allowed to collect on the District's pipeline and lateral access roads.

14. **Tampering with District Facilities**

No person shall tamper, modify, or interfere with any of the District's facilities, structures, or devices used for the delivery of water with the exception of minor adjustments to turnout valves as previously mentioned. No filtering devices or modifications to canal turnout trash racks will be permitted in the District's canal.

15. **Liability for Damage to District Facilities**

Any damage done to District facilities or property by the water users shall be the responsibility of the water user or landowner making such use of the property or facilities. If repairs are not made promptly by the responsible individuals, the District will make the necessary repairs and charge the responsible individual.

16. **Application of Fertilizers, Pesticides, and Chemicals**

The facilities of the District distribution system shall not be used for the application of fertilizers, pesticides, or chemicals. All water users shall use utmost caution in

applying airborne pesticides and chemicals to lands adjacent to the District's open canal to insure that the materials being applied by air do not drift into the canal.

17. **Disposal of Trash, Refuse or Foreign Material on District Rights-of-way or Facilities**

No rubbish, garbage, manure, refuse, waste excavation, or foreign material of any type shall be placed or allowed to be placed in any District canal or along any of the District's rights-of-way.

18. **Request for New or Additional Water Service**

Landowners desiring new or additional water service or modifications to existing service, must notify the District in writing of the exact location where service is desired, the capacity of the pump to be installed, the description of the parcel of property to be serviced, and the date when water service is required. A minimum of three months lead time will be required to purchase and install all materials for the turnouts. All of the costs for materials and installation for new turnouts not included in the original design of the project facilities, will be paid by the water user requesting service. The District is to be provided with a copy of the plans of the on-farm distribution system so that adequate records of location of the various pipelines can be maintained in the District office.

19. **Change in Rules and Regulations**

These rules and regulations shall become effective immediately and may be changed by resolution or minute order of the Board of Directors of the District from time to time.

20. **Enforcement of Rules and Regulations**

The Manager of the District shall be responsible for the enforcement of the rules and regulations. Refusal to comply with any of the rules and regulations shall be sufficient cause for the termination of water service, and water service will not again be furnished until full compliance has been made with all the requirements herein set forth. In no event shall any liability accrue against the District or any of its officers, agents or employees, for damage, direct or indirect, arising from such temporary discontinuance or reduction of water deliveries.

Appendix 9. Permanent Entitlement Transfer Policy

RESOLUTION NO. 641

RESOLUTION OF THE BOARD OF DIRECTORS OF BERRENDA MESA WATER DISTRICT OF KERN COUNTY CALIFORNIA AMENDING RESOLUTION #613 PERTAINING TO WATER MARKETING

WHEREAS, Section 8(a) of Resolution #613 established a limitation of 2.8 acre feet per acre on the sale of water entitlement, and

WHEREAS, Section 7 of the judgment in Kern County Superior Court Case #237845 set a limit based upon the ratio of lands in the service area to the District's entitlement, and

WHEREAS, the Board of Directors of the Berrenda Mesa Water District does resolve as follows:

Section 1: that Section 8(a) of Resolution #613 is hereby amended to read as follows:

8 (a) Owners of land for which a water supply contract has been executed, pursuant to the terms of Water Code Section 25422.5 shall be entitled to market the amount of entitlement set forth in said contract provided that no more than the amount set forth in paragraph 7 of the judgment in Kern County Superior Court Case #237845 which reads as follows:

"7. No owner of land within the service area of the District shall be allowed to sell entitlement attributable to such land in excess of an amount equal to the District's Table One entitlement for the year of transfer divided by the total service area of the District for that year."

Section 2: The terms of this resolution shall be retroactively effective to January 1, 2000.

President

ATTEST:

Secretary

I, HARRY O. STARKEY, Secretary of the BERRENDA MESA WATER DISTRICT, of Kern County, California, do hereby certify that the foregoing is a full, true and correct copy of a resolution adopted by the Board of Directors of said District at a regular meeting of said Board held on ~~October 15, 2002~~ AUGUST 21, 2003 by the following roll call vote:

AYES: MacILVAINE, LEON
ELWELL, NEAL
JOHNSON

ABSENT: NONE

NOES: NONE

Dated:_____

Secretary, Berrenda Mesa Water District

RESOLUTION NO. 628

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE BERRENDA MESA WATER DISTRICT, OF KERN COUNTY, CALIFORNIA, AMENDING RESOLTUION NO. 613 RELATING TO WATER MARKETING

The Board of Directors of Berrenda Mesa Water District does hereby resolve as follows:

Section 1: That Section 2 of Resolution No. 613 is hereby amended to read as follows:

"2(a) The owners of all lands from which the entire amount of the District Landowner Contracts for state water entitlement is sold or 2.8 acre feet of water from non-contract lands in the service area shall execute a consent to detach said land from the District. Such consent shall be in a form as determined by the District.

(b) If actual detachment is required by the District, the owner shall have the option of re-annexing said land to the District upon detaching a like amount of land with equal water entitlement."

ADOPTED, SIGNED AND APPROVED this 18th day of January, 2000.

President

ATTEST:

Secretary

I, HARRY O. STARKEY, Secretary of the BERRENDA MESA WATER DISTRICT, of Kern County, California, do hereby certify that the foregoing is a full, true and correct copy of a resolution adopted by the Board of Directors of said District at a regular meeting of said Board held on January 18, 2000, by the following roll call vote:

AYES: MacIlvaine
Leon
Elwell
Johnson

ABSENT: None

NOES: Neal

Dated:_____

Secretary, Berrenda Mesa Water District

RESOLUTION NO. 613

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE BERRENDA MESA WATER DISTRICT, OF KERN COUNTY, CALIFORNIA, RELATING TO WATER MARKETING.

WHEREAS, the rising cost of water has made it uneconomic to farm certain crops in the District; and

WHEREAS, certain provisions of state law have been enacted to facilitate the marketing of water by the District; and

WHEREAS, the prorata share of the District's water entitlement is 2.8 acre feet per acre; and

WHEREAS, the District's goal is to market water entitlement while maintaining a water supply sufficient to service the lands remaining in production.

NOW, THEREFORE, in consideration of the foregoing, the Board of Directors of the BERRENDA MESA WATER DISTRICT does hereby resolve, order, and determine as follows:

1. All landowners in the District shall be allowed to participate in the water marketing of a share of the District's water entitlement, provided they have contracted for a share of the District's water supply or are in the service area of the District.

2. All lands from which the entire amount of the District Landowner contract for state water entitlement is sold or 2.8 acre feet per acre from non-contract lands in the service area shall be detached from the District.

3. If a landowner owes money to the District for delinquent water tolls, standby charges, assessments, loans or otherwise, those monies shall be paid to the District from the proceeds of sale.

4. Owners of lands from which water entitlement is sold shall pay to the District a prorata share of the remaining balance of the District's bond and DWR loan indebtedness. Owners of all such lands shall also pay a prorata share of any costs or expense incurred in connection with such water marketing.

5. Owners of land from which their allocated water entitlement is sold shall pay the District for the present value of the unit cost per acre of operation, maintenance and administrative

costs for five years at 8% interest.

6. Water entitlement from District owned land shall be the first entitlement to be marketed. Thereafter service area lands shall have a priority of marketing.

7. All net proceeds from water entitlement sales from District owned lands shall be distributed to then current owners of record of all lands which were subject to standby charges as of January 1, 1996. The net proceeds of water entitlement sales from privately owned lands shall be distributed to the owners of said lands.

8. (a) Owners of lands for which a water supply contract has been executed, pursuant to the terms of Water Code Section 35422.5, shall be entitled to market the amount of the entitlement set forth in said contract provided that no more than 2.8 acre feet per acre of landowner contracts for such entitlement shall be sold prior to January 1, 2008.

(b) The District will retain and allocate for use and potential marketing 2.8 acre feet of water entitlement per acre for service area lands for which no water supply contract is signed. These service area lands without contracts shall be entitled to market their full allocation of 2.8 acre feet per acre of water entitlement.

(c) Non service area lands which do not sign a water supply contract will be excluded from marketing water entitlement and receiving revenue from entitlement sales and no water entitlement will be reserved for future use by such lands.

9. This resolution applies only to the sale of permanent water contract entitlement as opposed to annual sales of allocated water supply excess to the needs of the District lands.

10. This resolution applies only to sales of entitlement by the District on behalf of District landowners. Any request by a landowner to make a direct permanent sale of water entitlement will be reviewed by the District's Board of Directors on a case by case basis.

11. Resolution 602 is hereby repealed.

12. This resolution shall only take effect if the limits set forth in Section 1.b. of Resolution 611 are met.

ADOPTED, SIGNED AND APPROVED this 7TH day of AUGUST, 1997.

President

ATTEST:

Secretary

I, H. RONALD LAMPSON, Secretary of the BERRENDA MESA WATER DISTRICT, of Kern County, California, do hereby certify that the foregoing is a full, true and correct copy of a resolution adopted by the Board of Directors of said District at a regular meeting of said Board held on AUGUST 7, 1997, by the following roll call vote:

AYES: JOE MacILVAINE, RON KHACHIGIAN, BILL PHILLIMORE, TOM JOHNSON, MIKE NEAL
NOES: NONE

ABSENT: NONE

Dated:

Secretary, BERRENDA MESA WATER DISTRICT

RESOLUTION NO. 602

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE BERRENDA MESA WATER DISTRICT, OF KERN COUNTY, CALIFORNIA, RELATING TO WATER MARKETING

WHEREAS, the rising cost of water has made it uneconomic to farm certain crops in the District; and

WHEREAS, certain provisions of state law have been enacted to facilitate the marketing of water by the District; and

WHEREAS, the prorata share of the District's water entitlement is 2.8 acre feet per acre; and

WHEREAS, the District's goal is to market such prorata share while maintaining a water supply sufficient to service the lands remaining in production.

NOW, THEREFORE, in consideration of the foregoing, the Board of Directors of the BERRENDA MESA WATER DISTRICT does hereby resolve, order, and determine as follows:

1. All landowners in the District shall be allowed to participate in the water marketing of a prorata share (2.8 acre feet/acre) of the District's water entitlement.

2. All lands from which a prorata share of the District's contract entitlement is sold shall be detached from the District.

3. If a landowner owes money to the District for delinquent water tolls, standby charges, assessments, loans or otherwise, those monies shall be paid to the District from the proceeds of sale.

4. All lands from which water is sold shall pay to the District a prorata share of the remaining balance of the District's bond and DWR loan indebtedness. All such lands shall also pay a prorata share of any costs or expense incurred in connection with such water marketing.

5. Owners of land which sell their allocated water entitlement shall pay the District for the present value of the unit cost per acre of operation, maintenance and administrative costs for five years at 8% interest.

6. Water from District owned land shall be the first to be marketed. Thereafter service area lands shall have a priority of marketing over non-service lands for a period of five years.

7. After deduction of payments as aforesaid, all net proceeds from sales from District owned lands shall be distributed to then current owners of record of all lands which were subject to standby charges as of January 1, 1996. The net proceeds of sales of privately owned lands shall be distributed to the owners of said lands.

8. It is the intent of this Board to pursue legislation specifically permitting the District to enter into long term water contract with its landowners. In the interim,

commencing in the 1997 water year, the Board intends to modify the standby charge procedure so that service area lands shall receive a standby charge only to pay for the fixed component of the costs of water under the District's contract with the Kern County water Agency which has not been ordered by landowners as of September 1 of the year prior to the year of delivery. All other fixed and variable charges shall be raised through water tolls.

9. This resolution applies only to the sale of permanent water entitlement as opposed to annual sales of surplus water.

10. This resolution applies only to sales by the District on behalf of landowners. Any request by a landowner to make a direct sale will be reviewed on a case by case basis.

ADOPTED, SIGNED AND APPROVED this 20th day of February, 1996.

President

ATTEST:

Secretary

I, H. RONALD LAMPSON, Secretary of Berrenda Mesa Water District, of Kern County, California, do hereby certify that the foregoing is a full, true and correct copy of a resolution adopted by the Board of Directors of said District at a regular meeting of said Board held on February 20, 1996 by the following roll call vote:

AYES: Joe MacIlvaine
Bill Phillimore
Ron Khachigian
Mike Neal
Tom Johnson

ABSENT: None

NOES: Noes

Dated_____

_____
Secretary

Appendix 10. Water Transaction Report

Berrenda Mesa Water District

Water Transactions - Transaction and Usage Summary

From 01/01/2012 - 12/31/2012

Company	Effective Date	Description	Service Area	Transaction Amount
	01/01/2012	2012 Table A Allocation @ 65%		1,856.73
	01/01/2012	Carryover from 2011		338.35
	03/01/2012	Groundwater exchange w/ WKWD		1,000.00
	04/01/2012	Transfer from Pacific Almond		78.26
	04/30/2012	Agency Table A		18.20
	04/30/2012	Butte Co. Water (est)		53.43
	04/30/2012	CLWA Water (est)		691.56
	04/30/2012	Dry Year Program (SOD) (est)		298.00
	04/30/2012	FID Water (est)		27.73
	04/30/2012	TCCWD Water (est)		28.26
	04/30/2012	Yuba Water (est)		30.02
	06/22/2012	Adjust 2010 Carryover		43.89
	06/22/2012	Adjust 2011 Losses		-12.87
	07/30/2012	2011 Metering and Supply Adjustment		28.41
	09/30/2012	Dry Year Water (Stranded in Oroville)		-298.00
	10/23/2012	Browns Valley ID Water		12.03
	11/28/2012	Exchange with Western Development		250.00
	12/01/2012	Turnback Pool A		6.42
	12/01/2012	WHWD Water		20.55
	12/31/2012	2012 Losses		-35.20
			Total:	4,435.77
	Usage Within Water District (01/01/2012 - 12/31/2012)			-3,516.28
	Total ----------			919.49

Appendix 11. Certified Test Report

Propeller Meter

CERTIFIED TEST REPORT

CUSTOMER: MCCALLS METER SALES SERVICE
MODEL NO: M0306
METER SERIAL NO: 11-04485

CONFIGURATION

METER INSIDE DIAMETER: 6.065
METER OUTSIDE DIAMETER: 6.625
TEST DATE: 6/16/2011
TEST FACILITY: Volumetric
IDEAL TEST CONSTANT: 6738

CALIBRATION DATA

	Tested TC	GPM	Accuracy
1	6741	1257	100.0

CERTIFIED BY: Paul Hobbs **DATE:** 6/20/2011

This calibration was performed on a gravimetric or volumetric test facility, traceable to the National Institute of Standards and Technology, USA. The estimated flow measurement uncertainty of the calibration facilities are:
Gravimetric +/- 0.15% Volumetric +/- 0.5%

McCROMETER
3255 WEST STETSON AVENUE
HEMET, CA 92545 USA
PHONE (951) 652-6811 / FAX (951) 652-3078
WEB SITE: http://www.mccrometer.com E-MAIL: info@mccrometer.com

11-04485

6/20/2011 9:06:38 AM
Version 1 2 (4/18/2007)

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