



## MEMORANDUM

Date: May 19, 2010

To: Jill Duerig, General Manager

From: Kurt Arends, Assistant General Manager  
Jarnail Chahal, Acting Principal Engineer  
Brad Ledesma, Associate Engineer

### **Subject: Annual Review of Sustainable Water Supply for Zone 7 Water Agency**

On August 18, 2004, Zone 7 Water Agency (Zone 7) adopted the Reliability Policy for Municipal and Industrial (M&I) Water Supplies (Resolution 04-2662).<sup>1</sup> Resolution 04-2662 requires that Zone 7 staff complete an annual review of sustainable water supplies; the purpose of this memorandum is to comply with this requirement.

The review this year covered the following:

- Projected Water Demands: Next Five Years
- Available Water Supplies to Zone 7 at the Beginning of 2010
- Comparison of Supply and Demand: Next Five Years
- Programs Necessary to Meet Water Demands

The review completed in this memorandum indicates that Zone 7 has sufficient water supplies to meet projected water demands over the next five years with or without additional water conservation.

However, Zone 7's long-term water supply is at risk and subject to a very uncertain future due to recent court rulings, biological opinions associated with the Sacramento-San Joaquin Delta, and climate change. In response, Zone 7 staff is developing a Water System Master Plan update (WSMP) and revising the Urban Water Management Plan (UWMP) to address long-term water supply programs and projects necessary to meet projected water demands through buildout of adopted general plans.

### **PROJECTED WATER DEMANDS: NEXT FIVE YEARS**

Every year Zone 7 obtains water demand projections from all of its customers for the next five years – Table 1 summarizes these projections for 2010 to 2014 without additional water conservation.<sup>2</sup> As shown in Table 1, Zone 7's total water demands are projected to increase by 3.7 percent between 2010 and 2014, while water demands for

<sup>1</sup> A copy of Resolution 04-2662 is provided as Attachment A.

<sup>2</sup> Water conservation associated with Senate Bill SBX7-7 is discussed in subsequent sections.

Zone 7's untreated customers are expected to remain constant.

As a comparison, Zone 7 staff previously projected that water demands would increase by approximately 8 percent between 2009 and 2013.<sup>3</sup> This reduced projected water demand likely reflects recent water conservation efforts in the Livermore-Amador Valley associated with the current drought and the economic slowdown.

**Table 1. Projected Zone 7 Water Demands: Next Five Years, acre-feet<sup>(a)</sup>**

| Type                   | 2010   | 2011   | 2012   | 2013   | 2014   |
|------------------------|--------|--------|--------|--------|--------|
| M&I <sup>(b,c,d)</sup> | 46,200 | 46,600 | 47,100 | 47,500 | 48,100 |
| Untreated              | 4,600  | 4,600  | 4,600  | 4,600  | 4,600  |
| Total                  | 50,800 | 51,200 | 51,700 | 52,100 | 52,700 |

(a) Demands were rounded to the nearest 100 acre-feet.

(b) M&I = Municipal and Industrial.

(c) Demands include California Water Service Company, Dublin San Ramon Services District, City of Livermore, City of Pleasanton, Zone 7's direct retail customers, and Zone 7's unaccounted-for water.

(d) Includes groundwater-pumping quota for Dublin San Ramon Services District and unaccounted-for water.

### **Senate Bill SBX7-7 (20 Percent Reduction by 2020)**

In November 2009, the California legislature passed Senate Bill SBX7-7 (SB 7). SB 7 created a framework for future planning and actions by water supply retailers and agricultural water suppliers to reduce California's water use. More specifically, SB 7 required water supply retailers to reduce statewide per capita potable water consumption 20 percent by 2020.<sup>4</sup>

Although Zone 7 is not subject to the requirements of SB 7 because it is a wholesale water agency, Zone 7 fully supports the existing and planned efforts of the four water supply retailers within our service area to comply with this new law. Additionally, Zone 7 is working with its own direct and untreated water customers to reduce water demands.

Zone 7 is also working with the water supply retailers to better define existing water conservation tracking methods as part of the Valley Water Conservation Task Force and determine projected water conservation savings to meet SB 7 requirements as part of the UWMP update and the WSMP. Unfortunately, projected water conservation savings associated with SB 7 were not available from each of the water supply retailers for this memorandum.

Consequently, for planning-level purposes in this memorandum, Zone 7 staff developed preliminary estimates of potential water conservation savings using the criteria specified in SB 7 and data collected from each of the water supply retailers as part of the UWMP. These planning-level estimates were shared with the water supply retailers in February and April 2010, and are presented in Table 2 below.

Table 2 also summarizes the total projected water demand after including potential water conservation savings estimated by Zone 7 staff. As shown in Table 2, projected water demands could remain relatively constant between 2010 and 2014 depending on the

<sup>3</sup> Zone 7, 2009. Annual Review of Sustainable Water Supply for Zone 7 Water Agency.

<sup>4</sup> The baseline from which to save 20 percent by 2020 is different for each water supply retailer depending on historical data and use of recycled water.

success of regional conservation efforts.

**Table 2. Projected Zone 7 Water Demands with Water Conservation, acre-feet<sup>(a)</sup>**

| Type                          | 2010   | 2011   | 2012    | 2013    | 2014    |
|-------------------------------|--------|--------|---------|---------|---------|
| Total Water Demand            | 50,800 | 51,200 | 51,700  | 52,100  | 52,700  |
| Additional Water Conservation | (0)    | (500)  | (1,000) | (1,600) | (2,100) |
| Revised Water Demand          | 50,800 | 50,700 | 50,700  | 50,500  | 50,600  |

<sup>(a)</sup> Demands were rounded to the nearest 100 acre-feet.

<sup>(b)</sup> Water conservation is based on preliminary estimates determined by Zone 7 staff and reviewed by Zone 7's Retailers; these estimates will likely change as the Retailers better refine their own estimates.

For planning purposes in this review, Zone 7 staff compared projected water supplies with projected water demands, with and without water conservation, over the next five years.

### **AVAILABLE WATER SUPPLIES TO ZONE 7 AT THE BEGINNING OF 2010**

Zone 7 has developed a robust water supply system consisting of imported surface water, local runoff, groundwater recharge activities, and non-local storage.<sup>5</sup> This diverse water supply system allows Zone 7 to store excess water during average and wet years, and draw on these reserves during dry years to create a sustainable and reliable water supply for the Livermore-Amador Valley.

The purpose of this section is to review the water supplies, including contracted supply and storage, available to Zone 7 at the beginning of 2010. Attachment B provides a more detailed description of all of Zone 7's water supplies and their status.

### **Projected Yield from Contracted Water Supplies in 2010**

Each year Zone 7 receives water supply from its water rights permit for diversions from Arroyo del Valle, and its contracts with the Department of Water Resources (DWR) for State Water Project (SWP) water, Byron Bethany Irrigation District (BBID), and DWR for Yuba Accord Water. The exact quantity of water supply available through these contracts is unknown at the beginning of the year because the yield depends on many factors, including local precipitation and snowfall in the Sierras.

For planning-level purposes, Zone 7 staff estimates the projected yield from these water supplies at the beginning of the year, along with an estimate of the long-term average yield. Table 3 presents the projected yield in 2010 and the long-term average yield based on a review of actual deliveries, rainfall, DWR projections from January to May 2010, and a review of any new planning-level documents.<sup>6</sup> Table 3 also includes the long-term operational losses associated with artificial recharge in the local groundwater basin and participation in non-local groundwater banking programs.<sup>7</sup>

As shown in Table 3, the projected yield in 2010 from Zone 7's existing contracted water supplies is approximately 44,800 acre-feet,<sup>8</sup> while the long-term average yield is

<sup>5</sup> Additional information on each of Zone 7's water supply and storage components is available in Attachment B.

<sup>6</sup> New planning-level documents include DWR's Draft 2009 Reliability Report.

<sup>7</sup> Operational losses obtained from analysis completed for: Zone 7, 2009. Water System Update. November 18.

<sup>8</sup> Remaining water demand will be met with stored water supply as planned-for during drought conditions.

projected to be approximately 55,050 acre-feet after considering operational losses. Table 3 also indicates that deliveries from DWR through the SWP still makeup a majority of all Zone 7's supplies.

**Table 3. Projected Yield from Existing Contracted Water Supplies, acre-feet**

| Source <sup>(a)</sup>              | Available in 2010 |            | Long-term Average     |            |
|------------------------------------|-------------------|------------|-----------------------|------------|
|                                    | Yield             | % of Total | Yield                 | % of Total |
| Arroyo del Valle Runoff            | 6,500             | 14.5 %     | 7,300 <sup>(b)</sup>  | 12.6 %     |
| Byron Bethany Irrigation District  | 5,000             | 11.2 %     | 2,000                 | 3.5 %      |
| State Water Project <sup>(c)</sup> | 32,300            | 72.1 %     | 48,400 <sup>(d)</sup> | 83.5 %     |
| Yuba Accord (via DWR)              | 1,000             | 2.2 %      | 250                   | 0.4 %      |
| Subtotal                           | 44,800            | 100.0 %    | 57,950                | 100.0 %    |
| Operational Losses <sup>(e)</sup>  | 0                 | 0.0 %      | (2,900)               | 5.0%       |
| Total                              | 44,800            | 100.0 %    | 55,050                | 95.0%      |

- (a) Attachment B provides additional detail on each contract.
- (b) Long-term average yield from Arroyo Valle was reduced to 7,300 acre-feet from 9,300 acre-feet to better account for required allocations between Zone 7 and Alameda County Water District.
- (c) 2010 Yield is based on 40% (current 2010 allocation) of Zone 7's Table A amount of 80,619 acre-feet.
- (d) Long-term average yield is based on 60% of Zone 7's Table A amount of 80,619 acre-feet, as presented in DWR's Draft 2009 Reliability Report.
- (e) Operational losses include the losses associated with artificial recharge in the groundwater basin, and putting water into either Semitropic or Cawelo. Operational losses obtained from analysis completed for: Zone 7, 2009. Water System Update. November 18.

**Available Storage at the Beginning of 2010**

Zone 7 currently stores water in various storage facilities or programs to help meet water demands during acute or prolonged droughts. Table 4 summarizes the total accumulated storage available to Zone 7 over the next five years, the maximum storage available in 2010, and minimum storage available between 2011 and 2014.<sup>9</sup> A more detailed description of Zone 7's available storage is provided in Attachment B.

**Table 4. Available Storage in 2010, acre-feet**

| Storage Facility or Program           | Total Accumulated Storage <sup>(a)</sup> | Storage Available in 2010 | Minimum Annual Storage between 2011 and 2014 |
|---------------------------------------|--|---------------------------|--|
| Main Groundwater Basin <sup>(b)</sup> | 74,000                                   | 20,200                    | 14,000                                       |
| Lake Del Valle Carryover              | 4,900                                    | 4,900                     | 10,000                                       |
| State Water Project Carryover         | 20,500                                   | 20,500                    |  |
| Semitropic <sup>(c)</sup>             | 78,100                                   | 10,000                    | 9,100  |
| Cawelo                                | 5,000                                    | 5,000                     | 0  |
| Total                                 | 182,500                                  | 60,600                    | 33,100                                       |

- (a) Accumulated storage estimate is through April 2010.
- (b) As the available storage decreases in the main basin, the amount of groundwater available in any given year also decreases due to well locations and defined historic lows. For 2010, 20,200 acre-feet was used as a conservative estimate for planning-level purposes in this memorandum.
- (c) 2010 availability includes pump back of 9,100 acre-feet, and potential exchange water of approximately 900 acre-feet assuming the SWP delivery remains at 40% of Zone 7's Table A amount.

<sup>9</sup> Generally, the minimum annual storage is based on a certain level of management, including artificial recharge of the main groundwater basin and decisions to carry over water in both the SWP and within Lake Del Valle.

## COMPARISON OF SUPPLY AND DEMAND: NEXT FIVE YEARS

Table 5 compares available water supplies in 2010 to projected water demands over the next five years. For planning-level purposes in this memorandum, long-term average supplies and minimum storage available over the next five years were used to compare with projected water demands between 2011 and 2014. As shown in Table 5, Zone 7's existing water supply exceeds projected water demands over the next five years, with or without water conservation. Additional analysis also showed that Zone 7 can meet projected water demands during Single Dry and Multiple Dry conditions over the same period.<sup>10</sup>

**Table 5. Comparison of Supply and Demand: Next Five Years**

| Component            |                             | 2010     | 2011     | 2012     | 2013     | 2014     |
|----------------------|-----------------------------|----------|----------|----------|----------|----------|
| Without Conservation | Water Supply                | 44,800   | 55,050   | 55,050   | 55,050   | 55,050   |
|                      | Available Storage           | 60,600   | 33,100   | 33,100   | 33,100   | 33,100   |
|                      | Water Demand <sup>(a)</sup> | (50,800) | (51,200) | (51,700) | (52,100) | (52,700) |
|                      | Total                       | 54,600   | 36,950   | 36,450   | 36,050   | 35,450   |
| With Conservation    | Water Supply                | 44,800   | 55,050   | 55,050   | 55,050   | 55,050   |
|                      | Available Storage           | 60,600   | 33,100   | 33,100   | 33,100   | 33,100   |
|                      | Water Demand <sup>(a)</sup> | (50,800) | (50,700) | (50,700) | (50,500) | (50,600) |
|                      | Total                       | 54,600   | 37,450   | 37,450   | 37,650   | 37,550   |

<sup>(a)</sup> Includes both M&I and Untreated water demands.

## PROGRAMS NECESSARY TO MEET WATER DEMANDS

The review completed as part of this memorandum indicates that Zone 7 has sufficient water supplies to meet projected water demands over the next five years with or without additional water conservation. However, as demonstrated in previous water supply analyses completed by Zone 7 staff, Zone 7's water supply is at risk and subject to a very uncertain future due to recent court rulings, biological opinions associated with the Sacramento-San Joaquin Delta, and climate change.<sup>11</sup>

In response to these findings, Zone 7 staff is updating its Urban Water Management Plan (UWMP) and diligently working with Zone 7's water supply retailers to develop a Water System Master Plan (WSMP) that will provide a flexible roadmap to meet the water supply needs of the Livermore-Amador Valley through buildout of adopted general plans. Some of the possible additional water supplies currently being evaluated as part of the WSMP include, but are not limited to the following:

- Delta habitat, conservation, and conveyance program (i.e., long-term "Delta Fix")
- Winter re-operation of Lake Del Valle
- Increase yield from existing contract with Byron Bethany Irrigation District

<sup>10</sup> Original analysis is from: Zone 7, 2009. Water System Update. November 18. Information was augmented with data from the Draft 2009 Reliability Report provided by DWR.

<sup>11</sup> Zone 7, 2009. Water System Update. November 18.

- Purchase additional water from the SWP
- Los Vaqueros Reservoir participation
- Non-SWP purchase or transfer
- Arroyo Mocho water rights
- Arroyo Las Positas water rights
- Increase yield from existing Arroyo del Valle water rights
- Local rainfall capture
- Recycled water
- Desalination
- Additional groundwater demineralization
- Fringe basin development
- Reduce Water Losses (e.g., unaccounted-for water)
- Increased groundwater recharge capacity

Zone 7 Water Agency is committed to providing a reliable supply of high quality water to the Livermore-Amador Valley, and the WSMP, in conjunction with our UWMP update, are key programs necessary to meet this goal in the face of an uncertain future.

**ATTACHMENT A: RELIABILITY POLICY**

ZONE 7  
ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

BOARD OF DIRECTORS

RESOLUTION NO 04-2662

INTRODUCED BY DIRECTOR MARCHAND  
SECONDED BY DIRECTOR CONCANNON

Reliability Policy for Municipal & Industrial Water Supplies

WHEREAS, the Zone 7 Board of Directors desires to maintain a highly reliable Municipal and Industrial (M&I) water supply system so that existing and future M&I water demands can be met during varying hydrologic conditions; and

WHEREAS, the Board has an obligation to communicate to its M&I customers and municipalities within its service area the ability of the Zone's water supply system to meet projected water demands.

WHEREAS, the Board on May 15, 2002 adopted Resolution No. 02-2382 setting forth its Reliability Policy for Municipal & Industrial Water Supplies; and

WHEREAS, the Zone's current water supply policy includes a provision for a valley-wide groundwater production capability to meet 75% of valley-wide M&I demand in the event of an outage of the South Bay Aqueduct; and

WHEREAS, the Board desires to revise the Reliability Policy to include all Zone 7 water supply facilities and to clarify demand levels for planning purposes;

NOW, THEREFORE, BE IT RESOLVED that the Board hereby rescinds Resolution No. 02-2382 adopting the May 15, 2002 Reliability Policy for Municipal & Industrial Water Supplies; and

BE IT FURTHER RESOLVED that the Board hereby adopts the following policy goals regarding reliability<sup>1</sup> to guide the management of the Zone's M&I water supplies as well as its Capital Improvement Program (CIP)<sup>2</sup>:

- GOAL 1. Meet 100% of its treated water customers water supply needs in accordance with Zone 7's most current Contracts for M&I Water Supply, including existing and projected demands for the next 20 years as specified in Zone 7's Urban Water Management Plan, (UWMP), which will be coordinated with Zone 7's M&I water Contractors. Zone 7 will endeavor to meet this goal during an average water year<sup>3</sup>, a single dry water year<sup>4</sup>, and multiple dry water years<sup>5</sup>, and



GOAL 2: Provide sufficient treated water production capacity and infrastructure to meet at least 75% of the maximum daily M&I contractual demands should any one of Zone 7's major supply, production or transmission facilities experience an extended unplanned outage.

BE IT FURTHER RESOLVED that to ensure that this Board policy is carried out effectively, the Zone 7 General Manager will provide a water supply status report to the Board every five years with the Zone 7 Urban Water Management Plan that specifies how these goals can be, or are being, achieved.

If the General Manager finds that the goals might not be met, then the Board will hold a public hearing within two months of the General Manager's finding to consider remedial actions that will bring the Zone into substantial compliance with the stated reliability goals. Remedial actions may include, but are not limited to, voluntary conservation or mandatory rationing to reduce water demands, acquisition of additional water supplies, and/or a moratorium on new water connections. After reviewing staff analyses and information gathered at the public hearing, the Board shall, as expeditiously as is feasible, take any additional actions that are necessary to meet the reliability goals during the following five-year period; and

BE IT FURTHER RESOLVED that the Zone 7 General Manager shall prepare an Annual Review of the Sustainable Water Supply Report which includes the following information:

- (1) An estimate of the current annual average water demand for M&I water as well as a five-year projection based on the same information used to prepare the UWMP and CIP;
- (2) A summary of available water supplies<sup>6</sup> to Zone 7 at the beginning of the calendar year;
- (3) A comparison of current water demands with the available water supplies; and
- (4) A discussion of water conservation requirements and other long-term water supply programs needed to meet Zone 7 M&I water demands for a single dry water year and multiple dry years, as specified in the Zone's UWMP.

A summary of this review will be provided to M & I customers.

#### Definitions

<sup>1</sup>**Reliability**—the ability of a water supply system to provide water during varying hydrologic conditions without the need for reductions in water use.

<sup>2</sup>**Capital Improvement Program (CIP)**—the CIP is the Zone's formal program for developing surface and ground water supplies, along with associated infrastructure, including import water conveyance facilities, surface water treatment plants, groundwater wells, and M&I water transmission system to meet projected water demands.

<sup>3</sup>Average water year—the statistical average quantity of water from all of the water supplies available to Zone 7 on a contractual or legal basis (e.g., surface water runoff to Del Valle reservoir), based on the historical hydrologic records available to Zone 7.

<sup>4</sup>Single dry water year—for the purposes of meeting the requirements of the UWMP, the Zone 7 staff will identify and justify the selection of a calendar year from the historic record that represents the lowest yield from all normally contracted or legally available supplies.

<sup>5</sup>Multiple dry water years—for the purposes of meeting the requirements of the UWMP, the Zone 7 staff will identify and justify the selection of three or more consecutive dry years from the historic record that represent the lowest yields from all normally contracted or legally available supplies.

<sup>6</sup>Available water supplies consist solely of (1) water supplies that the Zone 7 has contracted for (e.g., listed under Schedule A of the State Water Contract, dry-year water options, special contracts with other water districts, etc.) and (2) water actually stored in surface and subsurface reservoirs.

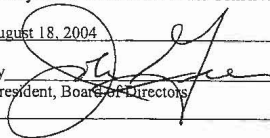
ADOPTED BY THE FOLLOWING VOTE:

AYES: DIRECTORS CONCANNON, GRECI, KOHNEN, MARCHAND, QUIGLEY

NOES: NONE

ABSENT: DIRECTORS KALTHOFF, STEVENS

ABSTAIN: NONE

I certify that the foregoing is a correct copy of a resolution  
Adopted by the Board of Directors of Zone 7 of Alameda  
County Flood Control and Water Conservation District on  
August 18, 2004  
By   
President, Board of Directors

Vice

## **ATTACHMENT B: ZONE 7'S EXISTING WATER SUPPLY CONTRACTS AND STORAGE**

Over the past few decades, Zone 7 Water Agency (Zone 7) has developed a robust water supply system consisting of local water rights, water supply contracts, and local and non-local storage; each is discussed in more detail below.

### **LOCAL WATER RIGHTS: ARROYO DEL VALLE RUNOFF**

Zone 7, along with Alameda County Water District (ACWD), holds a water right permit<sup>12</sup> to divert runoff from Arroyo del Valle, and stores this local runoff in Lake Del Valle under operating agreements with the Department of Water Resources (DWR). All inflow to Lake Del Valle, after accounting for prior rights, is equally divided with ACWD.

A review of historic runoff from Arroyo del Valle from 1913 to 2009 indicates that the total average inflow is approximately 24,000 acre-feet, of which, approximately 11,500 acre-feet is available for Zone 7. However, due to operational limitations associated with Lake Del Valle, Zone 7's current use of this inflow is limited to approximately 7,300 acre-feet. This supply will increase to approximately 7,700 acre-feet as water demands continue to increase within Zone 7's service area.<sup>13</sup> The remaining supply (3,800 acre-feet) is currently lost as flood releases.

However, as discussed in more detail in subsequent sections, existing gravel quarry operations will create a series of gravel quarry pits overlying the main groundwater basin; this will provide Zone 7 with approximately 100,000 acre-feet of storage capacity located over the Main Groundwater Basin between 2010 and 2030. This local storage will provide Zone 7 with the ability to capture these additional flood releases and increase Zone 7's long-term average yield from Arroyo del Valle runoff to 11,500 acre-feet.

### **WATER SUPPLY CONTRACTS**

Zone 7 currently has contracts with the Department of Water Resources (DWR) and Byron Bethany Irrigation District (BBID) to augment existing local runoff with imported surface water supplies. These contracts are discussed below.

#### **Contracts with DWR**

Zone 7 currently holds two contracts with DWR. One contract is for State Water Project (SWP) water, while the other is associated with the Yuba Accord; both are discussed below.

#### State Water Project (SWP)

Zone 7 currently has a long-term contract<sup>14</sup> with DWR for 80,619 acre-feet of Table A amount, which represents Zone 7's maximum annual entitlement through this contract. Each year, DWR only allocates a portion of this annual entitlement depending on

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<sup>12</sup> Permit 11319 (Application 17002).

<sup>13</sup> Yield from Arroyo Valle reduced to reflect 50/50 allocation of inflow between Zone 7 and Alameda County Water District.

<sup>14</sup> Zone 7's contract with DWR expires in 2036 with an option to renew for 75 years.

hydrologic conditions, DWR's operation of the State Water Project (SWP), and legal and environmental constraints.

Prior to 2007, DWR indicated that the long-term average yield from the SWP was approximately 76% of Zone 7's Table A amount, or approximately 61,300 acre-feet annually.<sup>15</sup> However, in 2007, DWR downgraded the water delivery reliability of the State Water Project due to federally imposed pumping restrictions – the restrictions were put in place due to concerns over declines in pelagic organisms in the Delta, primarily the decline of the Delta Smelt.

In August 2008, DWR published the final State Water Project Delivery Reliability Report 2007, which officially reduced the projected long-term average yield from the SWP to 66% of Zone 7's Table A amount, or approximately 53,200 acre-feet annually; this action reduced Zone 7's sustainable supply by 8,100 acre-feet (61,300 minus 53,200 acre-feet).

In January 2009, DWR released a Draft of the State Water Project Delivery Reliability Report 2009 to help quantify the impact of new biological opinions for species in the Delta (e.g., Salmon) and new studies completed on climate change. This draft report now indicates that the long-term average yield from the SWP is 60% of Zone 7's Table A amount, or approximately 48,400 acre-feet annually. This new estimate from DWR has reduced Zone 7's sustainable supply by an additional 4,800 acre-feet; consequently, Zone 7 has lost a total of 12,900 acre-feet of sustainable supply over the past three years.

As DWR refines these preliminary results, the projected yield could further decline; however, these results represent the most current projections available to date, and were incorporated into Zone 7 staff's review of sustainable supply.

#### *Article 21 Water and Turn-back Water*

As a contractor of the SWP, Zone 7 also has access to Article 21 (formerly called surplus water) and Article 56d water (turn-back water). Zone 7 generally incorporates any Article 21 water into its long-term average supplies; however, the projected yield from Article 21 water is very low due to pumping restrictions in the Delta, and was not included in this year's review.

Article 56d is a provision that allows contractors with excess water to sell their water to contractors that have water needs. Typically, there is very little water available in dry years but more available in wet years. However, Zone 7 staff does not expect a significant amount of Article 56d water to be available in the future until there is a resolution to existing pumping restrictions in the Delta and therefore, Article 56d water was not included in this year's review.

#### *Carryover*

As a State Water Contractor, Zone 7 has the ability to carry water from one year to the next in San Luis Reservoir – also called Article 56(c) water. As part of its operating agreement with DWR, Zone 7 also has the ability to carry inflow from Arroyo del Valle from one year to the next. Zone 7 typically tries to carry over 10,000 to 15,000 acre-feet of water to help year-to-year operations and mitigate the potential impacts of acute drought conditions.

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<sup>15</sup> DWR, 2005. The State Water Project Delivery Reliability Report 2005.

### *Yuba Accord Supply*

In 2008, Zone 7 entered into an agreement to purchase additional water from DWR as part of the Yuba Accord; the contract expires in 2025. The contract specifies four different conditions (four components) for which Zone 7 can obtain water. The first component is not available to Zone 7, while the second and third components are available during drought conditions. The fourth component is available when Yuba County Water Agency has determined it has water supplies available to sell.

The annual amount of water available in dry years is small - only 159 acre-feet was available in 2009, and only 1,000 are-feet will likely be available in 2010. As Zone 7 gains experience using this new contract and is able to better define potential long-term yields, then Zone 7 may incorporate more of it into our sustainable supply. For planning-level purposes, Zone 7 assumed that the long-term average yield was 250 acre-feet for this year's review.<sup>16</sup>

### **Byron Bethany Irrigation District (BBID)**

BBID diverts water from the Sacramento-San Joaquin Delta (Delta) pursuant to a "Notice of Appropriation of Water" dated May 18, 1914.<sup>17</sup> Zone 7 entered into a long-term<sup>18</sup> contract with BBID for up to 5,000 acre-feet annually of water supply under this appropriation.<sup>19</sup> The current contract expires in 2013; however, Zone 7 is currently renegotiating this contract, and expects to finalize an agreement to extend the term with BBID by the end of this year.

Although Zone 7 could request up to 5,000 acre-feet per year, and did so this year, Zone 7 staff uses 2,000 acre-feet as a conservative estimate of the long-term average yield from this source because additional analysis is required to justify this water is available during all hydrologic conditions.<sup>20</sup> Water purchased from BBID via this contract is delivered to Zone 7 via the South Bay Aqueduct for use in our service area.

### **LOCAL STORAGE**

Zone 7 has local storage available in the Main Groundwater Basin and in two quarry gravel pits (Lake I and Cope Lake) that overlie the Main Groundwater Basin. Both are discussed below.

#### **Main Groundwater Basin**

Zone 7's service area overlies the Livermore Valley Groundwater basin (Basin); the Main Basin is a portion of the Livermore Valley Groundwater Basin that contains the highest yielding aquifers and best quality groundwater.<sup>21</sup> For Zone 7, the Basin is considered a storage facility and not a long-term water supply because Zone 7 does not have a groundwater pumping quota, and only pumps groundwater it artificially recharges.

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<sup>16</sup> The long-term average is based on varying the maximum yield of 676 acre-feet (only Components 2 and 3) during critically dry years to no water in wet years without considering Component 4 water.

<sup>17</sup> Source: Mountain House Master Plan.

<sup>18</sup> 15-year contract, renewable every five years.

<sup>19</sup> The Zone 7 Board certified the Environmental Impact Report for this water supply in 1999.

<sup>20</sup> Zone 7 is currently reviewing the potential to increase projected long-term average yields from its contract with BBID as part of the Water System Master Plan update.

<sup>21</sup> Zone 7, 2009. Annual Report for the Groundwater Management Program – 2008 Water Year. May.

Consequently, Zone 7 has actively managed the Basin for over 40 years, and administers conjunctive use programs that integrate both surface and groundwater supplies.<sup>22</sup>

As part of its conjunctive use program, Zone 7 maintains groundwater levels above historic lows in the Main Basin through artificial recharge of SWP water to the arroyos for subsequent percolation and replenishment of existing aquifers.<sup>23</sup> Additionally, Zone staff established historic lows based on historical-low groundwater elevations in various wells in the Main Basin.<sup>24</sup> In general, the difference between water surface elevations when the Main Basin is full and water surface elevations when the Main Basin is at historic lows defines Zone 7's operational storage – operational storage is about 126,000 acre-feet based on Zone 7's experience operating the Main Basin.

Based on a review of current well capacities and discussions with Zone 7's Groundwater Protection and Projects section, Zone 7 has the ability to pump approximately 26,200 acre-feet over a one-year period. Additionally, for this planning-level review, Zone 7 staff included limits on annual groundwater pumping to ensure that water surface elevations remain above historic lows during a multiple dry year event.<sup>25</sup> The pumping limit used in the analysis (14,000 acre-feet) was based on preliminary modeling conducted by Zone 7 staff and assuming no artificial recharge activities.<sup>26</sup>

### **Chain of Lakes – Lake I and Cope Lake**

The Chain of Lakes (COL) is an area located between the cities of Pleasanton and Livermore, and refers to a series of ten mined out or active gravel quarry pits that have been or will be converted into surface water storage facilities and/or groundwater recharge basins once mining has been completed. The ten quarry pits or lakes are named Cope Lake, and Lakes A through I.

Although the Chain of Lakes will ultimately cover approximately 2,000 acres and store approximately 100,000 acre-feet of water, Zone 7 currently only owns Cope Lake and Lake I. Zone 7 expects to take ownership of Lake H sometime within the next five years, while the remaining lakes will be transferred to Zone 7 over the next 20 years. No additional storage or recharge capacity from the Chain of Lakes was assumed available to Zone 7 for this year's review.

### **NON-LOCAL STORAGE**

In addition to local storage, Zone 7 also participates in two groundwater-banking programs with Semitropic Water Storage District (Semitropic) and Cawelo Water District (Cawelo). Each is discussed below.

#### **Semitropic Water Storage District**

Zone 7 has 78,000 acre-feet of groundwater banking storage available through Semitropic to augment water supplies during drought conditions. During non-drought periods,

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<sup>22</sup> Zone 7, 2009. Annual Report for the Groundwater Management Program – 2008 Water Year. May.

<sup>23</sup> Zone 7, 2009. Annual Report for the Groundwater Management Program – 2008 Water Year. May.

<sup>24</sup> Zone 7, 2009. Annual Report for the Groundwater Management Program – 2008 Water Year. May.

<sup>25</sup> An example multiple dry year event is the 6-year drought that occurred between 1987 and 1992.

<sup>26</sup> Zone 7 conducted a preliminary analysis using the calibrated groundwater model to determine the average annual pumping limit that maximizes the recovery of groundwater basin storage during a 6-year drought, assuming average conditions that existed between 1987 and 1992, and only with existing facilities.

Zone 7 can put up to 5,883 acre-feet annually into the Semitropic groundwater bank. During droughts, Zone 7 has the ability to request 9,100 acre-feet of pumpback and anywhere from 0 to 8,645 acre-feet of exchange water;<sup>27</sup> the availability of exchange water depends on projected SWP deliveries. For conservative planning-level purposes in this year's review, Zone 7 staff assumed that only pumpback capacity would be available between 2011 and 2014.

### **Cawelo Groundwater Banking Program**

Zone 7 has 120,000 acre-feet of groundwater banking storage available with Cawelo to augment water supplies during drought conditions. During non-drought periods, Zone 7 can put 5,000 acre-feet annually into the bank.<sup>28</sup> During droughts, Zone 7 has the ability to request 10,000 acre-feet of pumpback. For conservative planning-level purposes in this year's review, Zone 7 staff assumed that no pumpback would be available from Cawelo between 2011 and 2014.

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<sup>27</sup> The availability of exchange water depends on the allocation from the State Water Project.

<sup>28</sup> Zone 7 only gets storage credit for 50% of the water provided to Cawelo. Per the existing contract, Zone 7 can only send 10,000 acre-feet in any given year to Cawelo; therefore, the maximum contractual credit is 5,000 acre-feet.