

ANTELOPE VALLEY-EAST KERN WATER AGENCY

2021 Water Shortage Contingency Plan

MAY 2021



Prepared by Water Systems Consulting, Inc.



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Water Shortage Contingency Plan

This WSCP is a detailed plan for how AVEK intends to respond to foreseeable and unforeseeable water shortages. A water shortage occurs when the water supply is reduced to a level that cannot support typical demand at any given time.

The Water Shortage Contingency Plan (WSCP) is used to provide guidance by identifying response actions to allow for efficient management of any water shortage with predictability and accountability. The tools in the WSCP enable the Antelope Valley-East Kern Water Agency (AVEK or Agency) to maintain reliable supplies and reduce the impact of supply interruptions due to extended drought or catastrophic supply interruptions.

The WSCP describes the following:

- **Water supply reliability analysis:** Summarizes the AVEK water supply analysis and reliability, and identifies any key issues that may trigger a shortage condition.
- **Annual water supply and demand assessment procedures:** Describes the key data inputs, evaluation criteria, and methodology for assessing the system's reliability for the coming year and the steps to formally declare any water shortage levels and response actions.
- **Standard shortage stages:** Establishes water shortage levels to clearly identify and prepare for shortages.
- **Shortage response actions:** Describes the response actions that may be implemented or considered for each stage to reduce gaps between supply and demand as well as minimize social and economic impacts to the community.
- **Communication protocols:** Describes communication protocols under each stage to ensure customers, the public, and government agencies are informed of shortage conditions and requirements.
- **Legal authority:** Lists the legal ordinance that grants AVEK the authority to declare a water shortage and implement and enforce response actions.
- **Financial consequences of WSCP implementation:** Describes the anticipated financial impact of implementing water shortage stages and identifies mitigation strategies to offset financial burdens.
- **WSCP refinement procedures:** Describes the factors that may trigger updates to the WSCP and outlines how to complete an update.
- **Plan adoption, submittal, and availability:** Describes the process for the WSCP adoption, submittal, and availability after each revision.

This WSCP was prepared in conjunction with AVEK's 2020 Urban Water Management Plan (UWMP) and is a stand-alone document that can be modified as needed. This document is compliant with California Water Code (CWC) Section 10632 and incorporates guidance from the State of California Department of Water Resources (DWR) UWMP Guidebook. The plan is intended to provide guidance, rather than absolute direction, for action in response to water shortages and provide options to responsibly manage water shortages.

1.1 Water Supply Reliability

Water supply reliability reflects the Agency's ability to meet the water needs of its retailers with water supplies under varying conditions. The analysis considers plausible hydrological and regulatory variability, climate conditions, and other factors that affect water supply and demand. The following is a concise narrative of the water supply reliability assessment. Chapter 7 of AVEK's 2020 UWMP describes the reliability of the water supply by comparing supply and demand projections through 2045 for normal, single dry, and multiple dry years. The section also assesses the drought risk over the next five years (2021 to 2025) assuming the driest five-year period is repeated over the next five years. Refer to the 2020 UWMP for the full assessment. As demonstrated in this section, AVEK has sufficient supplies to meet demand in normal year, single dry, and multiple dry years.

As a wholesale water supplier, AVEK provides water to retail water suppliers in the Antelope Valley. AVEK's supplies for this assessment consist of:

- The State Water Project (SWP), which is managed by DWR.
- Antelope Valley Groundwater Basin adjudicated rights, including production rights and imported water return flows, which are managed by the Antelope Valley Groundwater Basin Watermaster.
- New supplemental water supplies acquired by AVEK for Los Angeles County Waterworks Districts (LACWD) per a memorandum of understanding (MOU) with LACWD for new growth within the LACWD service area.

AVEK's water reliability goal is to provide a level of regional water reliability that supports customers' water needs by developing groundwater banking programs to help increase the reliability of the Antelope Valley region's water supplies. This is achieved by storing excess SWP water during wet periods in the local groundwater basin and recovering it for delivery to customers during dry and high-demand periods or during a disruption in deliveries from the SWP.

For the water supply reliability analysis, the following supply availability assumptions were applied for SWP Table A allocation for normal, single dry year, and multiple dry conditions for each of the City's supplies:

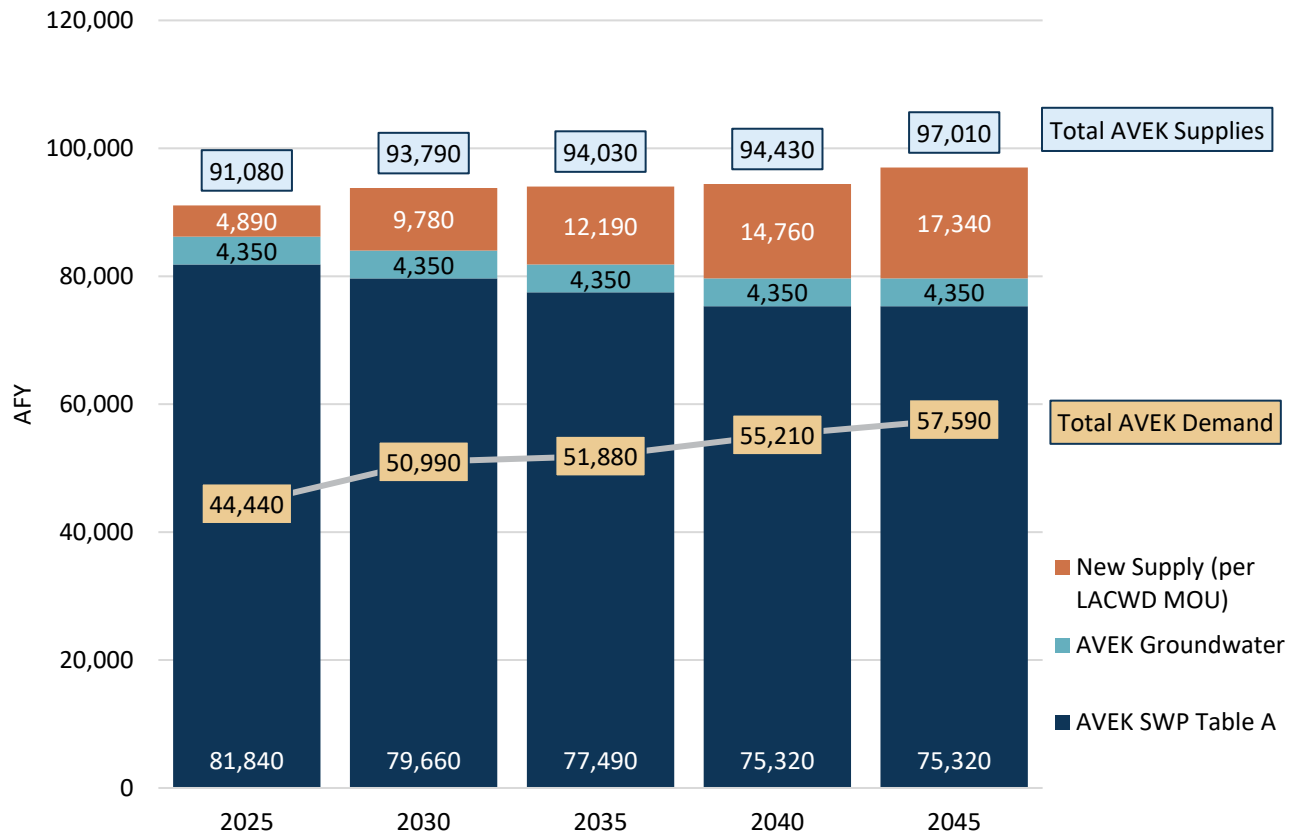
- **Normal Year:** Average yield based on DWR 2019 SWP Delivery Capability Report (DCR) (California Department of Water Resources 2020).
- **Single Dry Year:** The lowest Table A allocation was 5% in 2014 and 2021 (as of May 2021).
- **Multiple Dry Year:** The five-year historical sequence with the lowest available supply in the 2019 DCR was 1988 to 1992.

AVEK groundwater supplies are assumed to consist of 3,550 acre-feet per year (AFY) of production rights from the adjudication and 800 AFY of imported water return flows based on 2016 to 2020 return flows. Groundwater rights are not impacted by short-term drought conditions, so normal year groundwater yield assumptions are applied. In years with low SWP Table A allocations, the remainder of demand is met with groundwater bank supplies.

1.1.1 Normal Year

Average SWP Table A allocation is projected to decrease from 58% in 2020 to 52% in 2040 (California Department of Water Resources, 2020). Total normal year AVEK supplies are shown in **Figure 1**. Based on these assumptions, AVEK has sufficient supplies in normal years and could use available supplies to build groundwater storage for dry periods. For example, SWP water could be recharged when available, or unused groundwater rights can be carried over for use in future years.

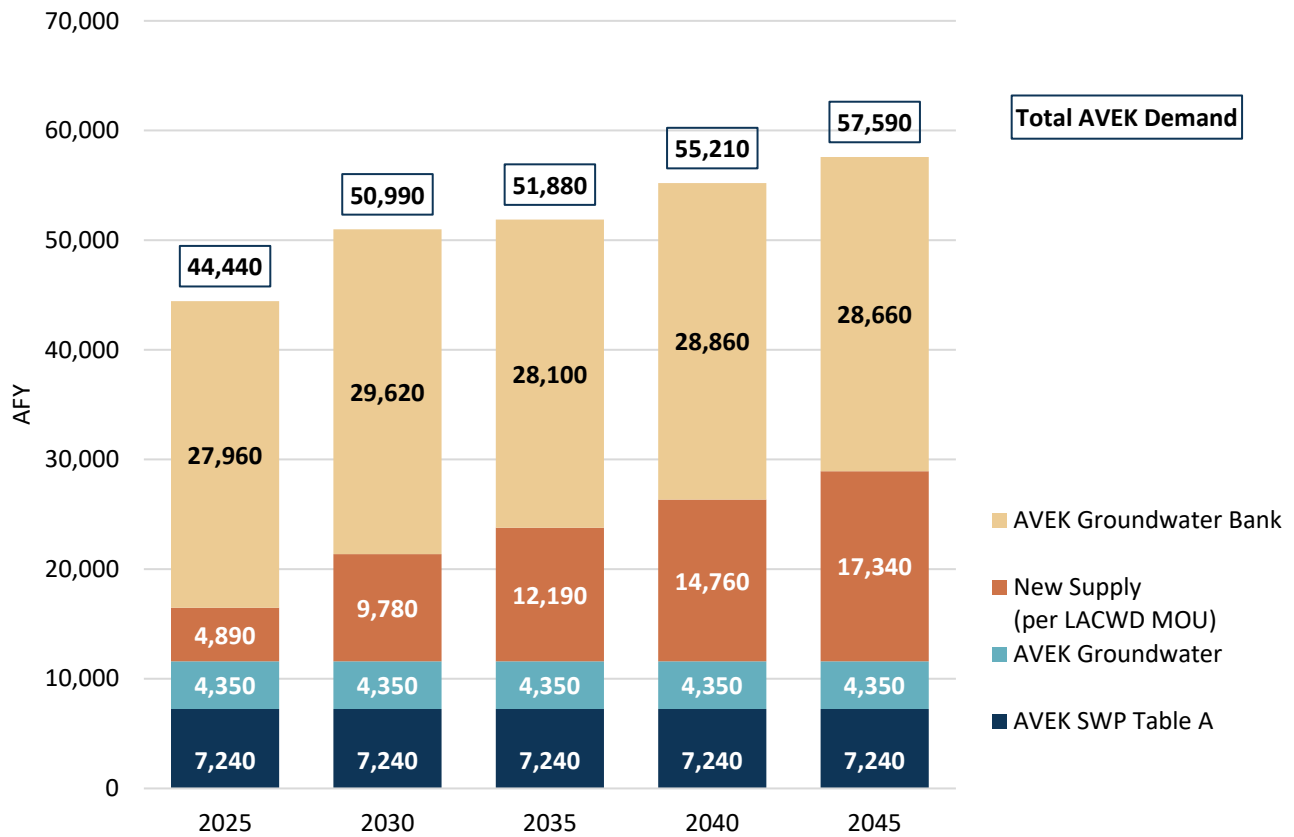
Figure 1. AVEK Supply and Demand Projections, Normal Year



1.1.2 Single Dry Year

Single dry year yield for SWP water is based on actual 2014 and 2021 allocations (as of May 2021) of 5%. Groundwater rights are not impacted by short-term drought conditions, so normal year groundwater yield assumptions are applied. The new supplemental water supplies (per LACWD MOU) are assumed to have greater reliability than SWP Table A supplies based on the mix of supplies. The remainder of demand is met with groundwater in storage. AVEK’s banking recovery production target is at least enough pumping capacity to meet demands in a year with SWP Table A allocations of 10%. As shown in **Figure 2**, groundwater bank supplies enable AVEK to meet its demands.

Figure 2. AVEK Supply and Demand Projections, Single Dry Year



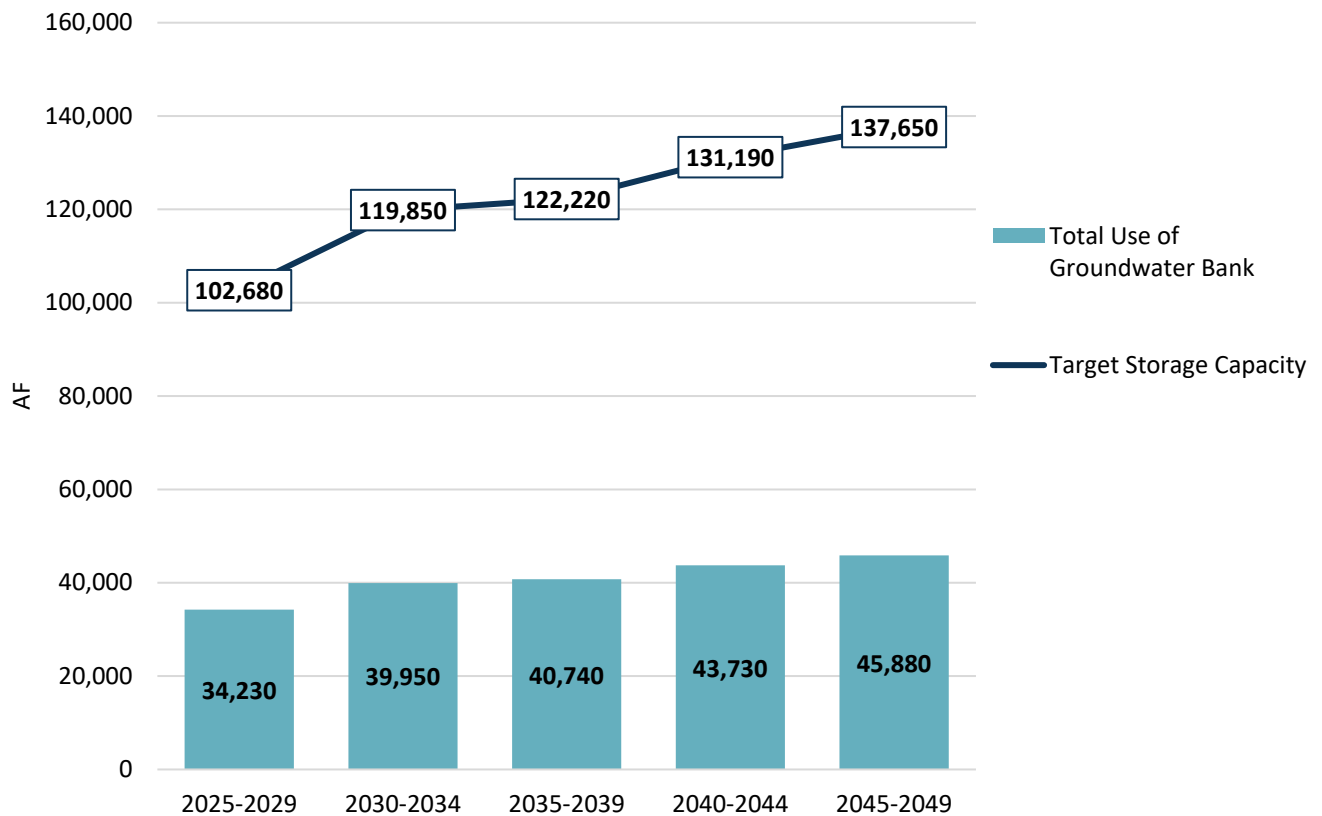
1.1.3 Five Consecutive Dry Years

For multiple dry years, SWP water availability is based on the five-year period with the lowest SWP simulated yield from the 2019 SWP DCR (1988–1992) and the following annual Table A allocation:

- Year 1 (1988) 12.3%
- Year 2 (1989) 32.2%
- Year 3 (1990) 13.3%
- Year 4 (1991) 25.6%
- Year 5 (1992) 18.0%

Similar to single dry year, new supplemental water supplies (per LACWD MOU) are assumed to have greater reliability than SWP Table A supplies, groundwater rights are not impacted by an extended drought, and groundwater bank supplies are used to meet remaining demands. As shown in **Figure 3**, additional groundwater bank supplies would be available if the five-year drought continued and sufficient water is in storage at the beginning of an extended drought.

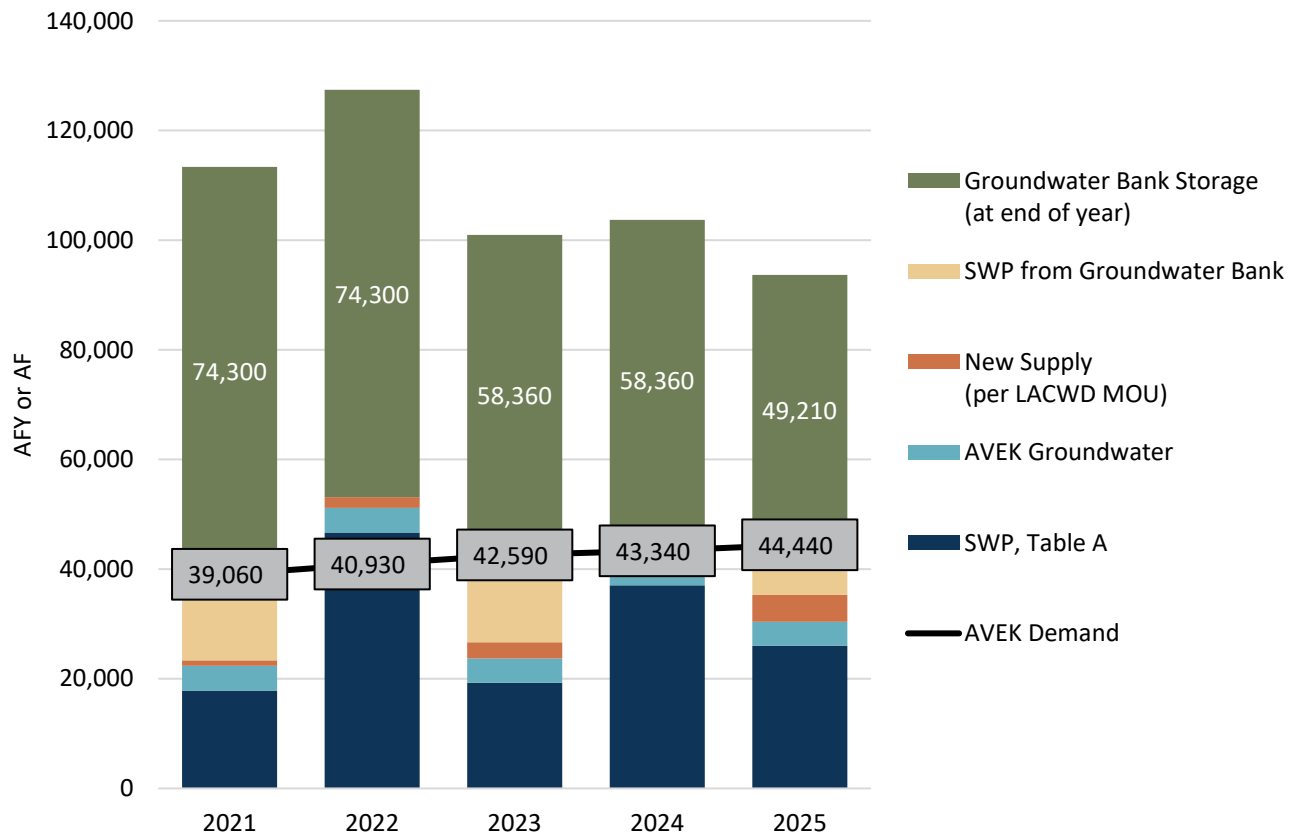
Figure 3. AVEK Groundwater Bank Use vs. Storage Capacity during Five Consecutive Dry Years



1.1.4 2021-2025 Drought Risk Assessment

The Drought Risk Assessment for the upcoming five years (2021–2025) is based on the five-year period with the lowest SWP simulated yield from the 2019 SWP DCR (1988–1992). **Figure 4** presents the projected supplies used to meet demands and the remaining available supply each year. AVEK currently has roughly 90,000 acre-feet (AF) of SWP water stored within its banks for future recovery and is implementing infrastructure projects to expand its capacity to recharge water, recover water, and distribute recovered water. As shown in the figure, AVEK still would have over 40,000 AF of groundwater remaining in storage at the end of a five-year drought that starts in 2021.

Figure 4. 2021–2025 AVEK Drought Reliability Assessment



1.2 Annual Water Supply and Demand Assessment

As established by CWC Section 10632.1, urban water suppliers must conduct annual water supply and demand assessments, and submit an annual water shortage assessment report to DWR with information on anticipated shortages, triggered shortage response actions, and compliance and enforcement actions consistent with the WSCP. Beginning July 1, 2022, AVEK must prepare its annual water supply and demand assessment and submit an Annual Water Shortage Assessment Report to DWR. The Annual Water Shortage Assessment Report will be due by July 1 of every year.

Per CWC, the annual assessment must include:

- The written decision-making process AVEK will use each year to determine its water supply reliability.
- The key data inputs and assessment methodology used to evaluate the supplier's water supply reliability for the current year and one dry year, including:
 - Current year unconstrained demand
 - Current year available supply in the current year and one dry year
 - Existing infrastructure capabilities and plausible constraints
 - A defined set of locally applicable evaluation criteria that are consistently relied upon for each annual water supply and demand assessment
 - A description and quantification of each source of water supply

AVEK regularly assess its water supply and demands. The following are AVEK's targets and goals when making decisions on managing AVEK's water supplies:

- Storage goals
 - SWP carryover goal of 15,000 to 20,000 AF in the event the following water year is below average or dry
 - Local groundwater storage goal to have enough local groundwater storage to meet customer demands for three years with a 10% SWP allocation for those three years
- During the fourth quarter of each year, AVEK requests a five-year demand projection from each of its customers. AVEK uses this information to calculate what the projected annual demand will be for AVEK and tracks the projected versus actual demand to adjust the plan for that year.
- AVEK's General Manager, Assistant General Manager, Water Resources Manager, and Operations Manager meet regularly to review the available water supplies and sources, customer demands, and transfer/exchange statuses. Decisions are discussed and made as to which water sources will be used and what facilities will be used to treat/distribute the water to meet the demands of its customers.

1.3 Water Shortage Stages

In the event of water supply shortages, the Agency will make water delivery reductions per this WSCP. The stages of action are summarized in **Table 1**. Actions to be taken as a result of a catastrophic water supply shortage are discussed in **Section 1.4.4**.

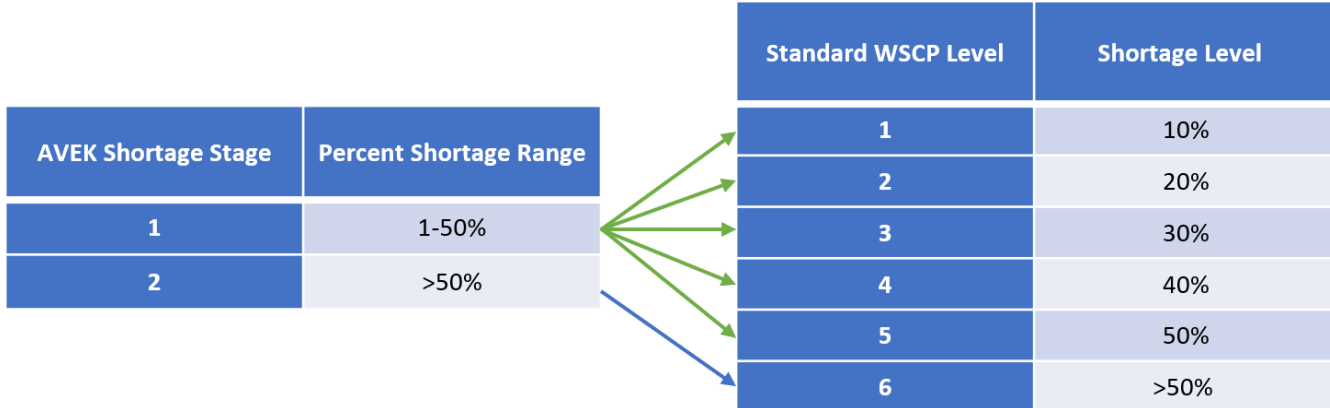
Table 1. WSCP Levels (DWR Table 8-1)

Shortage Level	Percent Shortage Range (Numerical Value as a Percent)	Water Supply Condition
1	Up to 50%	Reduction in SWP Allocation below Current Demand
2	>50%	Reduction in SWP Allocation below Current Demand or Catastrophic water supply shortage

1.3.1 Standard Water Shortage Level Crosswalk

CWC Section 10632(a)(3)(A) includes six standard water shortage levels corresponding to progressive ranges of up to 10%, 20%, 30%, 40%, and 50% shortages and greater than 50% shortages. If the supplier’s water shortage levels do not correspond with the six standard levels, a crosswalk between the supplier’s stages and the standard levels is required for compliance, as shown in **Figure 5**.

Figure 5. Water Shortage Level Crosswalk



1.4 Shortage Response Actions

CWC Section 10632 (a)(4) requires the WSCP to specify shortage response actions that align with the defined shortage levels. The Agency has defined specific shortage response actions that align with the defined shortage levels in **Table H-1** and **Figure H-5**. These shortage response actions were developed with consideration to the system infrastructure and operations changes, supply augmentation responses, customer-class- or water-use-specific demand reduction initiatives, and increasingly stringent water use prohibitions.

1.4.1 Demand Reduction

Although AVEK does not have the authority to implement consumer-level reduction methods, the Agency has adopted some consumption reduction measures to help retail water suppliers reduce water usage. These are listed in **Table 2** and described in more detail in the 2020 UWMP Chapter 9, Demand Management Measures.

Table 2. Demand Reduction Actions (DWR 8-2)

SHORTAGE LEVEL	DEMAND REDUCTION ACTIONS	HOW MUCH IS THIS GOING TO REDUCE THE SHORTAGE GAP? ¹	ADDITIONAL EXPLANATION OR REFERENCE	PENALTY, CHARGE, OR OTHER ENFORCEMENT
All	Expand Public Information Campaign	Up to 50%	Community outreach that includes educational information and water conservation tips	No

Note:

1. Reduction in the shortage gap is estimated and can vary significantly.

1.4.2 Supply Augmentation

The SWP conveyance infrastructure enables AVEK to convey supplemental water purchases to augment drought year supplies. Refer to the 2020 UWMP Section 6.2 for more information on supplemental water purchases and transfers. Supply augmentation actions are described in **Table 3**. These augmentations represent short-term management objectives triggered during a water shortage and do not overlap with the long-term new water supply development or supply reliability enhancement projects.

Table 3. Supply Augmentation & Other Actions (DWR 8-3W)

SHORTAGE LEVEL	SUPPLY AUGMENTATION METHODS AND OTHER ACTIONS BY WATER SUPPLIER	HOW MUCH IS THIS GOING TO REDUCE THE SHORTAGE GAP?	ADDITIONAL EXPLANATION OR REFERENCE
Agency Discretion	Water Purchases and Transfers	Varying	Supplemental water purchases from SWP

1.4.3 Emergency Response Plan

AVEK maintains emergency plans for activities required in the event there is an interruption in the SWP water supply or there is a major mechanical or electrical failure in one of the water treatment plants. In September 2020, AVEK adopted an Emergency Response Plan (ERP) in alignment with America’s Water Infrastructure Act of 2018. An ERP describes strategies, resources, plans, and procedures

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utilities can use to prepare for and respond to an incident, natural or man-made, that threatens life, property, or the environment. The ERP is not attached to this WSCP due to sensitive information included, but key aspects are summarized in this section.

The emergency activities undertaken by AVEK depend upon the severity of the problem and how quickly it can be remedied. Response to a catastrophic event will always include contact and coordination with AVEK's customers. If the emergency can be resolved within the available water storage time frame, only a few of the larger customers need to be notified of the temporary decrease in water supply. If there will be a stoppage in the raw water deliveries to the various water treatment plants, all customers (Municipal and Industrial (M&I) and agriculture) will be notified of the stoppage and how soon water deliveries may be resumed.

Possible catastrophes affecting water supply may include:

- Widespread power outage
- Local earthquake
- Agency treatment plant shutdown due to vital component failure
- Aqueduct failure due to earthquake or other circumstances
- Delta levee failure

In the event of power loss, AVEK has permanent emergency power generation equipment that automatically starts to maintain water treatment operations. In the event of an earthquake, AVEK personnel will survey and assess damage and respond accordingly with shutdowns and repairs. Damaged Agency treatment plant components, whether mechanical or electrical, may be able to be circumvented due to the duplication of pumping and operations systems or the availability of manual override controls.

If raw water deliveries to water treatment plants are temporarily stopped, treated water from other plants may be able to be rerouted to the affected areas via interconnecting pipeline systems. Recovery of previously banked groundwater can be used to supply water in the event of SWP outages. The magnitude of reduced water deliveries and length of time before resumption of full water availability will determine the extent of customer (M&I and agriculture) notification and activities required by AVEK staff. In the event of a long-term outage of SWP supplies, AVEK will coordinate with the retail water agencies to develop and implement appropriate regional water conservation measures.

Failure of the aqueduct or Delta levees could result in significant outages and potential interruption in SWP service to AVEK for six months or longer. DWR has estimated that, in the event of a major earthquake in or near the Delta, regular water supply deliveries from the SWP could be interrupted for up to three years, posing a substantial risk to the California business economy. Accordingly, a post-event strategy has been developed which would provide necessary water supply protections. The plan has been coordinated through DWR, the Army Corps of Engineers (Corps), Bureau of Reclamation, California Office of Emergency Services (Cal OES), Metropolitan Water District of Southern California, and State Water Contractors. Full implementation of the plan would enable resumption of at least partial deliveries from the SWP in less than six months.

DWR has developed the Delta Flood Emergency Management Plan to provide strategies for a response to Delta levee failures, addressing a range of failures up to and including earthquake-induced multiple island failures during dry conditions when the volume of flooded islands and saltwater intrusion is large. Under such severe conditions, the plan includes a strategy to establish an emergency freshwater pathway from the central Delta along Middle River and Victoria Canal to the export pumps in the south Delta. The plan includes the pre-positioning of emergency construction materials at existing and new stockpiles and warehouse sites in the Delta, and development of tactical modeling tools (DWR Emergency Response Tool) to predict levee repair logistics, water quality conditions, and timelines of levee repair and suitable water quality to restore exports. The Delta Flood Emergency Management Plan has been extensively coordinated with state, federal, and local emergency response agencies.

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DWR, in conjunction with local agencies, the Corps, and Cal OES, regularly conducts simulated and field exercises to test and revise the plan under real-time conditions.

DWR and the Corps provide vital Delta region response to flood and earthquake emergencies, complementing an overall Cal OES structure. Cal OES is preparing its Northern California Catastrophic Flood Response Plan, which incorporates the DWR Delta Flood Emergency Management Plan. These agencies use a unified command structure and response and recovery framework. DWR and the Corps, through a Draft Delta Emergency Operations Integration Plan (April 2015), would integrate personnel and resources during emergency operations.

The DWR Delta Levees Subvention Program has prioritized, funded, and implemented levee improvements along the emergency freshwater pathway and other water supply corridors in the central and south Delta region. These efforts have been complementary to the DWR Delta Flood Emergency Management Plan, which, along with use of pre-positioned emergency flood fight materials in the Delta, relies on the pathway and other levees providing reasonable seismic performance to facilitate restoration of the freshwater pathway after a severe earthquake. Together, these two DWR programs have been successful in implementing a coordinated strategy of emergency preparedness for the benefit of SWP and Central Valley Project (CVP) export systems.

Significant improvements to the central and south Delta levee systems along the Old and Middle Rivers began in 2010 and are continuing to the present time at Holland Island, Bacon Island, Upper and Lower Jones Tracts, Palm Tract, and Orwood Tract. This complements substantially improved levees at Mandeville and McDonald Islands and portions of Victoria and Union Islands. Together, levee improvements along the pathway and Old River levees consisting of crest raising, crest widening, landside slope fill, and toe berms meet the needs of local reclamation districts and substantially improve seismic stability to reduce levee slumping and create a more robust flood-fighting platform.

1.4.4 Seismic Risk Assessment and Mitigation Plan

AVEK completed a Risk and Resilience Assessment (R.E. Patterson and Associates, March 2020) in 2020 in alignment with America's Water Infrastructure Act of 2018 and conducted a focused seismic assessment as part of the 2020 AVEK Water System Master Plan (Carollo, September 2020). These documents, along with the AVEK ERP (discussed in the previous section) address the risk assessment and emergency response requirements for UWMPs in the water code.

1.5 Communication Protocols

AVEK strives to be proactive in communicating work strategy and conservation efforts with its retail customers. To support these efforts, AVEK developed a Strategic Communications Plan in 2020. For water shortages, AVEK would focus on key stakeholders, which include AVEK customers (public agencies, agricultural entities, water purveyors, and individuals), agency directors and staff, and State Water Contractors. AVEK would also engage with secondary stakeholders, such as constituents, government agencies (local, state, and federal), and elected officials (local, state, and federal).

Engagement would occur through owned media and earned media. Owned media is any communication channel that the Agency has control over, such as its website, social media pages, newsletters, or e-mail outreach. Owned media can be used to disseminate information and resonate messages.

The following media outlets have been identified and prioritized:

- Website, including news bulletins, press releases, news stories, and newsletter
- Newsletter
- Videos and photos
- Social media channels, including Facebook, Twitter, and LinkedIn

In addition, AVEK would emphasize water shortage conditions and measures at events. Earned media refers to publicity that is gained through unpaid promotional efforts, such as press placements or social media content shared by others. The Agency maintains a media distribution list.

1.6 Legal Authorities

In the event of water supply shortages, the Agency will make water delivery reduction per the Agency law for allocations and the Agency's water shortage contingency ordinance (Ordinance O-07-2), which is included in **Attachment 1**.

AVEK can declare a water shortage emergency in accordance with CWC Chapter 3 (commencing with Section 350) of Division 1 general provision regarding water shortage emergencies. AVEK will coordinate with any city or county within which it provides water supply services for the possible proclamation of a local emergency under California Government Code, California Emergency Services Act (Article 2, Section 8558).

1.7 Financial Consequences of WSCP

Revenues collected by the Agency are currently used to fund operation and maintenance of the existing facilities and fund new capital improvements. In dry years, the Agency will estimate a projected range of water sales versus shortage stage to quantify the impact the shortage stage may have on projected revenues and expenses.

Revenue reductions and an increase in expenses may occur during implementation of the water shortage contingency plan. The magnitude of the revenue reduction and expenditure increase will depend on the severity of the shortage. In some cases, AVEK may be able to absorb the revenue shortfall/expenditure increase by reallocating existing funds, such as delaying some capital projects. For more severe events, the Agency may enact a rate adjustment to its customers.

1.8 WSCP Refinement Procedures

AVEK intends to use this WSCP as an adaptive management plan to respond to foreseeable and unforeseeable water shortages. The WSCP is used to provide guidance to the Agency, its staff, and the public by identifying response actions to allow for efficient management of any water shortage with predictability and accountability. To maintain a useful and efficient standard of practice in water shortage conditions, the requirements, criteria, and response actions need to be continuously evaluated and improved upon to make sure the WSCP provides the tools to maintain reliable supplies and reduce the impacts of supply shortages.

AVEK deliveries are entirely metered. The meter readings will be used to monitor the actual reductions in deliveries to AVEK's customers in accordance with the water shortage contingency plan to measure effectiveness of implemented strategies.

1.9 Plan Adoption, Submittal, and Availability

Per CWC Section 10632 (a)(c), AVEK sent letters of notification of preparation of the 2021 WSCP to all necessary cities, counties, retail water agencies, and interested parties within its service areas 60 days prior to the public hearing. Copies of the notification letter and distributions list is included in **Attachment 2**. AVEK made the draft 2021 WSCP available for public review and held a public hearing on June 8, 2021. The notice of the public review hearing (**Attachment 2**) was advertised in the Valley Press on May 26, 2021 and June 2, 2021. The 2020 UWMP, 2021 WSCP, and 2015 UWMP addendum were adopted by AVEK's Board of Directors on June 22, 2021. A copy of the Resolution of Adoption is included as Attachment 3.

Once the 2021 WSCP is adopted, a copy will be submitted to the California State Library, DWR, and all cities and counties within 30 days of adoption. The Agency will also have a physical copy of the 2021 WSCP available for public review at the AVEK Office (see address below) during normal business hours.

The WSCP also will be posted on the Agency's website at www.avek.org.

**Antelope Valley-East Kern Water
Agency 6500 W. Avenue N
Palmdale, CA 93551**

Based on DWR's review of the WSCP, AVEK may make any amendments in its adopted WSCP as required and directed by DWR. If AVEK revises its WSCP after it is approved by DWR, an electronic copy of the revised WSCP will be submitted to DWR within 30 days of its adoption.

1.10 References

California Department of Water Resources. (2020). *2019 State Water Project Delivery Capability Report*.

Carollo. (September 2020). *DRAFT AVEK Water System Master Plan*.

R.E. Patterson and Associates. (March 2020). *AVEK Risk and Resilience Assessment*.

1

Attachment 1: AVEK Water Shortage Contingency Ordinance

2

Attachment 2: Notifications and Notification List

