**ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT**
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# MEMORANDUM

Date: May 20, 2009

To: Jill Duerig, General Manager

From: David Lunn, Water Resources Manager
Brad Ledesma, Associate Engineer

**Subject: Annual Review of the Sustainable Water Supply Report**

The purpose of this memorandum is to present Zone 7 Water Agency's (Zone 7) review of sustainable water supplies available to meet current and projected water demands for the Livermore-Amador Valley as required by Resolution 04-2662 (*Reliability Policy for Municipal and Industrial Water Supplies*, see Attachment A)[1]. Reliability is the ability of a water supply system to provide water during varying hydrologic conditions without the need for reduction in water use. A sustainable water supply is an intrinsically simple concept that involves meeting the needs of the present without compromising the needs of the future. The following sections present the analysis and conclusions of this review:

- Summary of Conclusions
- Projected Water Demands
- Available Water Supply
  - Water Supply Available in 2009
  - Long-term Average Yield and Sustainable Supply from Existing Water Supplies
  - Comparison of Supply and Demand: Next Five Years
- Comparison of Supply and Demand: Buildout Conditions
- Future Path Toward Sustainability
- Commitment to the Livermore-Amador Valley

## SUMMARY OF CONCLUSIONS

The sustainability and reliability of Zone 7's existing water supply system is achieved first by having sufficient long term supplies to meet demands and then by storing surplus water in wet years for use in dry years; it is heavily dependent on having enough wet years to balance the dry years. This balance between wet and dry years is evaluated by comparing projected yields from existing water supplies over a wide range of historic hydrology to make sure that Zone 7 can meet 100% of its treated water customer water supply needs during: an average water year; the worst single dry year from the historic record that represents the lowest yield from all available supplies; and multiple dry water

[1] Resolution 04-2662 was adopted by the Zone 7 Board of Directors on August 18, 2004.

years from the historic record. Traditionally, if the projected yields over a long range of hydrology can be shown to meet a future demand every year, then the system is called sustainable for that level of demand. In general, if long-term average yields from existing water supplies are less than projected water demands, then over time, the storage reserves needed to meet reliability goals will erode and the system is not sustainable

Zone 7 staff compared projected water demands to the long-term average yield of existing water supplies in the current year (2009), over the next five years (2009 to 2013), and at buildout, to identify potential deficiencies in the existing water supply system. This comparison indicated that the existing water supply system could reliably meet projected water demands of 62,500 acre-feet which is 9,000 AF more than 2013 demands, but that projected water demands at possible buildout exceed long-term average yields expected from existing water supplies and therefore, the existing system could become unsustainable in about a decade, sometime between 2015 and 2020.

The exact year that the existing system becomes unsustainable can't be determined because of a number of current uncertainties (e.g., rate of urban growth, rate of growth in untreated demands, changes in water efficiency, timing of potential solutions, or future adjustments to projected demands by Zone 7 customers) that would significantly influence timing. However, Zone 7 has developed a risk model to help incorporate these uncertainties, along with other key issues, into future evaluations of Zone 7's existing water supply system.

Zone 7 is committed to providing a reliable supply of high quality water to the Livermore-Amador Valley. This memorandum and the planned risk-based water supply analysis will help Zone 7 staff select the best mix of solutions to meet this goal in the face of an uncertain future. Based on this commitment, Zone 7 staff feels that it is reasonably likely that Zone 7 will be able to meet contracted water demands through projected buildout of the Livermore-Amador Valley.

## PROJECTED WATER DEMANDS

The Reliability Policy specifies that this report include an estimate of the current annual average water demand for Municipal and Industrial (M&I) water as well as a five–year projection. Zone 7 staff receives projected water demands for the next five years (2009 to 2013) from its M& I and Untreated customers; staff presented these demand projections at the October Board meeting. Projected water demands at buildout, however, were obtained from planning documents[2] available at the time this review was completed and from discussions with or letters from individual retailers.

Table 1 summarizes the projected demands used in this year's sustainability report over the next five years and at buildout. As shown in Table 1, water demands are projected to

[2] Available planning documents included urban water management plans, draft general plan updates, Environmental Impact Reports, or letters provided by individual customers.

increase by 8.2% (from 49,610 to 52,710 acre-feet) over the next five years, and by 31% (from 53,670 to 69,170 acre-feet) between 2013 and buildout.

**Table 1. Projected Treated and Untreated Water Demands Met by Zone 7[(a,b)]**

| Type | 2009 | 2010 | 2011 | 2012 | 2013 | Buildout |
|---|---|---|---|---|---|---|
| Treated | 44,450 | 45,440 | 46,220 | 47,190 | 48,240 | 59,920 |
| Untreated | 4,270 | 4,450 | 4,460 | 4,460 | 4,470 | 8,250 |
| UAFW[(c)] | 890 | 900 | 950 | 960 | 960 | 1,000 |
| Total | 49,610 | 50,790 | 51,630 | 52,610 | 53,670 | 69,170 |

[(a)] Demands in acre-feet are slightly different than the Five Year Delivery Request report given at the October Board meeting because they include Unaccounted-for Water.
[(b)] Demands rounded to the nearest 10 acre-feet.
[(c)] UAFW = Unaccounted-for Water

Zone 7 staff used the projected water demands presented in Table 1 as part of this year's annual review; however, Zone 7 plans to work with the retailers and other customers in the future to help better define projected water demands through buildout as part of future evaluations of the existing water supply system.

## AVAILABLE WATER SUPPLY

Zone 7 has developed a robust water supply system consisting of imported surface water, local runoff, groundwater recharge activities, and non-local storage.[3] This diverse water supply system allows Zone 7 to store excess water in groundwater basins and reservoirs during 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 present our current 2009 supply, and an estimate of the maximum sustainable supply available from our existing water supply sources. The evaluation of the maximum sustainable supply included an evaluation of a long-term 80-year scenario (see Attachment B) intended to determine the maximum amount of water Zone 7 could deliver reliably over a full range of hydrologic conditions without the need for reductions in water use.

### Water Supply Available in 2009

The Reliability Policy specifies that this report also include a "summary of available water supplies to Zone 7 at the beginning of the calendar year." The exact quantity of current year yield available from each supply source is unknown at the beginning of each year. Accordingly, Zone 7 staff develops a set of contingency plans showing several wet

[3] Additional information on each of Zone 7's water supply and storage components is available in Attachment E.

scenarios and several dry scenarios, including a plan for the worst-case one-year drought and multi year drought. A 30%, 50% and 100% State Water Project (SWP) allocation scenario is provided to DWR each September for their operations planning. Each January, Zone 7 staff typically shares these scenarios, along with other key operational information, with Zone 7 retailers. But by April or May each year the current year yield is better known and the scenarios become working operational plans.

Zone 7 started the 2009 calendar year with 187,900 acre-feet (AF) of water in storage; of that, 66,000 AF could be available this year (via pumpback and well capacities). The winter and spring have been dry and current year yields total 33,845 AF.[4] Zone 7 will utilize about 16 thousand AF (TAF) from storage to meet the current 50 TAF demand in 2009. Table 2 summarizes available storage and water supplies in 2009.

**Table 2. Available Storage and Water Supply in 2009, acre-feet**

| | Component | Total Storage[(a)] | Available in 2009 |
|---|---|---|---|
| Storage | SWP Carryover | 14,600 | 14,600 |
| | Semitropic | 78,100 | 9,300 |
| | Cawelo | 5,000 | 5,000 |
| | Lake del Valle | 8,200 | 8,200 |
| | Main Groundwater basin | 82,000 | 30,000 |
| | Total | 187,900 | 66,000 |
| Current Year Yield | Component | | Available in 2009 |
| | State Water Project (30% allocation) | | 24,186 |
| | Arroyo Valle Water Rights | | 5,000 |
| | BBID | | 4,500 |
| | Yuba | | 159 |
| | Total | | 33,845 |
| **Total Supply Available in 2009** | | | **99,845** |

[(a)] As of January 1, 2009.

**Long-term Average Yield and Sustainable Supply from Existing Water Supplies**

Zone 7's water supplies consist of imported surface water and local runoff; the groundwater basin is considered a storage facility and not a long-term supply since Zone 7 must recharge the basin from surface water supplies before pumping from groundwater wells (See Attachment E).

The long-term average yield from imported surface water and local runoff depends on hydrologic, legal, and environmental conditions. DWR has determined the maximum potential yield from the SWP based on these conditions and has reported it in the State Water Project Water Delivery Reliability Report (see Attachment D). DWR provides the information as an average and as a sequence of estimated yields for an 80-year

[4] In January 2009, Zone 7 staff met with the retailers to present and discuss our current water supplies and show our plan to deliver water even in a critical dry year to meet their needs in 2009.

hydrologic period. Zone 7 determines this quantity for local water based on hydrology, our water rights, and environmental conditions.

To determine the Long-term Sustainable Supply, Zone 7 develops an 80-year simulation of annual operations (see Attachment B). This 80 year simulation demonstrates long term sustainability. During the long term hydrologic period there will also be storage and operational losses (evaporative losses in Lake del Valle, recharge losses, 10% losses for Semitropic, 50% losses for Cawelo and loss of SWP carryover). Storage and operational losses average about 2,000 acre-feet a year. The sustainable supply is the average supply less operational losses. Table 3 summarizes Zone 7 staff's estimate of the long-term average yield from each of these water supplies. Attachment E contains additional information on each of these supplies. As shown in Table 3, Zone 7's total long-term average yield from all water supply sources managed by Zone 7 is approximately 64,500 acre-feet. Storage and operational losses average about 2,000 acre-feet a year. The total Sustainable Supply for Zone 7 supplies is 62,500 acre-feet.

**Table 3. Long-Term Average Yield and Sustainable Supply from Water Supplies Managed by Zone 7[(a)] (acre-feet)**

| ***Source of Water Supply*** | ***Long-Term Average Yield*** | ***% of Total*** |
|---|---|---|
| State Water Project | 53,200 | 82.5% |
| Lake Del Valle | 9,300 | 14.4% |
| Byron Bethany Irrigation District (BBID) | 2,000 | 3.1% |
| **Total Long-Term Average Yield** | **64,500** | 100% |
| Storage and Operational losses | (2,000) | |
| **Long Term Sustainable Supply** | **62,500** | |

[(a)] Additional detail is available in Attachment B.

The analysis performed for the current year (2009) confirmed that Zone 7 had sufficient storage and facilities to utilize all long-term supplies (64,500 acre-feet) and does not lack storage.

Table 3 also indicates that the majority (82%) of Zone 7's average annual yield is obtained through the State Water Project. As discussed in Attachment C and D, recent legal constraints and projected impacts from climate change have significantly reduced the projected yield from the SWP over the past few years. More specifically, Zone 7's average long-term yield from the SWP is only 66%, or approximately 53,200 acre-feet (66% of 80,619 acre-feet); this has been reduced by approximately 10% over the previously projected yield in 2007 (see Attachments C & D).

## COMPARISON OF SUPPLY AND DEMAND: NEXT FIVE YEARS

The Reliability Policy specifies that this report also include "An estimate of the current annual average water demand for M&I water as well as a five-year projection…and a comparison of current water demands with the available water supplies." Since the exact supply we receive from existing sources in any given year is unknown, we use the Long-Term Average Yield. Table 4 presents the average available supply and demand for the next five years. The available supply from storage includes conservative assumptions for storage reserves used from the groundwater basin and Semitropic. The Reliability Policy specifies that the report include a discussion of programs needed to meet Zone 7 M&I demands for multiple dry years. A multi-year drought lasting the entire 5-year period from 2009 to 2013 would require a total of only 40-50 TAF from our current storage reserves (180 TAF). No new programs are needed to meet multi-year drought demands over the next five years.

**Table 4. Supply and Demands Over the Next Five Years, acre-feet**

| Component | | 2009 | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|---|---|
| Supply | Average Yield | 64,500 | 64,500 | 64,500 | 64,500 | 64,500 |
| | Available Storage | 40,000 | 40,000 | 40,000 | 40,000 | 40,000 |
| | *Subtotal* | *104,500* | *104,500* | *104,500* | *104,500* | *104,500* |
| Demand | Treated | 44,450 | 45,440 | 46,220 | 47,190 | 48,240 |
| | Untreated | 4,270 | 4,450 | 4,460 | 4,460 | 4,470 |
| | UAFW[(c)] | 890 | 900 | 950 | 960 | 960 |
| | *Subtotal* | *49,610* | *50,790* | *51,630* | *52,610* | *53,670* |

[(c)] UAFW = Unaccounted-for Water

## COMPARISON OF SUPPLY AND DEMAND: BUILDOUT

Table 5 compares projected water demands to projected long-term average yield from existing water supplies. As shown in Table 5, projected water demands exceed the estimated long-term average yield of existing water supplies by approximately 4,670 acre-feet (or approximately 6.7% of projected water demands). After considering storage and operational losses the projected water demands exceed long-term average sustainable supply by an additional 2,000 acre-feet, or 6,670 acre-feet (10% of projected water demands).

**Table 5. Comparison of Buildout Demands to Long-Term Average Water Supply**

| Condition | Total Long-Term Average Water Supply, acre-feet | Projected Water Demand at Buildout, acre-feet | Difference |
|---|---|---|---|
| Average Yield | 64,500 | 69,170 | (4,670) |
| Sustainable Supply After Storage and Operational Losses | 62,500 | 69,170 | (6,670) |

As discussed previously, Zone 7 has a conjunctive use system that relies on storage to meet demands during dry years so that it can meet reliability goals. In general, if long-term average yields from existing water supplies are less than projected water demands, then overtime, the storage reserves needed to meet reliability goals will erode; thereby, creating an unsustainable situation.

Table 5 clearly indicates that currently-projected water demands at buildout exceed the long-term average yield of existing water supplies and therefore, the existing water supply system will become unsustainable in about a decade. As discussed below, this shortfall could be addressed in several ways, from conservation to expanded irrigation with recycled water to new water supplies to Delta improvements, or any combination thereof.

The exact year that the existing water supply system becomes unsustainable can not be determined due to a number of current uncertainties (e.g., estimated number of wet years between droughts or timing of potential solutions) that may significantly influence timing. As will be discussed in the next section, however, Zone 7 has developed a risk model to help incorporate these uncertainties, along with other key issues, into future evaluations of Zone 7's existing water supply system.

## FUTURE PATH TOWARD SUSTAINABILITY

As demonstrated by the recent legal and environmental constraints placed on SWP diversions in the Delta, the sustainability and reliability of long-term water supplies for the Livermore-Amador Valley face an uncertain future. However, Zone 7 Water Agency is committed to providing a reliable supply of high quality water to the Livermore-Amador Valley, and is moving forward with a risk-based water supply analysis to help develop an action plan that will maximize flexibility and minimize risk to meet this commitment (See Attachment F).

The risk-based analysis will not only include an evaluation of the existing water supply system per established contracts, ordinances, resolutions, and policies, and known constraints to key water supplies, but will also evaluate potential solutions, including, but not limited to the following (in alphabetical order):

- Additional Storage
- Additional SWP Table A Water
- Delta Habitat Conservation and Conveyance Plan (i.e., peripheral canal)
- Enhanced Groundwater Recharge and Recovery
- Los Vaqueros Expansion Project
- Potable Water Offsets from Recycled Water in the Livermore-Amador Valley
- Pilot Delta Diablo Sanitation District Brackish Water Desalination Plant
- Removal of Existing Constraints on Non-SWP Supply Contracts (e.g., BBID Contract)
- Revise Existing Resolutions and Policies
- Storm water Diversion and Storage for Water Supply

- Water Conservation (Treated and Untreated)
- Water Supply Exchange Opportunities with Other SBA Contractors

Zone 7 does not consider the above list final, and envisions that other potential solutions will surface throughout the analysis and in the future. Once completed, however, this analysis will help identify the path forward that will allow Zone 7 to meet contracted water demands through projected buildout of the Livermore-Amador Valley.

## COMMITMENT TO THE LIVERMORE-AMADOR VALLEY

Zone 7 Water Agency is committed to providing a reliable supply of high quality water to the Livermore-Amador Valley. Our approved deliveries are sustainable under existing supply conditions and will remain so for anticipated increased contractual requests for another decade. This annual Sustainable Water Supply Report and the planned risk-based water supply analysis are the first steps toward meeting this goal for full buildout demands in the face of an uncertain future. Based on this commitment, Zone 7 staff feels that it is reasonably likely that Zone 7 will be able to meet all contractual needs through projected buildout of the Livermore-Amador Valley.

# 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[1] to guide the management of the Zone's M&I water supplies as well as its Capital Improvement Program (CIP)[2]:

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[3], a single dry water year[4], and multiple dry water years[5], 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[6] 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

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

[2]**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.

[3]**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.

[4]**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.

[5]**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.

[6]**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

Original resolution signed by the President, Board of Directors

# ATTACHMENT B: TRADITIONAL ANALYSIS OF SUSTAINABILTY

The purpose of Attachment B is to provide additional detail on the traditional analysis used by Zone 7 to evaluate sustainability as part of this year's annual review report. The following sections describe the traditional analysis:

- Definition of Sustainability
- 80-Year Hydrologic Period
- Analysis of Zone 7's Existing Water Supply System

## DEFINITION OF SUSTAINABILITY

Sustainability is a common sense concept that refers to the ability of a system to operate in perpetuity without depleting the natural resources. Sustainability with respect to a water supply refers to delivering a volume of water every year to meet the community's needs without experiencing problems over the long term. It often is not simply the average supply but it is the integration of the water supply system with the water storage and conveyance system. Storage is required to capture water in wet years for use in dry years. Sustainability implies that the volume of water could be delivered in dry years from stored water collected in wet years. If the storage is full then the wet year yield can't be collected and is lost. This would reduce the yield below the simple average.

Just as storage can limit sustainability, conveyance limitations can also reduce sustainability. For groundwater systems the conveyance is the ability to recharge the basin and pump water from the basin. For out of basin banking programs, the ability to store water and return water from storage are critical to the evaluation of sustainability. In summary, to demonstrate sustainability requires analysis of the system over a full spectrum of water supply conditions.

For surface water systems sustainability is reduced with reductions in storage and conveyance. Lake del Valle provides storage for local water but in wet years, if the reservoir fills then there is no more storage and water is lost as flood releases down the Arroyo and out to the Bay. Zone 7 staff has worked with DWR to develop a contract for storage of local water in Lake del Valle that allows use of the lake for storage of local water. The existing system has been analyzed using daily data from over 90 years of record to maximize the potential yield from our local watershed. The current long term yield is based on conditions prior to the availability of the full Chain of Lakes. The future chain of Lakes Diversion from Lake A was evaluated to determine the size needed to capture our full share of Arroyo Valle Runoff. This information was converted into a probability distribution and incorporated into the Z7sim model. The Z7sim model is currently configured for operations without the ability to convey water to the groundwater basin through the Chain of Lakes Facility. We anticipate that a larger percent of the potential local supply can be captured in the future when the Chain of

Lakes is completed. For the State Water Project sustainability is reduced with reductions in conveyance of water through the delta. With current Delta conveyance restrictions the high flows of winter can't be conveyed to the pumps and the supply is lost to the ocean. With Delta conveyance improvements being studied this year, we anticipate that those studies will show how more wet-season water can be conveyed to the pumps for storage in SWP reservoirs south of the Delta and storage in Zone 7 in-basin and out-of-basin groundwater storage. We anticipate that a larger amount of the potential State Water Project water can be captured in the future when the Delta conveyance improvements are completed.

## 80-YEAR HYDROLOGIC PERIOD

Each year Zone 7 reviews the long-term water operations to determine the current status of our sustainable water supply. The analysis involves an integrated water operations evaluation of our continued water operations over a long period of record that includes a wide range of hydrologic years including two long term droughts (1929-34 & 1987-92) and the worst case single drought year (1977). The study also evaluated our ability to refill storage during wet years. During the study, adjustments are made in operational rules for using storage or refilling storage. Knowledge gained through these operational studies is used in our water operations planning each year to insure that Zone 7 operates in an optimal manner to maintain a reliable supply of water.

The integrated use of our facilities was studied over the 77 year hydrologic period 1922-1998 utilizing new 1922-2003 SWP delivery estimates (see Figure B1). Several different studies in the reliability report were used in the modeling including the worst case individual studies and several other variations. These were analyzed to determine of the sensitivity of our analysis to changes in the use of different hydrologic sequences. We also evaluated several worst case scenarios including the possibility that Zone 7 will not be able to add any additional water to Cawelo.

## ANALYSIS OF ZONE 7'S EXISTING WATER SUPPLY SYSTEM

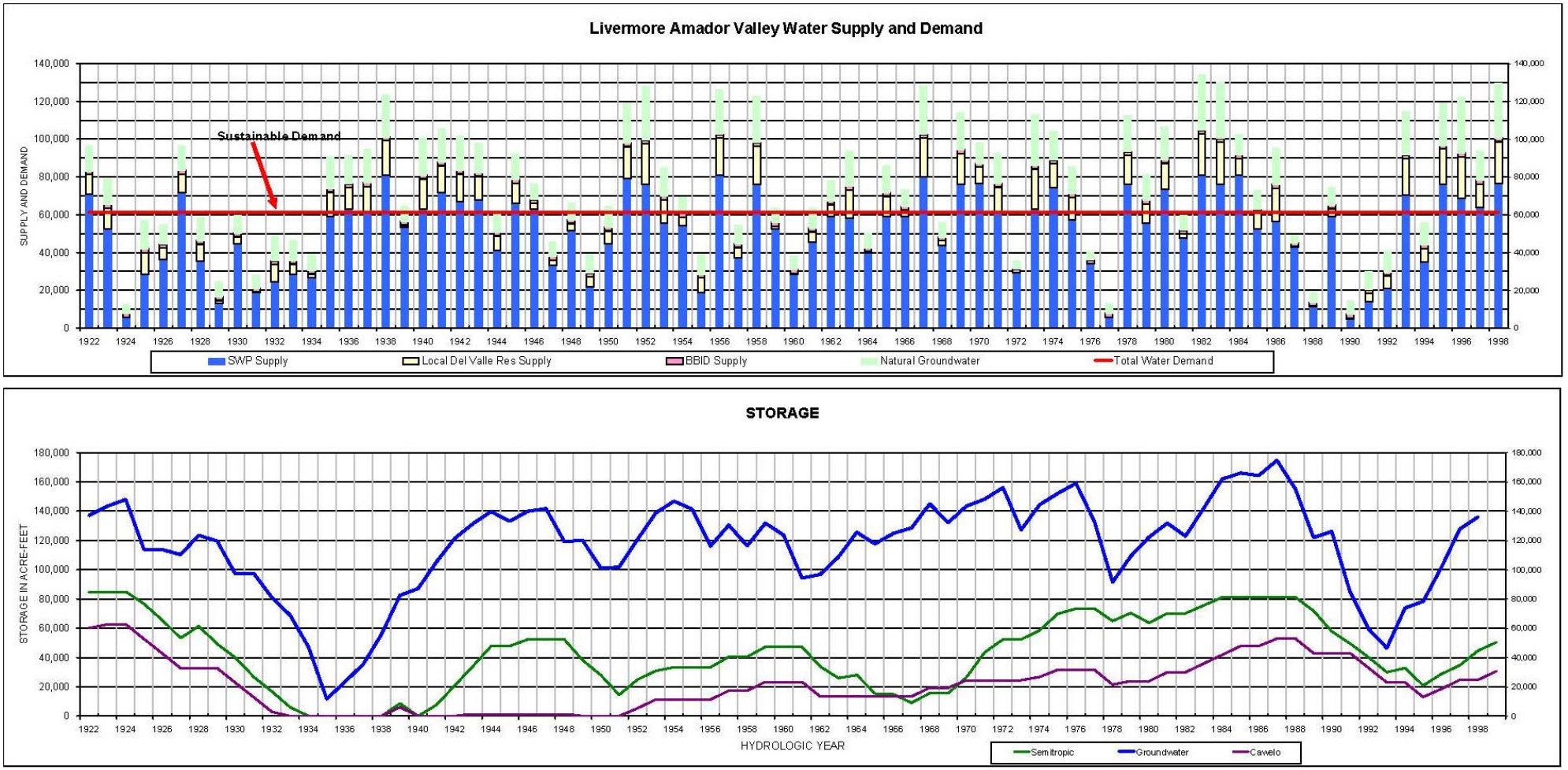
The typical reliability analysis involves determining a successful delivery plan for the worst credible dry year and for the worst credible multi year drought. In a worst case, drought Zone 7 is expecting only 5% SWP allocations. Zone 7 would need a maximum of 62,000 acre-feet (maximum sustainable supply and approximate 2015-2020 demand level). This could be delivered in a year with only 5% SWP allocations: 30 TAF would come from municipal wells pumping groundwater. 4 TAF would come from SWP 10 TAF would come from SWP carry over, 10TAF from Cawelo, 9,5TAF would come from Semitropic and 2 TAF acre-feet would come from BBID for a total of 65.5TAF which is more than enough to meet demands our maximum sustainable supply.

The typical analysis for the UWMP also includes determining the reliability during a multi year drought of 3 or more years. Zone 7 typically prepares a year by year schedule or plan showing how full deliveries could be met throughout a six year "worst credible" drought. This longer drought period is used because it is the longest period of historic record with below average supplies without wet years to balance the dry years. Although the there are only 80 years of available data (1922-2002) Zone 7 has looked at the longest

precipitation record in the state and determined that the two 6 year droughts (1929-34 and 1987-92) are the largest droughts in the 138 year Livermore rainfall record and the largest droughts in the 160 years (1850-2009) Sacramento and San Francisco record (The oldest records in the State). This analysis tests the whether Zone 7 has sufficient total storage volume. It also demonstrates how full our storage should be to prepare for droughts.

Another question is whether Zone 7 would be able to refill our storage and "would this really work over the long term?" To answer this question, Zone 7 reviewed the longest period of record available and tested the system over the entire historic period of record. The results show that Zone 7 has a Long-Term Average yield of 64,500 AF and a sustainable supply of 62,500 acre-feet. Zone 7 can deliver 62,500 acre-feet of water to treated and untreated water customers with 2,000 acre-feet a year of average operational losses. This means that Zone 7 could continue to deliver water to meet all the communities' needs up to a demand level of 62,500 acre-feet a year with less than a 1% chance of ever drawing the groundwater levels to historic lows.

# Figure B1. 80-Year Hydrologic Sequence



# ATTACHMENT C: DELTA CONVEYANCE RESTRICTIONS

The purpose of this attachment is to provide a brief timeline of the recent restrictions in the Delta that have reduced the long-term average yield of Zone 7's contract with the Department of Water Resources (DWR) for Table A Water delivered through the State Water Project (SWP). The timeline is as follows:[1]

- 1986: United States v. SWRCB: State court rules SWRCB Delta water quality standards as insufficient protection for fish, but keeps standards in place as SWRCB develops new standards.
- 1989: National Marine Fisheries Service (NMFS) lists Central Valley fall-run salmon as threatened under the federal Endangered Species Act. DFG later lists salmon under state ESA.
- 1991: US Environmental Protection Agency (USEPA) declares state Delta water quality standards invalid, as insufficient protection for Delta fishery.
- 1992: NMFS issues first biological opinion on salmon and DFG later adopts federal opinion. DWR shuts down SWP Delta export pumps, based on DFG request to reduce "take" of salmon.
- 1993:
    - DWR unilaterally continues complying with NMFS biological opinion after its expiration.
    - Governor Wilson asks SWRCB to withdraw new draft Delta water quality standards.
    - U.S. Fish & Wildlife Service (FWS) and DFG list delta smelt as threatened under federal and state ESA statutes. FWS issues first biological opinion for delta smelt, but DFG never adopts the delta smelt opinion under state ESA.
    - Federal court orders USEPA to prepare federal water quality standards for the Delta.
- 1994:
    - After substantial federal-state conflict, federal and state agencies sign agreement to cooperate on development of new Delta water quality standards.
    - Governor Wilson and Secretary of the Interior Bruce Babbitt sign "Bay-Delta Accord" – on court deadline day for new federal Delta water quality standards – providing for adoption of new state standards. Water users and other Delta stakeholders countersign Accord.
- 1995:
    - NMFS and FWS issue new biological opinions based on new Delta water quality standards from the Accord.
    - SWRCB adopts Delta Water Quality Control Plan (WQCP), accepting water projects commitment to comply with new standards.

[1] California'sWater System and the Sacramento-San Joaquin Delta, October 4, 2007.

- San Joaquin River tributary water districts sue SWRCB over WQCP, in order to avoid any requirement of their compliance. Suit settled because only state-federal projects comply.

- 1998: SWRCB begins hearings on how to implement 1995 Delta water quality standards.
- 1999:
  - Central Valley Project (CVP) and State Water Project (SWP) Delta export pumps shut down in the spring and late fall after exceeding take limits for ESA-listed fish.
  - Federal Judge Oliver Wanger (E.D. Cal./Fresno) issues first of several opinions regarding Congressional allocation of 800,000 acre-feet of federal CVP water to the environment.
- 2000:
  - SWRCB Decision 1641 (2000) implements 1995 Delta WQCP by requiring federal-state water project compliance and San Joaquin River Agreement for tributaries. Lawsuits filed.
  - CALFED Bay-Delta Program Record of Decision executed, including federal biological opinions. CALFED "Environmental Water Account" initiated.
- 2001:
  - Court of Federal Claims rules that the Federal Government committed a taking of SWP contractor water rights in its 1992-94 implementation of the federal ESA in the Delta.
  - Bush Administration does not appeal decision and settles lawsuit for $16.7 million, ignoring objections from the California Attorney General and the Schwarzenegger Administration that the federal judge incorrectly interpreted California law.
- 2005:
  - DFG reports substantial decline in Delta fishery and ecosystem at Assembly hearing.
  - At Senate hearings, DWR cannot identify any permit to "take" delta smelt under state law, but claims "patchwork" of compliance with state ESA.
  - New federal biological opinions issued, in order to allow Bureau of Reclamation to sign new long-term contracts for water deliveries from the CVP.
  - State and federal ESA lawsuits filed.
- 2006: State appeals court substantially upholds SWRCB Decision 1641 implementing the 1995 Delta WQCP.
- 2007:
  - State court judge (Alameda Co.) rejects DWR's "patchwork" defense, ruling that DWR has not complied with state ESA. Orders pumps shut down in 60 days, but appeal stays order.
  - Judge Wanger holds FWS delta smelt biological opinion invalid, requires parties to present proposals for remedies. At end of remedies hearing on delta smelt, Judge orally orders certain actions to protect delta smelt

pending completion of a new biological opinion and directs parties to prepare a written order (August 31).

- Judge Wanger holds hearing on NMFS biological opinion on salmon protection (October 3).

ATTACHMENT D: DWR Reliability Report

The purpose of this attachment is to provide additional information on the most recent reliability report completed by DWR, and the impact that report had on Zone 7's SWP deliveries.

## KEY CHANGES IN THE RELIABILITY REPORT

In 2007, DWR downgraded the water delivery reliability of the State Water Project due to federally imposed pumping restrictions in the Delta. These restrictions were brought about due to significant concerns over the pelagic organism decline in the Delta, primarily the decline of Delta Smelt. In February 2008 DWR released a Draft of The State Water Project Delivery Reliability Report 2007 and in August 2008 DWR published the final report. The report quantified the two most significant changes facing the SWP system: Delta pumping restrictions and climate change. California's long-term Operations, Criteria and Plan (OCAP) was revised in December 2008 but no additional analysis has been provided by DWR. Zone 7 and others are using the August DWR report as the best current assessment of the reliability of the SWP system under current conditions based on the regulatory controls to conveyance through the Delta and the current Delta infrastructure.

The report also quantifies the projected impacts of climate change on our future water supply. Several possible global warming models which indicate changes in future SWP yield were used. The final reliability study recommends that a combination of the different Delta conveyance restrictions and some climate change must be incorporated in the proper analysis of the reliability of the SWP supply.

## IMPACT TO ZONE 7'S SWP SUPPLY

Our revised current long-term average yield from the State Water Project remains at 53,200 acre-feet (a reduction of 7,700 acre-feet from the earlier estimate of 60,900 acre-feet a year). In the new study, as summarized in Table D1 and Figure D1, the estimated future yield of the SWP has been reduced from 76% to 66% of Table A.

**Figure D1. Comparison of the 2005 and 2007 Probability of Exceedence**

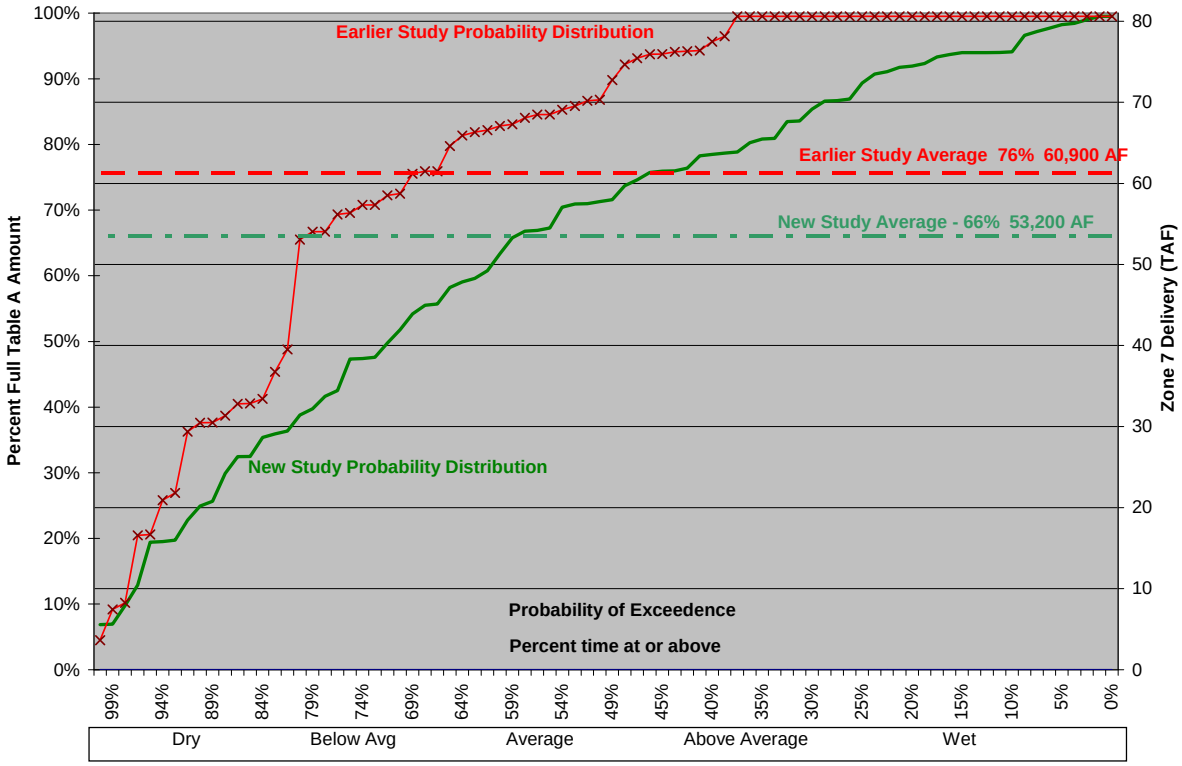



**Table D1. SWP Table A deliveries from Delta under Future Conditions**

| Study or Future Conditions | Long term average | Single Dry Year 77 | 2-year Drought 1976-77 | 4-year drought 1931-34 | 6 year Drought 1928-34 | Single Wet Year | 6 year Wet Period |
|---|---|---|---|---|---|---|---|
| 2005 report | 77% | 5% | 40% | 33% | 38% | 95% | 93% |
| 2007 report | 66% | 7% | 26% | 32% | 33% | 94% | 84% |
| % difference | -14% | 140% | -35% | -3% | -13% | -1% | -10% |

Most of the reduction is due to anticipated regulatory restrictions in Delta pumping. Only about 18% of the reduction is due to climate change. For Zone 7, the total reduction is 14% of SWP supplies or 7,700 acre-feet. Table D1 also compares the percent of Table A received for various dry through wet periods for both the 2005 report and the new 2007 report. As shown in Table D1, the 2007 report shows a 35% reduction in supply during a 2-year drought. The 2007 report shows the 6-year drought has only a 13% reduction, which fits the 14% long-term average reduction. The data in table D1 is from tables 6-14 and 6-15 in the Draft SWP Delivery Reliability Report 2007.

Figure D1 displays and compares results of the current 2007 reliability study with the earlier 2005 study in graphical form. The percent of SWP deliveries ranges from about 7% in very dry years on the lower left up to 100% in the very wet years on the top right. The top red curve displays the results from the earlier (2005) study. The lower green curve displays the results from the new (2007) study. This figure is a probability distribution graph showing SWP deliveries to Zone 7. The horizontal axis represents the probability distribution in percent of time at or above a given amount. Dry years are plotted towards the left and are represented by the 80-99% probability of exceedence. Dry years have a low percent delivery of SWP water. Wet years are plotted towards the right and are represented by the 20%-1% probability of exceedence. Wet years have a very high percent delivery of SWP water and typically result in 100% delivery of "Table A" contract amount.

On Figure D1, the left vertical axis represents the amount of SWP water delivered to Zone 7 each year as a percent of our "Table A" contract amount. In the very dry years, as little as 7% of Table A water would be delivered to Zone 7. In the very wet years the full amount (100%) would be delivered to Zone 7. The right axis of the graph shows the amount of water to be delivered to Zone 7 in thousand acre feet (TAF).

Deliveries are significantly lower under the recent study conditions. The "worst case" dry year is shown on the far left side of the graph. Deliveries in the "worst case"- "critical dry year" would only be about 7%. The most probable or median year is the 50% probability of exceedence condition shown in the middle of the horizontal axis. Deliveries in the median year would be about 70% under new study conditions (shown in green solid line). Deliveries in the median year for the earlier study would be about 95%. This is a reduction of about 20,000 acre-feet in deliveries for a median year. The wet years are shown on the far top right. In the new study, only in the very wet years representing about only 5% of the time we would get 100% of our supply.

The difference between earlier study shown in the top line and the new study shown in the lower line varies from a small amount in dry years on the left to large amounts in below and above average cases and then back to small amounts in wet years on the right. The reduction in deliveries is greatest in the middle half between the 80% probability of exceedence and the 30% probability of exceedence. The long term average is reduced from about 76% (75.54%) to only 66%. This is reduction of about 7,700 acre-feet in long term sustainable supply.

Climate Change impacts are due to global warming. The slow process of global warming is expected to cause earlier snow melt and rising sea level changes. Some of the models also indicate a slight increase in total precipitation. The reliability report recommended using averaged results from several climate models. As stated earlier, climate change represents about one quarter of this projected reduction in SWP supplies.

# ATTACHMENT E: COMPONENTS OF THE LIVERMORE-AMADOR VALLEY'S WATER SUPPLY

The Livermore-Amador Valley has a diverse portfolio of water supplies, including:

- State Water Project
- Lake Del Valle Yield
- Byron Bethany Irrigation Contract
- Supplemental Supplies: Zone 7 Water Agency
- Supplemental Supplies: Livermore-Amador Valley

Each is discussed in more detail below.

## STATE WATER PROJECT (SWP)

In 1962, Zone 7 became the first State Water Project Contractor to take water deliveries. Since 1962 Zone 7 has increased our share of water and currently has a long-term contract with the SWP for delivery of 80,619 acre-feet of water a year. This "Table A Amount" was previously referred to as "Maximum Annual Entitlement." Typically the SWP with its present configuration and lower demands can deliver a slightly higher percent of requested amounts and this quantity will decrease as the demands by all SWP contractors increase. In the 1990's, DWR's early operation studies using the older DWRSIM (computer model) under the Monterey Agreement indicate an average future (2020) yield of 75.57% (60,900 acre-feet). As the models improved with additional hydrologic data and the incorporation of more operational criteria, DWR revised their estimates of long term yield. In December 1992 DWR published the first "State Water Project Delivery Reliability Report". This report utilized the CALSIM II model and the results indicated an average yield of 75-76% (74.59% for Study 2021A, 75.73% for Study 2021B). In 2005 the new DWR Reliability Report indicated an average yield of 77 percent. For the past several years Zone 7 staff has reviewed this report and others and concluded that an estimate of 75.57% as the average future yield was still generally valid. But in 2007, conditions changed, and the new 2007 Reliability Report shows significantly lower long term yield of the SWP. (See Table D1 and Attachment D)

## LAKE DEL VALLE

future average yield is water developed by the Zone under its water rights permit for the Arroyo Del Valle. This water is captured and made available in the Del Valle Reservoir through operating agreements with the State Department of Water Resources. The 30-year historic yield to Zone 7 is about 8,000 acre-feet. The future and long-term yield (2020) is calculated at 9,300 acre-feet based on modeling of historic runoff data and future Zone 7 winter season demands. Changes have occurred in our local water operations and future changes may increase or decrease our local yield. Factors which may increase our yield include the future Chain of Lakes which have the potential to allow the capture of more local water which previously had been released into the arroyo and out to the Bay as flood releases. Factors that may decrease our yield include

environmental issues associated with conveying water through Sycamore Grove Park, possible flow requests for in stream environmental concerns and possible reductions in future precipitation associated with global warming. The current estimated yield of 9,300 is still considered to be a reasonable estimate of the long term average yield.

## BYRON BETHANY IRRIGATION DISTRICT (BBID)

This water is purchased from BBID and imported via the South Bay Aqueduct for use in our service area. Zone 7 entered into a long-term (15 year renewable every 5 years) contract with BBID for up to 5,000 acre-feet annually. In 1999 the Zone 7 Board certified the EIR for this water supply. Although we could take up to 5,000 acre-feet per year and have taken up to about 4,300 acre-feet per year, we are using 2,000 acre-feet as a conservative estimate of the long-term average yield from this source.

## SUPPLEMENTAL SUPPLIES: ZONE 7

In addition to SWP, Lake Del Valle Water, and BBID supply, Zone 7 also has access to Yuba Accord water and additional SWP water available through article 21 of its contract with DWR.

### Yuba Accord Supply

This water is purchased as part of the DWR Yuba Accord. In 2008 Zone 7 entered into an agreement to purchase Yuba water. The annual amount of water available in dry years is small, 877 acre-feet were available in 2008 and only 159 are-feet are available in 2009. This water is conveyed to Zone 7 by the SWP. As Zone 7 gains experience using this water and determines how much of this water can actually be delivered to Zone 7 across the delta in wet years then Zone 7 may incorporate more of it into our sustainable supply.

### Article 21 Water and Turn-back water

When available, Zone 7 takes delivery of SWP Article 21 water (formerly called surplus water) and SWP Turn-back water (SWP Article 56d). Zone 7 generally incorporates any Article 21 water into the calculation our average SWP yield. When available Zone 7 purchases SWP water from the Turn-back pool. The Turn-back program 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. This water is purchased when available by Zone 7 but is not expected to be generally available in the future until there is a resolution to the conveyance restrictions in the Delta.

## SUPPLEMENTAL SUPPLIES: LIVERMORE-AMADOR VALLEY

In addition to water provided by Zone 7, purveyors in the Livermore-Amador Valley also have access to groundwater and recycled water.

### Safe Groundwater Yield

Safe Groundwater Yield from Main Basin is defined as the amount of water that can annually be pumped from the groundwater basin and replenished by average annual

natural recharge. More water can be and is pumped from the main basin each year as long as Zone 7 artificially recharges the basin with additional water from our other sources. The long-term baseline safe yield is based on natural recharge and over a century of hydrologic records and projections of future recharge conditions. The safe yield in the main groundwater basin is currently 13,400 acre-feet annually. From this baseline safe yield, the Valley's major water retailers are permitted to pump a combined 7,200 acre-feet annually. This amount, referred to as the Groundwater Pumping Quota, is limited as part of our Municipal and Industrial water supply contract with each retailer. The remaining balance of the safe yield is pumped for other municipal, agricultural and gravel mining area uses. Zone 7's groundwater pumping for our treated water deliveries does not use the baseline safe yield from the basin; instead we pump only water that has been recharged as a part of our artificial recharge program.

**Recycled Water**

Recycled water is tertiary-treated recycled water used for irrigation in Livermore and Dublin. The City of Livermore has been using recycled water since the mid-1960's at the Livermore Municipal Golf Course and has expanded to irrigate lands north of 580, along Isabel Avenue and in Oaks Business Park west of Isabel Avenue/Highway 84. Dublin San Ramon Service District (DSRSD started recycled water irrigation in 1999 at the Dublin Sports Ground and has expanded recycled water use for irrigation for most of east Dublin and Dougherty Valley. The total recycled water includes all recycled water produced by DSRSD and Livermore. Recycled water is a very reliable supply; however, the use of recycled water was historically discouraged due to the potential of salt buildup in our groundwater basin. As part of the Regional Water Quality Control Board's (RWQCB) issuance of the regional recycle water master permit, a "Salt Management Plan" for the groundwater basin was required.

The Salt Management Plan, which was approved by RWQCB and has been incorporated into the Groundwater Management Plan, provides tools and strategies for preventing the general salt buildup which has been slowly degrading the quality of our potable wells for decades. The Salt Management Plan preferred strategy called for increased groundwater recharge with lower TDS imported surface water and increased groundwater pumping of high TDS groundwater that is flowing into the Main Basin in Pleasanton from the north. The high TDS groundwater would be demineralized and delivered for potable water use. The concentrate from the demineralization facility would be exported by DSRSD via the LAVWMA pipeline that currently transports wastewater out of the watershed and directly to the San Francisco Bay. This allows for an expanded use of recycled water, the "uninterruptible" water supply.

The current sustainable supply of 3,600 acre-feet is simply the current estimated amount used for irrigation. This amount is expected to increase.

# ATTACHMENT F: Discussion of the Path Forward

As demonstrated by the recent legal and environmental constraints placed on SWP diversions in the Delta, the sustainability and reliability of long-term water supplies for the Livermore-Amador Valley face an uncertain future. Consequently, Zone 7 staff developed a risk-based water supply model to help incorporate key uncertainties (e.g., estimated number of wet years between droughts, timing of potential solutions, or future adjustments to projected demands by Zone 7 customers) influencing our existing water supply system. Zone 7 staff will use the model to evaluate the consequences, positive or negative, of potential changes to the water supply system in the future (e.g., a new biological opinion or a peripheral canal). Subsequent sections describe the approach necessary for using the risk model to conduct a long-term water supply analysis.

## Risk-Based Approach to Water Supply

The risk-based long-term water supply model uses Monte Carlo analysis to assess the ability of Zone 7's water supply system to manage non-sequential allocations of SWP water (as predicted by DWR's CalSims modeling) and other water supplies. Zone 7 staff will use this new model to quantify the risk to key elements in the system, including the probability of having a shortage or drawing the main groundwater basin down to historic lows. The analysis will include evaluating Zone 7's existing water supply system, collecting key information on potential solutions, developing portfolios that minimize risk and maximize flexibility, and recommending a preferred path to secure a sustainable and reliable water supply for the Livermore-Amador Valley.

### First Step: Evaluate the Existing System

Zone 7 will use the new model to compare existing water supplies to projected water demands for the Livermore-Amador Valley per established contracts, ordinances, resolutions, and policies, and known constraints to key water supplies (e.g., flow restrictions established by the biological opinion for Delta Smelt released in December 2008).

However, unlike the analysis completed as part of this report, the new analysis will review the existing water supply system from a risk-based point-of-view. For example, the new analysis will help Zone 7 staff identify the probability of drawing storage reserves to unacceptable levels beyond 2013 – there is a significant difference between a 1% and an 80% chance of drawing the groundwater levels to historic lows at buildout.

As part of this effort, Zone 7 staff will:

- Review current contracts, ordinances, resolutions, policies, and known impacts to key water supplies.
- Work with the retailers and untreated customers to refine and develop projected water demands for the Livermore-Amador Valley.
- Incorporate this information into the newly developed risk model.
- Analyze Zone 7's existing water supply system for potential deficiencies.

Conducting an analysis of the existing system is essential to understanding the condition of Zone 7's water supply system, and the influence that existing facilities and current policies have on that condition. This analysis will also provide the information necessary to help staff start preparing for other key water supply planning documents (e.g., the 2010 Urban Water Management Plan).

Second Step: Collect Information on Potential Solutions

Another key component of the risk-based approach is to collect sufficient information about potential solutions so that Zone 7 staff can properly evaluate the timing, magnitude, and reduced risk associated with expected benefits. As part of this effort, Zone 7 staff will work diligently to collect information on potential solutions, including, but not limited to the following (in alphabetical order):

- Additional Storage
- Additional SWP Table A Water
- Delta Habitat Conservation and Conveyance Plan (i.e., peripheral canal)
- Enhanced Groundwater Recharge and Recovery
- Los Vaqueros Expansion Project
- Potable Water Offsets from Recycled Water in the Livermore-Amador Valley
- Pilot Delta Diablo Sanitation District Brackish Water Desalination Plant
- Removal of Existing Constraints on Non-SWP Supply Contracts (e.g., BBID Contract)
- Revise Existing Resolutions and Policies
- Storm water Diversion and Storage for Water Supply
- Water Conservation (Treated and Untreated)
- Water Supply Exchange Opportunities with Other SBA Contractors

Zone 7 does not consider the above list final; moreover, staff envisions that other potential solutions will surface throughout this process and in the future.

Third Step: Identify and Optimize Portfolios Necessary to Correct Existing Deficiencies

Zone 7 envisions that a combination of the potential solutions described above will be necessary to help secure a sustainable and reliable water supply for the Livermore-Amador Valley. Consequently, Zone 7 staff will take the information collected in the second step and combine various solutions that compliment each other while also minimizing risk and maximizing flexibility.

Designing portfolios with maximum flexibility is the key to developing a long-term water supply that can navigate through the turbulent future triggered by recent regulatory and environmental constraints - this turbulence means that the preferred portfolio today may not be the preferred portfolio in the future. For example, a portfolio consisting of water conservation, recycled water, and a peripheral canal may work today based on the best available information, but not in the future – if parties involved are unable to generate sufficient support for a peripheral canal.

Accordingly, Zone 7 staff will also develop these portfolios so that the preferred path has sufficient flexibility to change directions if key decisions or trigger points are unfavorable to the long-term water supply for the Livermore-Amador Valley.

As part of this step, Zone 7 staff will also optimize the size of each element within the portfolio to ensure that each portfolio provides the maximum benefit for the lowest cost. For example, the total cost of a portfolio consisting of water conservation, recycled water, and desalination will vary depending on the amount of water conservation and the infrastructure necessary for recycled water and desalination plants – the amount of water conservation and the size of infrastructure, combined, should be optimized to ensure cost efficiency.

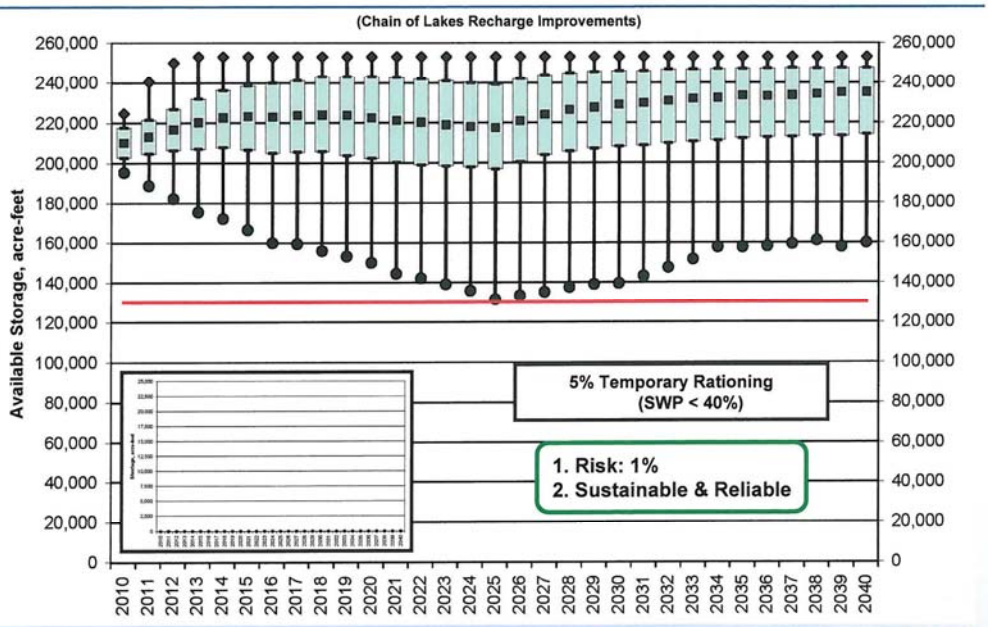
Fourth Step: Rank Portfolios, Compare Alternatives, and Recommend a Preferred Path

After each portfolio has been identified and optimized, Zone 7 staff will develop a priority matrix that will be used to facilitate a comparison of the portfolios against each other. At a minimum, the priority matrix will account for:

- Flexibility
- Risk Reduction
- Cost Effectiveness

Based on the final comparison of the portfolios and additional input from Zone 7 customers, Zone 7 staff will recommend a preferred portfolio for the Board to consider.

# Example Analysis: One Potential Path






DHCCP & Saving