BELLA VISTA WATER DISTRICT
URBAN WATER MANAGEMENT PLAN

APPENDIX I – GROUNDWATER MANAGEMENT PLAN

Coordinated AB 3030
Groundwater Management Plan
for the
Redding Groundwater Basin

Prepared for the
Redding Area Water Council

Prepared by
Shasta County Water Agency

November 1998

Updated May 2007

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Chapter 1 - Introduction

Background and Authority of AB 3030

Section 1.01. On January 1, 1993, California Assembly Bill 3030, the Groundwater Management Act, was codified into California law. California Water Code Sections 10750 et seq., allow local water agencies to adopt local groundwater management plans. Local public and private entities are encouraged by Water Code Section 10755.2 to adopt and implement a coordinated AB 3030 Plan, such as this plan for the Redding Groundwater Basin.

Section 1.01.A. On September 16, 2002, the California Legislature passed Senate Bill 1938. This act amended Water Code Sections 10753.4 and 10795.4; amended and renumbered Sections 10753.7, 10753.8, and 10753.9; and added Sections 10753.1 and 10753.7.

Section 1.02. Development of an AB 3030 Plan under Water Code Sections 10750, et seq., allows local entities to efficiently manage groundwater supplies, assure long-term water supplies, and distribute costs, benefits, and water sharing in a locally determined equitable manner.

Section 1.03. The Department of Water Resources (“DWR”) defines a "Groundwater Management Plan" as "planned use of the groundwater basin yield, storage space, transmission capability, and water in storage."

Section 1.04. Water Code Section 10750 et seq., defines "Groundwater Management Program” as “a coordinated and ongoing activity undertaken for the benefit of a groundwater basin pursuant to a Groundwater Management Plan as specified in AB 3030."

Section 1.05. The Redding Area Water Council (“Water Council”) is an association of numerous public and private entities within the Redding Groundwater Basin area who have determined by Memorandum of Understanding (MOU) dated August 1998 to jointly prepare, adopt, and implement an AB3030 Plan for the Redding Basin.

The Shasta County Water Agency (SCWA), an authorized groundwater management agency as defined in Water Code Section 10753, was authorized by the Water Council MOU to serve as the lead agency in preparing, adopting, and implementing this AB 3030 Groundwater Management Plan. The MOU also designated the Water Council to serve in a policy making oversight capacity for this planning effort. Accordingly, this plan has been undertaken by agreement of the public and private entities comprising the Water Council, as permitted by Water Code Sections 10750.7, 10753 and 10755.2. (See Table 1 for a list of Water Council members.)

Section 1.06. By executing the MOU, each of the participating entities has found and declared that management of the groundwater within their combined jurisdictions, by joint preparation, adoption and implementation of this AB3030 Plan, is in the public interest and will be of common benefit to water users within the Plan Area described in Chapter 2 of this Plan.

Section 1.07. The Water Council has determined that the adoption of this plan will provide immediate and long-term benefits for all beneficial uses of water.

Management Objectives

Section 1.08. The purposes of this Groundwater Management Plan can be summarized as follows:

A. To avoid or minimize conditions that would adversely affect groundwater availability and quality within the Plan area.

B. To develop a groundwater management program that addresses data collection and which protects and enables reasonable use of the groundwater resources of the Redding Basin.

Section 1.09. The Plan will not intrude upon, diminish, or negate in any manner, the existing authority of each affected agency, except as may be expressly provided. This Plan is intended to supplement and strengthen individual agency authority, while building on coordination efforts through the public/private entity partnership established by the above-referenced MOU. Elements of the Groundwater Management Plan will be achieved by Basin-wide consensus, wherever possible.

Coordinated Implementation

Section 1.10. The Water Council shall implement this AB 3030 Plan, with SCWA serving as the lead agency, consistent with the MOU establishing the Water Council. Accordingly, SCWA, working with and at the direction of the Water Council Policy Advisory Committee, will coordinate with all affected water purveyors and other interested parties to implement this Plan within the defined Plan Area.

Section 1.11. Upon its adoption by majority vote of the Water Council, and upon meeting all regulatory prerequisites, this Plan will be effective within the entire jurisdictional boundary of each participating public entity except where the jurisdictional boundaries are outside of Shasta County or the Redding Groundwater Basin (as shown schematically in Figure 1).

TABLE 1
Redding Area Water Council

Member Agencies
City of Anderson
City of Redding
City of Shasta Lake
Shasta County Water Agency
Anderson-Cottonwood Irrigation District
Bella Vista Water District
Clear Creek Community Services District
Centerville Community Services District
Cottonwood Water District
Shasta Community Services District
Mountain Gate Community Services District
McConnell Foundation – Advisory Only

Chapter 2 - Plan Area

Location

Section 2.01. The AB 3030 Plan Area Encompasses the cities of Shasta Lake, Redding, and Anderson, and the lands served by the numerous other water districts, agencies and purveyors in Shasta County and northern Tehama County comprising the Water Council. The Plan Area is the Redding Groundwater Water Basin (shown on Figure 1), including the service areas of the public water purveyors (shown on Figure 2).

Physiography and Geology

Section 2.02. The Redding Basin is bounded on the east by the dissected alluvial terraces, which form the foothills of the Cascade Range. The low hills and dissected uplands of the Coast Range stretch for the length of the western Shasta and Tehama County borders. The interior of the Redding Basin is characterized by stream channels, floodplain, and natural levees of the Sacramento River and its tributaries. Alluvial fans are also present near the confluence of tributaries with the Sacramento River.

Section 2.03. The Redding Groundwater Basin consists of a sediment-filled, southward-plunging, symmetrical trough (Department, 2001). Simultaneous deposition of material from the Coast Range and the Cascade Range resulted in two different formations, which are the principal freshwater-bearing formations in the basin. The Tuscan Formation, in the east, is derived from Cascade Range volcanic sediments, and the Tehama Formation, in the western and northwest portion of the basin, is derived from Coast Range sediments. These formations are up to 2,000 feet thick near the confluence of the Sacramento River and Cottonwood Creek; the Tuscan Formation is generally more permeable and productive than the Tehama Formation (Department, 2001). Groundwater recharge occurs in the higher elevations through stream seepage and direct infiltration of precipitation. Rivers and streams transition to gaining streams at lower elevations and receive direct groundwater discharge. Areas of riparian vegetation occur along surface water features throughout the basin.

Section 2.04. The oldest rock unit exposed in the area is the Upper Cretaceous Chico Formation. This unit consists of sandstone, conglomerates, and shale, which are of marine origin. In most areas of the Redding Basin, the Chico Formation contains salt water under artesian pressure. The Chico Formation is overlain by the Tuscan Formation in the eastern portion of the basin and by the Tehama Formation in the eastern portion.

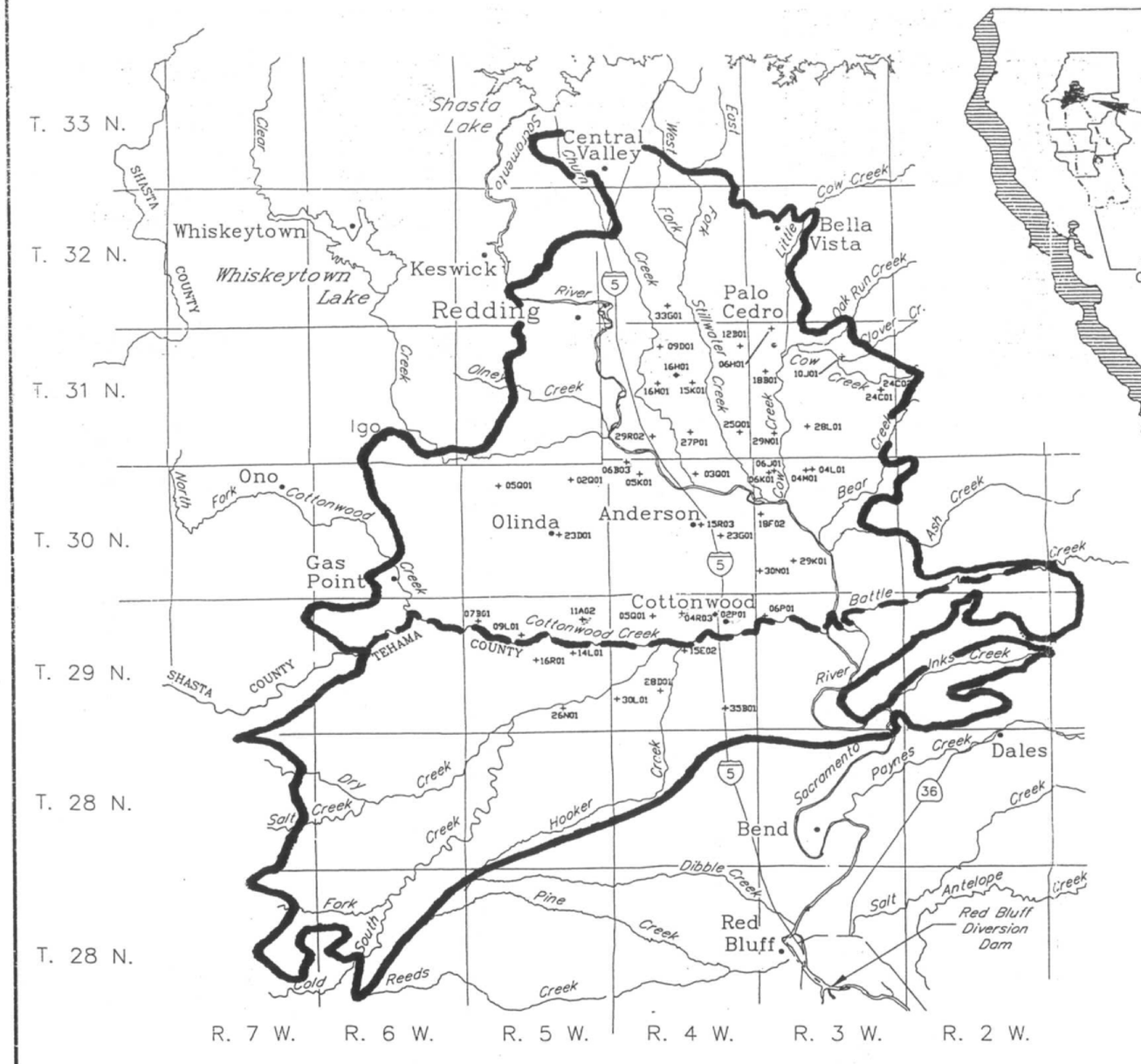
Section 2.05. The Tuscan Formation is Pliocene in age, and consists of tuff breccia, tuffaceous sandstone and conglomerate, and tuffaceous silt and clay (Anderson, 1933). The mudflow deposits are generally of low permeability, but in many areas of the Redding Basin, the mudflows were eroded, sorted, and redeposited shortly after eruption. These reworked deposits are composed of thick, highly permeable sand and gravel strata. These units of the Tuscan Formation are the most prolific aquifers of the Redding Basin.

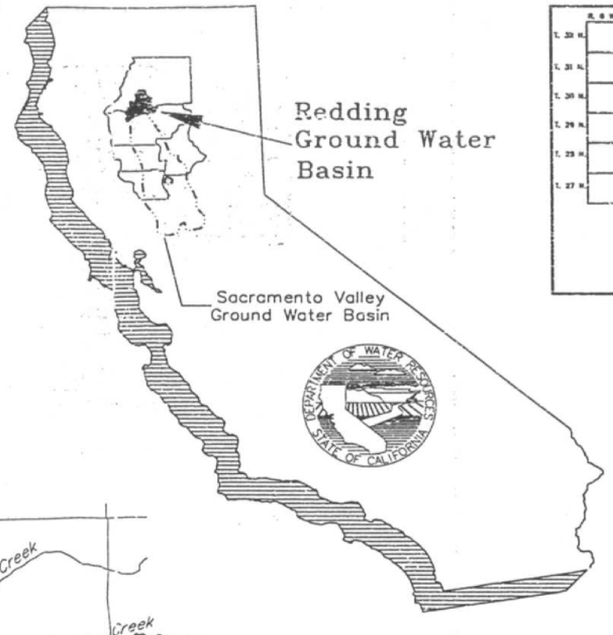
Section 2.06. The valley fill sediments that were eroded from the finer- grained rocks of the Coast Range that bound the Redding Basin to the west comprise the Pliocene Tehama Formation. The Tehama Formation is comprised of silt, sand, gravel, and clays of fluvial origin, and have been observed to be locally cemented (Russel, 1931). The Tehama Formation is another principal water-bearing formation in the Redding Basin, and contains groundwater under both confined and unconfined conditions. While parts of the Tehama Formation appear to be younger in age than the Tuscan Formation, the two formations interfinger in the central portion of the basin, indicating that these portions of the two formations are equivalent in age.

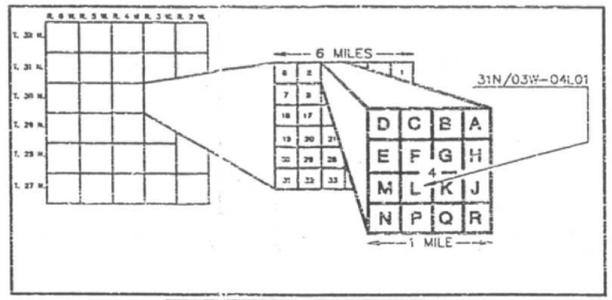
(See Figure 3 for an illustrative depiction of a typical geologic cross-section view looking from west to east across the Redding Basin.)

Section 2.07. The Red Bluff Formation unconformably overlies most of the interbedded Tehama and Tuscan Formations. It is composed primarily of coarse gravels and boulders in a reddish sand, silt, and clay matrix, and outcrops to the west of the Sacramento River (Pierce, 1983). These materials may have been originally deposited by debris-laden, turbid streams draining glacial areas. (Bulletin 118-6, DWR, 1978) The Red Bluff Formation is poorly to moderately permeable, and, in general, areas of outcrop are above the zone of saturation.

Section 2.08. Alluvial deposits of varying age underlie the floodplain along the Sacramento River and its tributaries. These flood-deposited materials generally appear as thin layers of gravel, sand, silt, and clay that occur in thicker beds along the channel of the Sacramento River. The deposit is unconsolidated and the permeability is generally moderate but locally, where gravels predominate, may be very high (Pierce, 1983).







State Well Numbering System

EXPLANATION

- \+ Semi-Annually Monitored Well
- • Monthly Monitored Well
- 09A01 Section Number, Tract, and Sequence Number of State Well Number. Combined with the Township and Range to Determine the Entire State Well Number.
- Shasta County Line
- Approximate Ground Water Basin Boundary

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
NORTHERN DISTRICT

Ground Water Levels in the Redding Ground Water Basin

LOCATION OF GROUND WATER LEVEL MONITORING WELLS
February 1994

0 2 4 6 8 10
Miles

FIGURE 1

Page -5-

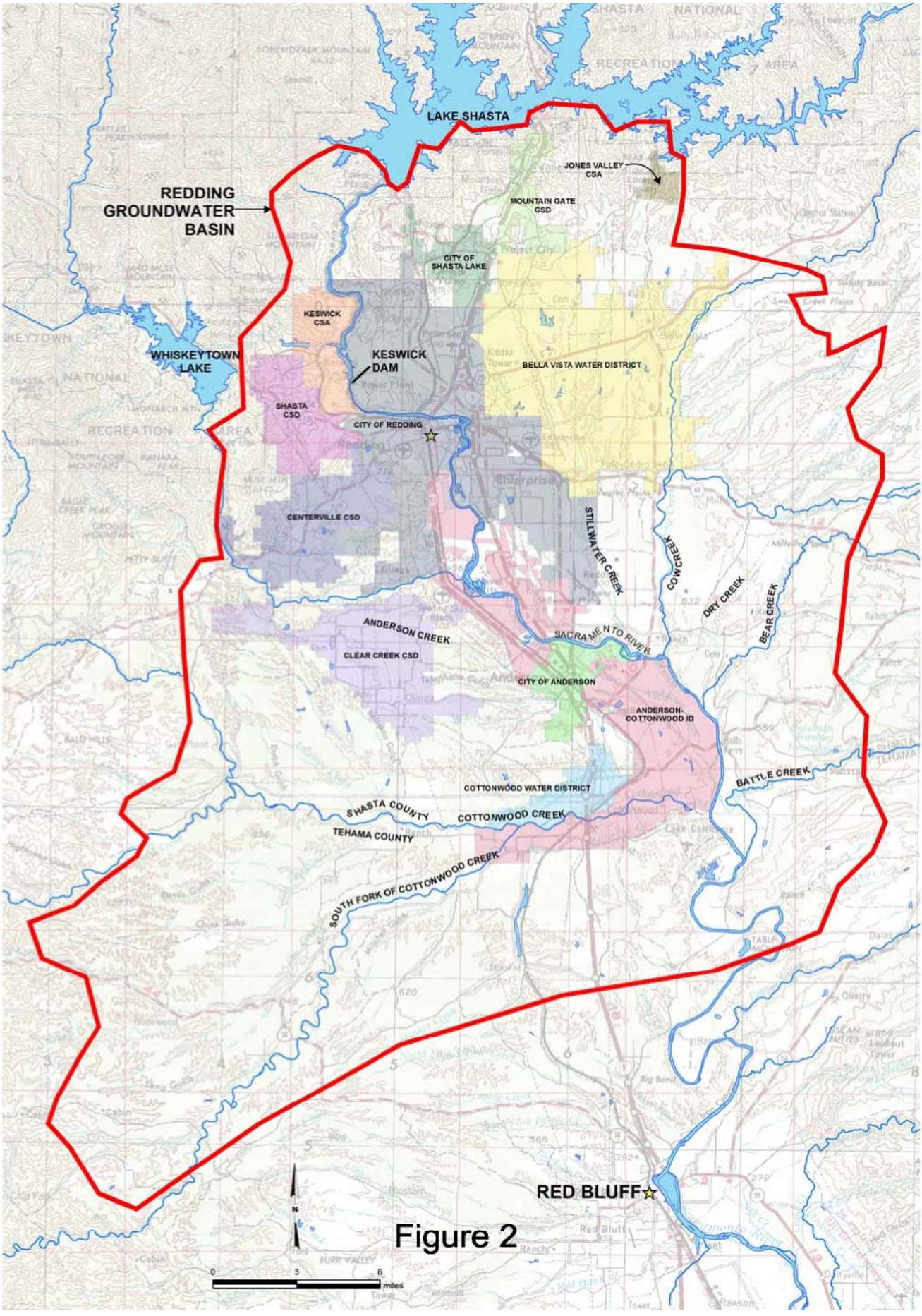
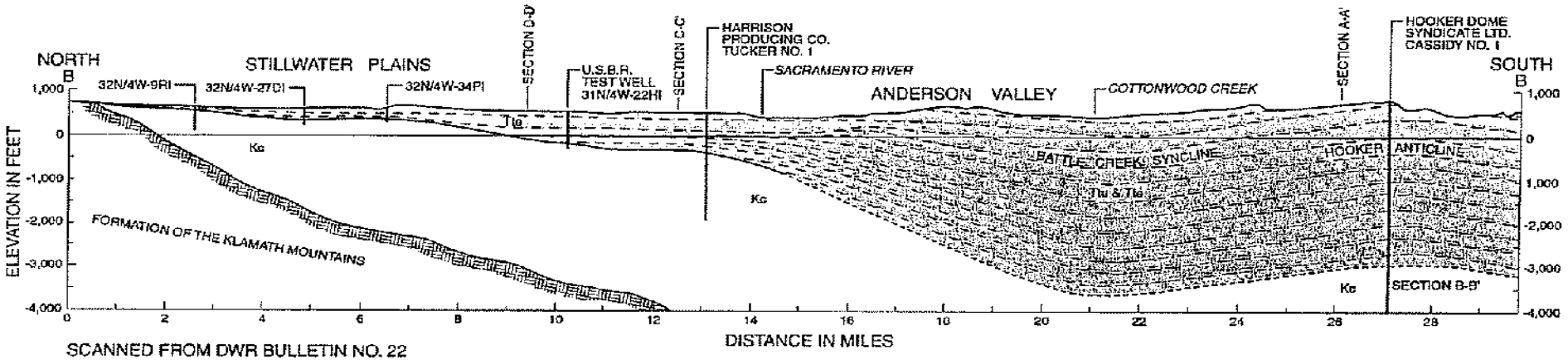

LAKE SHASTA
REDDING GROUNDWATER BASIN
JONES VALLEY CSA
MOUNTAIN GATE CSD
CITY OF SHASTA LAKE
KESWICK CSA
KESWICK DAM
WHISKEYTOWN LAKE
BELLA VISTA WATER DISTRICT
SHASTA CSD
CITY OF REDDING
CENTERVILLE CSD
STILLWATER CREEK
COW CREEK
DRY CREEK
BEAR CREEK
ANDERSON CREEK
SACRAMENTO RIVER
CLEAR CREEK CSD
CITY OF ANDERSON
ANDERSON-COTTONWOOD ID
BATTLE CREEK
COTTONWOOD WATER DISTRICT
SHASTA COUNTY
COTTONWOOD CREEK
TEHAMA COUNTY
SOUTH FORK OF COTTONWOOD CREEK
RED BLUFF
N
0
3
6
miles

Figure 2



SCANNED FROM DWR BULLETIN NO. 22

FIGURE 3

GENERALIZED CROSS SECTION ACROSS THE SACRAMENTO VALLEY

REDDING GROUNDWATER BASIN, SHASTA COUNTY

2478_07 (7/7/98)

Climate

Section 2.09. Shasta County exhibits a wide range of precipitation and temperature due to the relatively large elevation difference between the valley floor and the highlands in the extreme eastern and western portions of the County adjacent to the Redding Basin. Precipitation and temperature data from Redding, representing typical valley floor climate parameters in the Redding Basin, demonstrate that the valley lands encompassing the Redding Basin experience hot dry summers and mild winters.

Section 2.10. Typical temperatures in the Redding area are summarized in Table 2. Mean annual precipitation in Shasta County (from the Shasta County Hydrology Manual) is shown on Figure 4.

Section 2.11. The major portion of annual precipitation generally occurs from November through April; very little rainfall typically occurs between May and October. Average annual rainfall in the Redding Basin varies from approximately 25 to 50 inches.

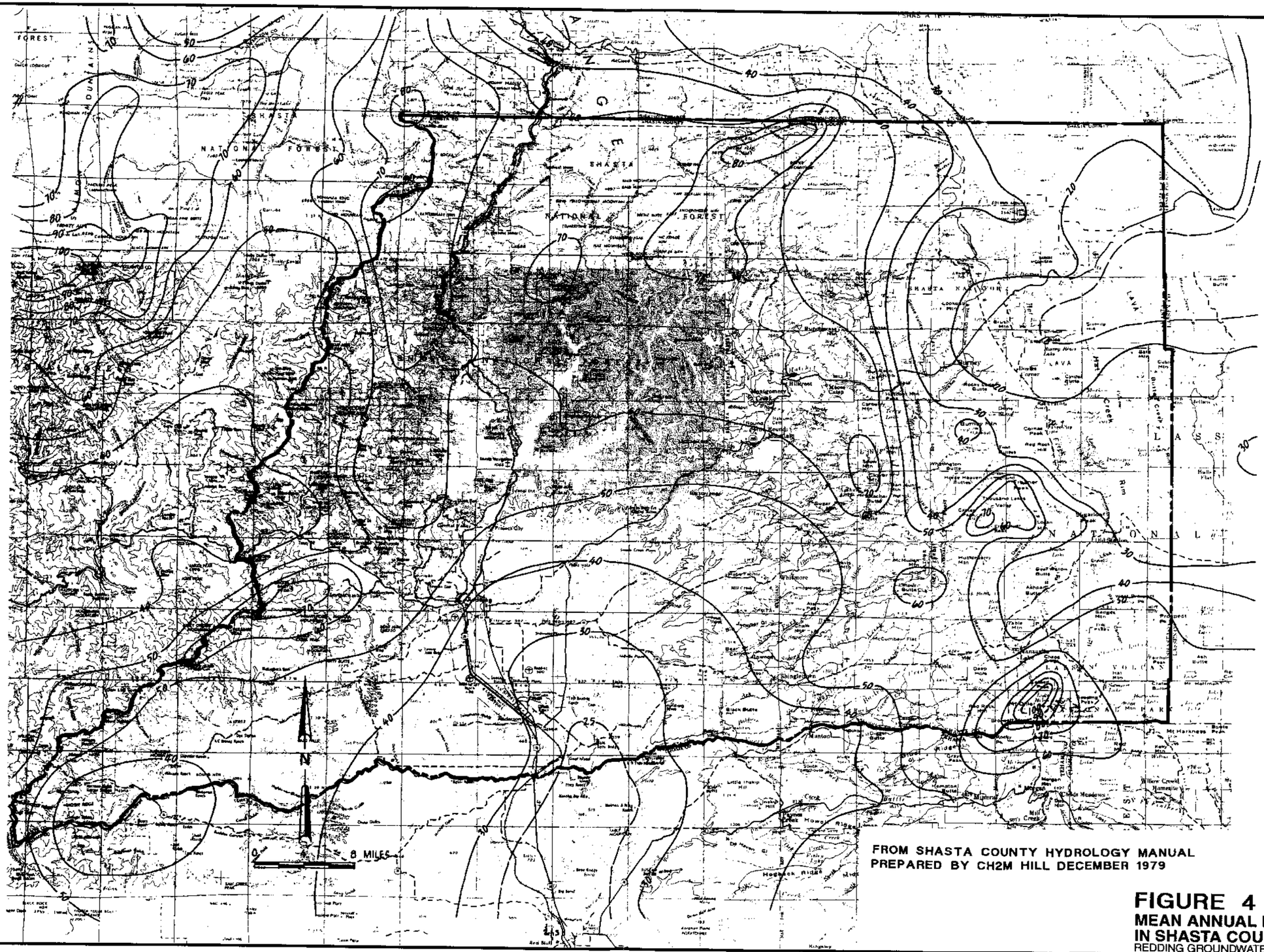
Section 2.12. The population within the Redding Basin is growing at a much higher rate than in the surrounding areas, in part because of the availability of public services, including public water supplies. The development of public water systems has resulted in a variety of high intensity land uses, including urban, residential, agriculture, riparian and native vegetation, and recreation. The three incorporated cities in the Redding Basin—Redding, Shasta Lake, and Anderson—currently account for about sixty-six percent (66%) of the total population within the Redding Basin. (See Shasta County Water Resources Master Plan—Phase 1 Report, SCWA (1997), Appendix C). Long-term population growth rates in the Redding Basin have been relatively uniform since World War II

TABLE 2

Historic Climatic Data for Redding, California

Month	[1]Normal Mean Temperature (EF)	[2]Highest Temperature of Record (EF)	[2]Lowest Temperature of Record (EF)	[2]Average Sunshine
Jan	45.5	77	19	73%
Feb	50.7	83	21	83%
Mar	52.2	85	28	84%
Apr	58	94	33	90%
May	66.4	104	36	91%
Jun	76.1	111	42	94%
Jul	81.5	118	54	97%
Aug	79.5	115	51	97%
Sep	74.1	116	40	94%
Oct	63.5	105	33	92%
Nov	51.8	88	23	84%
Dec	45	74	17	73%
Annual Average	62	118	17	88%

[1]Period of record: 1961 through 1990
[2]Data through 1995



FROM SHASTA COUNTY HYDROLOGY MANUAL
PREPARED BY CH2M HILL DECEMBER 1979

FIGURE 4
MEAN ANNUAL PRECIPITATION IN SHASTA COUNTY
REDDING GROUNDWATER BASIN, SHASTA COUNTY

2478_11 (7/7/98)

Economy

Section 2.13. The economy of Shasta County and the Redding Basin is directly tied to water supply. Lack of reliability in the water supplies has resulted in severe impacts within the service areas of purveyors who rely on federal water contracts for all or a major portion of their water supplies. Since 1991, there have been cutbacks of as much as 75 percent of agricultural allocations and 25 percent of municipal and industrial allocations. These cutbacks have resulted in substantial uncertainty and related constraints on the short-term and long-term planning needed for the orderly development of the Redding Basin.

Local Interest

Section 2.14. In late 1996, the SCWA, acting as a lead agency in this coordinated planning process, hired CH2M HILL, a water resources consulting firm, and retained legal counsel specializing in water, environmental, and regulatory law to assist with development and implementation of the Groundwater Management Plan. Working together, the Water Council members prepared the "Shasta County Water Resources Master Plan Phase 1 Report" (October 1997), which addresses current and future water needs in Shasta County and the Redding Basin. The Water Council members, by terms of the June 1998 MOU, have agreed to continue with this joint planning effort, including the preparation of an integrated surface and groundwater management plan for the Redding Groundwater Basin.

List of Participants

Section 2.15. The Water Council includes the major public and private water users in the Redding Basin. Water use for 1995 by type of use and purveyor or major user in the Redding Basin is shown in Table 3.

Section 2.16. In addition to the above referenced public and private stakeholders, key interest groups will be encouraged to participate in Plan implementation, including public education.

Section 2.17. The success of this Groundwater Management Plan, as prepared pursuant to Water Code Section 10750 et seq., will largely be dependent on the extent of coordination between all affected public entities and other interested parties. As required under Water Code Section 10750 et seq., a notice of public hearing will be published to consider whether to implement a Groundwater Management Plan.

Legal, Financial and Political Considerations

Section 2.18. In Shasta County, as in other parts of California, water resources management is governed by a complex system of local, state, and federal laws. Water use, development, and allocation are controlled by legal contracts and agreements, common law principles, statutes, constitutional provisions, and court decisions. These legal considerations, in combination with the jurisdictional powers of the various local governing agencies and the private property rights of groundwater users, form the framework that governs water resources management in Shasta County and the Redding Basin. A more thorough overview of the institutional framework for water resource management in California is provided in Chapter 2 of *The California Water Plan Update* (DWR Bulletin 160-98).

TABLE 3
1998 Annual Water Needs Summary
Redding Basin
(acre-feet x 1,000, except as noted)

	Major Public Purveyors						Small Purveyors	Private Users		
	ACID Gravity	BVWD Pressure	Clear Creek CSD Pressure	Anderson City Pressure	Redding City Pressure	Shasta Lake City Pressure	Others[a] Pressure	HWUI[b] Pressure	Irrigators, 50% Gravity, 50% Pressure	Totals
Water-Using Lands										
Irrigated Agriculture										
Permanent Crops	5.40	0.24	3.10	0.00	0.14	0.00	0.00	0.00	0.04	8.92
Grain and Field Crops	1.04	0.63	0.09	0.00	0.45	0.00	0.00	0.21	1.31	3.73
Pasture	45.93	10.35	3.57	0.00	0.00	0.04	0.10	1.38	13.82	75.19
Truck	0.14	0.02	0.04	0.00	0.04	0.00	0.00	0.00	0.30	0.54
Rice	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rural Urban (1 to 5 acres)	8.48	4.18	0.00	0.00	0.00	0.00	0.08	0.00	0.00	12.74
Total	**60.99**	**15.42**	**6.80**	**0.00**	**0.63**	**0.04**	**0.18**	**1.59**	**15.47**	**101.12**
Urban										
Urban	0.00	2.07	0.56	1.34	15.66	2.06	0.93	0.00	2.44	25.06
Rural Urban Domestic (1 to 5 acres)	0.00	0.98	0.95	0.09	1.51	0.02	1.44	0.00	1.63	6.62
Total	**0.00**	**3.05**	**1.51**	**1.43**	**17.17**	**2.08**	**2.37**	**0.00**	**4.07**	**31.68**
Commercial and Industrial										
Commercial	0.00	0.25	0.07	0.16	1.16	0.02	0.04	0.00	0.11	1.81
Industrial	0.00	1.70	0.14	0.07	0.60	0.00	0.12	14.67	0.71	18.01
Total	**0.00**	**1.95**	**0.21**	**0.23**	**1.76**	**0.02**	**0.16**	**14.67**	**0.82**	**19.82**
Recreational and Environmental										
Water Bodies	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00
Parks and Golf Courses	0.00	0.68	0.00	0.16	0.87	0.08	0.02	0.00	0.24	2.05
Riparian Vegetation	4.67	0.30	0.03	0.00	3.53	0.00	0.00	0.00	3.14	11.67
Total	**4.67**	**0.98**	**0.03**	**0.16**	**4.40**	**0.08**	**0.02**	**0.00**	**3.38**	**13.72**
Diversions to Other Counties	30.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	30.00
Total	**30.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**30.00**
Total Water Delivery Demands, acre-feet per year	95.66	21.40	8.55	1.82	23.96	2.22	2.73	16.26	23.74	196.34
Conveyance Losses (acre-feet per year)	79.34	1.06	0.43	0.09	1.02	0.11	0.14	0.81	1.16	84.16
Current Diversion Requirements (acre-feet per year)[c]	**175.00**	**22.46**	**8.98**	**1.91**	**24.98**	**2.33**	**2.87**	**17.07**	**24.90**	**280.50**

a Centerville CSD, Shasta County CSD, Keswick CSA, Mountain Gate CSD, Cottonwood Water District and Jones Valley CSA.

b Heavy Water Usage Industrial (Simpson Paper Company, Sierra Pacific Industries, and Wheelabrator).

c Includes 20,000 acre-feet per year delivered to Tehama County and 10,000 acre-feet delivered to downstream users.

Section 2.19. The Water Council will adopt rules and regulations to implement provisions of this AB 3030 Plan. All such rules and regulations shall be adopted pursuant to Water Code Section 10753.8.

Section 2.20. Though permitted pursuant to Water Code Section 10754 et seq., no fees or assessments to finance AB 3030 Plan expenses, such as administrative and operating costs, will be considered by the Water Council unless a future need is demonstrated.

Condition of the Groundwater Basin

Redding Groundwater Basin and Sub-Basins

Section 2.21. The boundaries of the Redding Basin roughly approximate the eastern and western edges of the Sacramento Valley floor. (See Figure 1, showing the Basin and Plan Area.) The foothill areas that constitute the eastern and western portions of Shasta and Tehama Counties adjacent to the Redding Basin are designated as "highland" areas, and are noted for their relative scarcity of groundwater resources. Sub-basins and areas within the Redding Basin with unique characteristics will be identified and evaluated in AB 3030 Plan implementation.

Existing Monitoring

Section 2.22. Since the late 1920s, the State Department of Water Resources (DWR) and the United States Bureau of Reclamation have measured groundwater levels for 48 wells in the Redding Basin. Currently, 35 wells are monitored semi-annually and 5 wells are measured on a quarterly basis.

Section 2.23. The DWR issues periodic reports that relate to the monitoring program in the Redding Basin. These reports include groundwater hydrographs for the monitored wells. Appendix “B” contains access information for DWR Groundwater levels.

Section 2.24. Most wells in the monitoring program are measured by DWR semi-annually, usually in March and October. These monitoring periods provide an indication of groundwater levels before and after the typical agricultural irrigation season.

Section 2.25. In addition to recording water levels, the DWR reports also include, for each well, information on the producing aquifer(s), degree of certainty associated with the groundwater body classification, the hydrogeologic unit, and the applied use of the extracted groundwater.

Section 2.26. The data from these historic and ongoing monitoring efforts will be considered and reflected in the ongoing development of a Redding Basin computer model.

Historic Variations in Groundwater Levels

Section 2.27 Groundwater levels in the Redding Basin fluctuate seasonally in response to the quantities of discharge from, and recharge to, the groundwater basin that occurs in a particular year. The primary source of groundwater discharge from the aquifer is groundwater pumping, along with a small quantity of subsurface outflow from the basin, while the main sources of recharge are deep percolation of precipitation and applied water, along with leakage from surface streams.

Section 2.28. Monthly measurements of groundwater show that water levels start dropping in early spring (usually April) and continue to decline through the summer until early September. Maximum levels are usually reached by February.

Section 2.29. Over the long term, groundwater levels in the Redding Basin have remained steady. There are seasonal fluctuations (summer to winter), and there are some fluctuations caused by climatic patterns (wet or dry years), but overall, groundwater levels have not changed significantly throughout the period of record.

Historic Groundwater Pumpage

Section 2.30. In the earlier parts of this century, little groundwater was used in Shasta County and the Redding Basin. The Sacramento River and its primary tributaries provided the source of water for most irrigation. A notable exception is along Cottonwood Creek, where substantial groundwater extraction occurred over several decades, largely ending in the 1980s.

Section 2.31. In the early 1970s, approximately 5 percent of all irrigation water came from groundwater, and approximately 95 percent came from surface-water sources. In 1995, approximately 12.5 percent of all water used in the Redding Basin was derived from groundwater. The vast majority of groundwater extracted is put to municipal and industrial uses. Groundwater is the principal source of water supply for areas outside of the service areas of the 14 water districts within the basin.

Groundwater Quality

Section 2.32. The general quality of groundwater in the Redding Basin is considered good to excellent (TDS between 95 and 424 mg/L) for most uses, except for that water from shallow depths along the margin of the basin where pre-Tertiary formations may be tapped. Some wells in those areas yield water with constituents that are above limits for drinking (primarily metals, TDS, chloride and sulfate). This water is likely derived from the Chico Formation (Pierce, 1983).

Section 2.33. Additional review of existing and potential groundwater quality problems in the Redding Basin is needed. This will occur in AB 3030 Plan implementation.

Need for Groundwater Management Plan

Section 2.34. There is a substantial, but undefined, supply of groundwater in the Redding Basin. The Redding Basin does not appear to be in a state of groundwater overdraft; however, at this time there is no certainty as to how close the Redding Basin is to overdraft, what constitutes a “safe annual yield,” and when and how frequently well interference problems may arise in the future.

The Redding Groundwater Basin has been estimated to contain up to 3,500,000 AF of groundwater in storage (DWR Bulletin 118, 1975). Groundwater levels in wells within the Basin are depressed seasonally, but fully recover over the winter months in all but the driest rainfall years. However, further study is necessary to determine the effects of a prolonged, severe drought on regional groundwater levels.

Section 2.35. The need for an AB 3030 Plan is documented in the Shasta County Water Resources Master Plan Phase 1 Report (October 1997) “Phase 1 Report,” which was prepared for the Water Council. As indicated in that report, additional study of the Redding Basin’s characteristics is needed to better understand and evaluate the occurrence, movement, origin, and destination of groundwater in the Redding Basin, and what constitutes reasonable use thereof.

Section 2.36. This plan is intended to provide a mechanism for both the public and private stakeholders in the Redding Basin to evaluate, manage, protect, and preserve this valuable local groundwater resource.

Replace Figures 5-11 with citations to Appendix B in 2.22-2.36. Appendix B would contain appropriate web links to historic documents.

Chapter 3 - Elements of the AB 3030 Plan

AB 3030 Plan Elements

Section 3.01. The approach to groundwater management reflected in this AB 3030 Plan will generally be based on voluntary cooperation between water agencies, purveyors, and interested private parties in the Redding Basin, with an information gathering and monitoring emphasis. This plan includes the following elements: (1) Data Development/Groundwater Monitoring; (2) Public Entity Coordination and Reporting; (3) Public Information and Education; (4) Export Limitations; (5) Water Quality; (6) Wellhead Protection; (7) Land Use; (8) Conjunctive Use Operations; (9) Groundwater Management Facilities; and (10) Groundwater Overdraft and Well Interference. These elements are further described below.

Data Development/Groundwater Monitoring

Section 3.02. To ensure that its actions are taken in accordance with the public interest, and to further prevent the use of unnecessary and potentially burdensome management techniques, SCWA will work with Water Council participants to collect data and will conduct or receive necessary and relevant studies, for the purpose of further documenting the existing quality and quantity of groundwater within the Redding Basin. This SCWA activity will be undertaken in a scope and manner consistent with the Water Council MOU, including the preparation and maintenance of a linked surface water and groundwater computer-based model.

Section 3.03. SCWA will serve as the Water Council's information and data collection coordinator, and will collect and conduct, or have conducted, technical investigations to carry out this plan, including computer model development. All data collection and technical investigations authorized under this plan shall be carried out by SCWA in consultation with the Water Council Policy Advisory Committee.

Section 3.04. One of the goals in the data collection and evaluation process will be to determine the Redding Basin's long-term safe annual yield. For the purpose of this plan, "long-term safe annual yield" shall be as defined in Appendix A, which defines this and other key AB 3030 Plan and implementing regulation terms. The determination shall estimate the safe annual yield of the total Redding Basin under various hydrologic conditions and the probable boundaries of the sub-basin hydrologic units.

Section 3.05. The Water Council shall prepare a report on the status of the Redding Basin no less than bi-annually. The report shall include an estimate of annual recharge, pumping, and groundwater discharge to surface streams. The report shall include any other information that the Water Council deems relevant and necessary to the effective management of groundwater within the Plan Area, including estimated changes in water levels.

A. Collection and Analysis of Data/Preparation of Reports on Hydrologic Conditions. Data related to the hydrologic inventory of the Redding Basin will be collected and reviewed as a component of the periodic report to be prepared by the Water Council. Principal factors to be considered will include surface water imported to and exported from the Redding Basin, evapotranspiration, the estimated groundwater recharge, discharge, and extractions from the Redding Basin, and subterranean outflow.

B. Preference for Use of Existing Databases. To avoid incurring unnecessary costs, the Water Council shall utilize data and models developed for the Redding Basin Management Planning effort and further determine the status of additional studies and monitoring programs carried out within the Redding Basin by federal, state, and local agencies. Where possible, information from pre-existing data collection programs, and new data derived from the computer model to be developed for the Water Council and other sources, will be incorporated into the report.

C. Expansion of Data Collection Efforts. Where significant and important data are missing or incomplete, the Water Council will determine methods to acquire a more complete database.

Section 3.06. The Water Council, using its Technical Advisory Committee as it determines appropriate, may prepare or receive reports on groundwater and supplemental water supplies, groundwater quality, and other conditions within the Plan Area. The Water Council may identify information useful to a water replenishment or conjunctive use project and prepare reports on the utility of these types of projects within the Plan Area.

Section 3.07. To protect and/or enhance the quality and quantity of water within the Redding Basin, the Water Council shall develop and implement a Redding Basin monitoring program. The monitoring program may consist of the measures identified in these sections and will be implemented by the adoption of rules and regulations, as determined appropriate by the Water Council Policy Advisory Committee.

A. Monitoring Redding Basin Conditions. The previous and ongoing collection and analysis of basic hydrologic data are important elements of the Management Plan. Monitoring is essential to characterize Redding Basin conditions and to provide the technical information needed to make decisions regarding the optimal use and management of the Redding Basin. Monitoring of the Redding Basin will allow the Water Council to: (1) identify reliable sources of information; (2) identify changing conditions; (3) develop and implement specific groundwater management programs as may be determined necessary in the future; and (4) document the accomplishments of the management program.

B. Use of Existing Monitoring Data. The Water Council shall coordinate with the DWR, Northern District Office, Anderson-Cottonwood Irrigation District, and other appropriate entities to use and supplement their existing semi-annual well water level measurement program. Monitoring of water levels will allow the Water Council to gauge the status of the groundwater resource in response to changing hydrologic conditions and water use practices. The number and location of these wells will be determined by the Water Council Policy Advisory Committee.

C. Monitoring Groundwater Quality Conditions. The Water Council shall include one or more monitoring wells within the Redding Basin, and in each sub-basin where feasible, for the purpose of measuring water quality conditions within the Redding Basin. The number and location of these wells will be determined by the Water Council Policy Advisory Committee. Efforts will be made to use existing wells that are subject to water quality testing to minimize costs associated with the water quality-monitoring program.

Section 3.08. The Water Council shall prepare an annual estimate of the amount of water extracted within the Plan Area and of the total cumulative groundwater extractions within the Redding Basin.

Public Entity Coordination and Reporting

Section 3.09. The Water Council shall strive at all times to coordinate with all agencies having jurisdiction over water-related matters in and adjacent to the Redding Basin.

Section 3.10. The Water Council will coordinate with the Regional Water Quality Control Board, U.S. Environmental Protection Agency, the State Office of Drinking Water, and other state and local regulatory agencies to monitor and develop information concerning groundwater quality compliance with applicable standards, and to otherwise manage and ensure reasonable use of Plan Area groundwater.

Public Information and Education

Section 3.11. It is essential to involve the public, agricultural, industrial, and business communities early in the development of the Groundwater Management Plan. Throughout the implementation of this plan, public education and community relations will be integral to successful groundwater management in the Redding Basin.

Section 3.12. The Water Council shall provide public outreach through public presentations, published information items, and references to groundwater data available through other public agencies, as determined by the Policy Advisory Committee.

Export Limitations

Section 3.13. In order to preserve and protect Redding Groundwater Basin resources, and to ensure their reasonable and beneficial use in a way that is not detrimental to the Basin and its local users, County of Shasta Ordinance No. SCC 98-1, as adopted by the Shasta County Board of Supervisors on January 27, 1998, is fully incorporated into this AB 3030 Plan by reference, and shall apply throughout the AB 3030 Plan area except: (1) as otherwise provided by this Plan; or (2) as it may be superceded by adoption of one or more local ordinances within individual public agency boundaries. That groundwater extraction and export ordinance, which is codified as Chapter 18.08 of the Shasta County Code, is attached to this Plan as Appendix A.

The term “Shasta County” as used in Exhibit “A” for the purpose of requiring a permit for the export of ground water outside of the County, shall mean the AB 3030 Plan area.

The term “Commission” as used in Exhibit “A” shall be the Water Council Technical Advisory Committee, as established by MOU, unless otherwise designated and appointed by the Water Council.

The terms “Clerk of the Board” and “Board” as used in Exhibit “A” for the purpose of appeals from Commission actions on permit applications, shall mean the “Director” as therein defined and the full Water council, Respectively.

Water Quality

Section 3.14. The Water Council, working with members and non-member entities shall develop a program to assess, monitor, and protect the quality of groundwater in the Redding Basin to ensure the quality is acceptable for all beneficial uses.

Wellhead Protection

Section 3.15. Abandoned wells provide the potential for pollutants or contaminants to enter and/or spread into the Redding Basin groundwater. As such, well abandonment represents a

key concern in groundwater management. The Water Council shall coordinate with the County Division of Environmental Health to obtain written notice concerning well abandonment projects.

Section 3.16. Improperly constructed and abandoned wells can impair yields and increase the potential for groundwater contamination. The Water Council supports the California Model Well Code standards, and the Shasta County well construction and destruction ordinance and regulations, and will work with the County Division of Environmental Health to provide information to well owners throughout the Basin regarding proper well construction and abandonment procedures.

Land Use

Section 3.17. To improve coordination among Water Council members and jurisdictions having land use authority, the Water Agency will request notification and circulation of CEQA documents for projects in the basin that identify potentially significant effects to groundwater quality. The Water Agency will notify members of the Water Council that may be affected and collaborate to assess the risk of groundwater contamination.

Conjunctive Use Operations

Section 3.18. The Water Council shall evaluate options and develop a program for conjunctive use of Redding Basin water sources in an effort to increase or maintain Redding Basin water supplies.

Groundwater Management Facilities

Section 3.19. The Water Council will assess the need for short- and long-term facilities, such as conjunctive use facilities, and develop plans as may be determined appropriate.

Groundwater Overdraft and Well Interference

Section 3.20. A mitigation and prevention program will be developed to address potential overdraft, well interference, and similar problems that would adversely affect the groundwater resources in the Plan area. This program will identify strategies and actions that will promote reasonable groundwater usage in the Redding Basin.

Section 3.21. The Water Council Policy Advisory Committee shall review this AB 3030 Plan and its implementation on a bi-annual basis and shall report its findings to all MOU participants.

Chapter 4 - Implementation

Procedure

Section 4.01. A Groundwater Management Plan developed pursuant to Water Code Section 10750 et seq., must be conducted according to the procedure show in Table 4.

TABLE 4 Procedure to Implement Groundwater Management Plan
1. Publish notice of public hearing to consider whether to adopt resolution of intent.
2. Conduct a hearing on whether to adopt a resolution of intent to adopt a Groundwater Management Plan.
3. Adopt a resolution of intention to adopt a Groundwater Management Plan.
4. Publication of notice.
5. Prepare a Groundwater Management Plan within 2 years.
6. Hold a second hearing after plan preparation is complete.
7. Consider protests at conclusion of second hearing.
8. If protests are received from landowners representing more than 50% of assessed value of property in the County occurs, the Plan shall not be adopted.
9. If protests are received from landowners representing less than 50% of assessed value of property in the Redding Basin Plan area occurs, the AB 3030 Plan may be adopted within 35 days after Step 6.

Plan Administration

Section 4.02. The Water Council will administer the AB 3030 Plan throughout the Plan Area in accordance with the adopted Water Council MOU. As reflected in that MOU, successful implementation of the AB 3030 Plan must involve the ongoing participation of, and coordination between, all Redding Basin agencies which are empowered with groundwater-related duties and other interested local entities.

Section 4.03. Consistent with Water Council objectives in preparing this AB 3030 Plan, it is intended that this Plan will apply to the service areas of all local water purveyors within its stated boundaries. However, any local agency, investor-owned utility, or mutual water company which may decline to have the plan made applicable within its service area will be exempt from this plan within its jurisdiction, as stated in the MOU or applicable law.

Section 4.04. Any local water agencies within the boundaries of the AB 3030 plan area that decline to participate in cooperative management of the Redding Basin within its agency boundary shall be encouraged to adopt their own groundwater management plans and coordinate with the Water Council to the extent possible.

Section 4.05. This AB3030 Plan shall be funded, with respect to implementation and maintenance, as provided in the Water Council MOU as may be amended.

Section 4.06. In accordance with the California Groundwater Management Act, the Water Council will develop rules and regulations from time to time, to implement provisions of this plan, as it may be amended consistent with the Water Council MOU. These rules and regulations shall be adopted by the Water Council by resolution.

Section 4.07. All meetings of the Policy Advisory Committee and/or Technical Advisory Committee will be publicly noticed in print media of general circulation. Parties that have requested will be notified of meetings in the same manner as the Policy Advisory Committee and/or Technical Advisory Committee.

A. Time will be allotted during meetings of the Policy Advisory Committee and/or Technical Advisory Committee for public comment. The amount of time will be at the discretion of the Water Committee member conducting the meeting.

B. Written comments germane to the Policy Advisory Committee and/or Technical Advisory Committee meeting will be considered if received before the close of business 5 working days after the meeting.

Section 4.08. All known water purveyors whose boundaries overlie the Redding Groundwater Basin will be notified of meetings of the Policy Advisory Committee and/or Technical Advisory Committee in the same manner as members of the Water Committee.

A. Time will be allotted during meetings of the Policy Advisory Committee and/or Technical Advisory Committee for purveyor comment. The amount of time will be at the discretion of the Water Committee member conducting the meeting.

B. Written comments germane to the Policy Advisory Committee and/or Technical Advisory Committee meeting will be considered if received before the close of business 10 working days after the meeting.

Chapter 5 - Plan Amendments

Section 5.01. This AB3030 Plan shall be periodically updated, based on changed circumstances within the Redding Basin, as determined by the Water Council.

Section 5.02. Plan Amendments shall occur in the manner established in the Water council MOU, as may be amended.

Section 5.03. The Water Council shall endeavor to publicly distribute, and educate the public concerning any AB3030 Plan amendments adopted resulting in more than mere technical changes.

APPENDIX "A"

SHASTA COUNTY GROUNDWATER
EXTRACTION AND EXPORT ORDINANCE

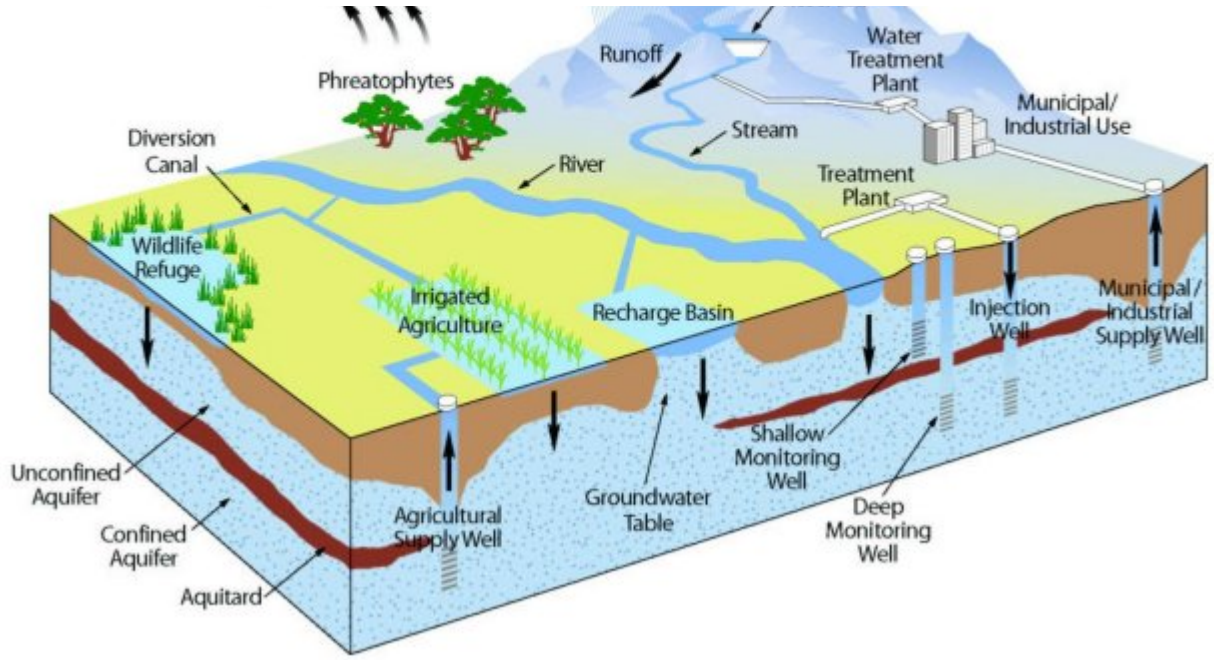
Enterprise-Anderson Groundwater Sustainability Planning

The Enterprise-Anderson Groundwater Sustainability Agency (EAGSA) has been formed to ensure the continued sustainability of the Enterprise and Anderson groundwater basins.

SGMA Groundwater Management

Sign In

EAGSA Home



Overview

On September 16, 2014, Governor Jerry Brown signed into law a three-bill legislative package collectively known as the Sustainable Groundwater Management Act (SGMA).

SGMA requires governments and water agencies of high and medium priority basins to halt overdraft and bring groundwater basins into balanced levels of pumping and recharge. Under SGMA, these basins should reach sustainability within 20 years of implementing their sustainability plans. For critically over-drafted basins, that will be 2040. For the remaining high and medium priority basins, 2042 is the deadline.

SGMA empowers local agencies to form Groundwater Sustainability Agencies (GSAs) to manage basins sustainably and requires those GSAs to adopt Groundwater Sustainability Plans (GSPs) for crucial groundwater basins in California.

Our Community

The Enterprise Anderson Groundwater Sustainability Agency (EAGSA) consists of the overlying members of the Redding Area Groundwater Basin. The EAGSA was formed by Memorandum of Understanding (MOU) agreed to by:

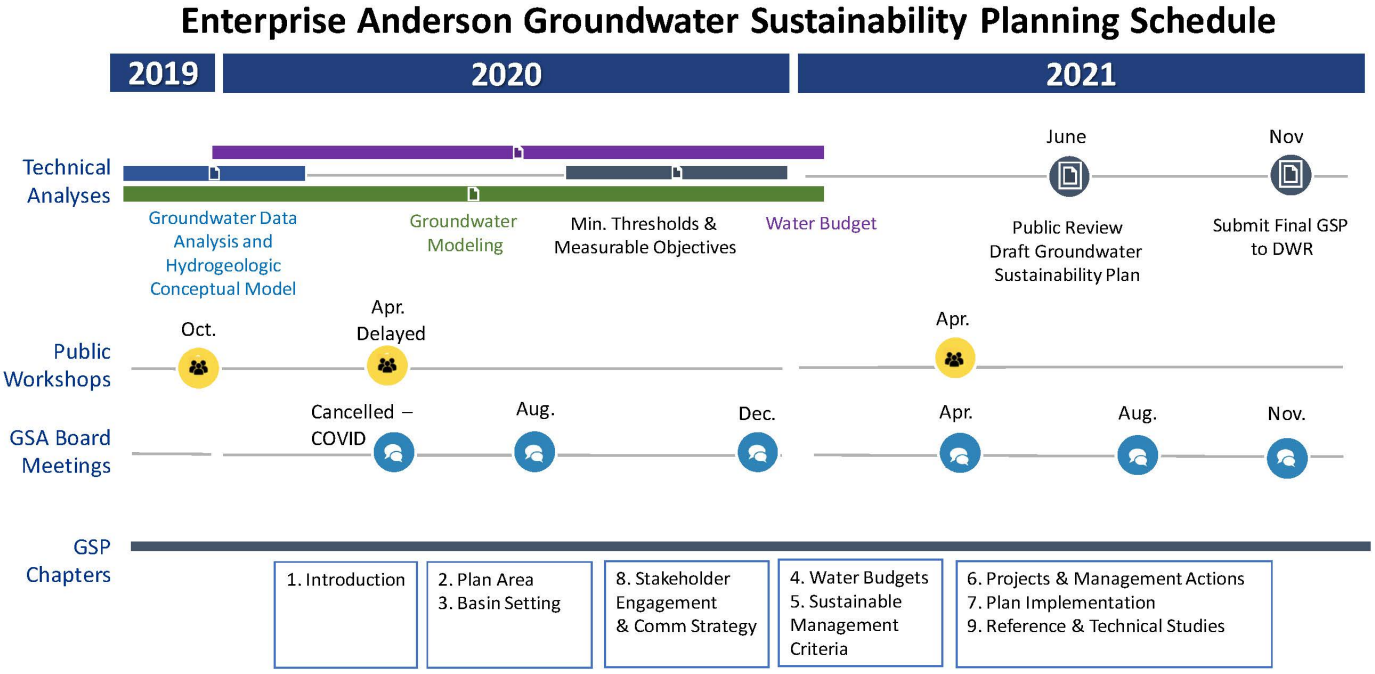
- City of Anderson
- County of Shasta
- Clear Creek Community Services District (CCCSD)
- Bella Vista Water District

Sign In

EAGSA Home

The EAGSA Board of Directors is comprised of elected officials representing each agency.

Resources



BELLA VISTA WATER DISTRICT
URBAN WATER MANAGEMENT PLAN

APPENDIX J – BULLETIN 118

Redding Groundwater Basin, Enterprise Subbasin

- Groundwater Basin Number: 5-6.04
- County: Shasta
- Surface Area: 60,900 acres (95 square miles)

Basin Boundaries and Hydrology

The Enterprise Subbasin comprises the portion of the Redding Groundwater Basin bounded on the west and southwest by the Sacramento River, on the north by the Klamath Mountains, and on the east by Little Cow Creek and Cow Creek. Annual precipitation within the basin ranges from 29- to 41-inches, increasing to the north.

Hydrogeologic Information

Water-Bearing Formations

The Enterprise Subbasin aquifer system is comprised of continental deposits of late Tertiary to Quaternary age. The Quaternary deposits include Holocene Stream Channel Deposits and terrace deposits of the Modesto and Riverbank formations. The Tertiary deposits are the Pleistocene Tehama Formation and the Tuscan Formation. The following descriptions of water-bearing formations are from Helley and Harwood (1985) unless otherwise noted.

Holocene Stream Channel Deposits. The youngest alluvium consists of unconsolidated gravel, sand, silt and clay from stream channel and flood-plain deposits. Holocene stream channel deposits are observed along the entire extents of the western boundary along the Sacramento River. These deposits are also observed along Stillwater Creek extending from the Klamath Mountains to the Sacramento River in the center of the subbasin and along Cow Creek on the eastern side. The thickness ranges to 50 feet. This unit represents the perched water table and the upper part of the unconfined zone of the aquifer. Although the alluvium is moderately permeable, it is not a significant contributor to groundwater usage.

Pleistocene Terrace Deposits. The Modesto and Riverbank formations consist of poorly consolidated gravel with some sand and silt deposited during the Pleistocene. They are usually found as terrace deposits near the surface along the Sacramento River and tributaries. The thickness ranges to 50 feet. They are moderately to highly permeable and yield limited domestic water supply from perched water tables.

Pliocene Tehama Formation. The Tehama Formation consists of locally cemented silts, sand, gravel, and clay of fluviatile origin derived from the Klamath Mountains and Coast Ranges. Thickness of the formation along the southern boundary ranges from 300 feet at the southwestern extents of the subbasin to 1,000 feet at the confluence of Cow Creek and the Sacramento River. From north to south along Cow Creek, the deposit uniformly increases in thickness from where the Chico Formation daylights near Bella Vista to a depth of 500 feet in the vicinity of Palo Cedro and to a depth of 1,000 feet at the Sacramento River (DWR 1964). The permeability is

moderate to high, with yields of 100- to 1,000-gpm. The formation interfingers with the Tuscan Formation along the eastern boundary; however, the extents are unknown.

Pliocene Tuscan Formation. The Tuscan Formation consists of volcanic gravel and tuff-breccia, fine- to coarse-grained volcanic sandstone, conglomerate and tuff, tuffaceous silt and clay predominantly derived from andesitic and basaltic source rocks. The formation is described as four separate but lithologically similar units, Units A through D (with Unit A being the oldest), which in some areas are separated by layers of thin tuff or ash units.

Unit A is the oldest water-bearing unit of the formation and is characterized by the presence of metamorphic clasts within interbedded lahars, volcanic conglomerate, volcanic sandstone and siltstone. Unit B is composed of a fairly equal distribution of lahars, tuffaceous sandstone, and conglomerate. Coarse cobble to boulder conglomerate predominates the deposit in the eastern and northern parts of mapped unit. Unit C consists of several massive mudflow or lahar deposits with some interbedded volcanic conglomerate and sandstone. Unit D consists of fragmental deposits characterized by large monolithologic masses of andesite, pumice, and fragments of black obsidian in a mudstone matrix. The unit has limited areal extents and may not occur within the Redding Basin.

Permeability is moderate to high with yields of 100- to 1,000-gpm except for beds of tuff-breccia which are essentially impermeable.

Recharge Areas

Recharge to the principal aquifer formation is mostly by infiltration of streamflows. Infiltration of applied water and streamflows, and direct infiltration of precipitation are the main sources of recharge into the alluvium (Pierce 1983).

Groundwater Level Trends

Review of the hydrographs for long-term comparison of spring-spring groundwater levels indicates a gradual decline of approximately 5- to 10-feet associated with the 1976-77 and 1987-94 droughts, followed by a gradual recovery to pre-drought conditions of the early 1970's and 1980's. Evaluation of groundwater level data shows a seasonal fluctuation of approximate 5- to 10-feet and, for the semi-confined wells, between 10- to 15-feet for normal and dry years. Overall, there does not appear to be any increasing or decreasing trends in groundwater levels.

Groundwater Storage

Groundwater Storage Capacity. The storage capacity for the entire Redding Basin is estimated to be 5.5 million acre-feet for 200 feet of saturated thickness over an area of approximately 510 square miles (Pierce 1983). Specific yield data for the Enterprise Subbasin aquifer system is not available to estimate storage capacity at the subbasin level.

Groundwater Budget (Type B)

Estimates of groundwater extraction are based on a survey conducted by the California Department of Water Resources in 1995. The survey included land use and sources of water. Estimates of groundwater extraction for agricultural and municipal/industrial uses are 4,449 and 4,127 acre-feet respectively. Deep percolation from applied water is estimated to be 3,788 acre-feet.

Groundwater Quality

Characterization. Magnesium-sodium bicarbonate is the predominate water type in the subbasin. Sodium bicarbonate and sodium chloride type waters are also found. Total dissolved solids range from 160- to 210-mg/L (DWR unpublished data).

Impairments. High levels of total dissolved salts and chlorides are present in the lower Tehama and Tuscan Formations. Sodium and boron is present at shallow depth where wells draw from the Chico Formation. Locally high concentrations of iron and manganese occur in the basin.

Water Quality in Public Supply Wells

Constituent Group[1]	Number of wells sampled[2]	Number of wells with a concentration above an MCL[3]
Inorganics – Primary	18	0
Radiological	19	0
Nitrates	17	0
Pesticides	7	0
VOCs and SVOCs	14	0
Inorganics – Secondary	18	7

[1] A description of each member in the constituent groups and a generalized discussion of the relevance of these groups are included in *California's Groundwater – Bulletin 118* by DWR (2003).
[2] Represents distinct number of wells sampled as required under DHS Title 22 program from 1994 through 2000.
[3] Each well reported with a concentration above an MCL was confirmed with a second detection above an MCL. This information is intended as an indicator of the types of activities that cause contamination in a given basin. It represents the water quality at the sample location. It does not indicate the water quality delivered to the consumer. More detailed drinking water quality information can be obtained from the local water purveyor and its annual Consumer Confidence Report.

Well Characteristics

	Well yields (gal/min)	
Irrigation	Range: 30 – 700	Average: 266 (5 Well Completion Reports)
	Total depths (ft)	
Domestic	Range: 18 – 713	Average: 139 (1970 Well Completion Reports)
Irrigation	Range: 32 – 460	Average: 180 (65 Well Completion Reports)

Active Monitoring Data

Agency	Parameter	Number of wells /measurement frequency
DWR	Groundwater levels	17 wells semi-annually
DWR	Miscellaneous Water Quality	3
Department of Health Services	Miscellaneous Water Quality	43

Basin Management

Groundwater management:	Shasta County adopted a groundwater management ordinance in 1998.
Water agencies	
Public	Redding Area Water Committee, Bella Vista WD, City of Redding, Shasta Dam Area Public Utility District, Shasta County Water Agency, Shasta Community Service District.
Private	

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Errata

Changes made to the basin description will be noted here.

Redding Groundwater Basin, Millville Subbasin

- Groundwater Basin Number: 5-6.05
- County: Shasta
- Surface Area: 67,900 acres (106 square miles)

Basin Boundaries and Hydrology

The Millville Subbasin comprises the portion of the Redding Groundwater Basin bounded on the west by Cow Creek, Little Cow Creek, and the Sacramento River; on the north by the Klamath Mountains; on the east by the Cascade Range; and on the south by Battle Creek. Annual precipitation ranges from 27- to 31-inches, increasing to the north.

Hydrogeologic Information

Water-Bearing Formations

The Millville Subbasin aquifer system is comprised of continental deposits of late Tertiary to Quaternary age. The Quaternary deposits include Holocene alluvium and Pleistocene Modesto and Riverbank formations. The Tertiary deposits include the Pliocene Tehama Formation along the Sacramento River and the Tuscan Formation. The Tuscan Formation is the primary water-bearing unit in the subbasin. The following descriptions of water-bearing formations are from Helley and Harwood (1985) unless otherwise noted.

Holocene Alluvium. The alluvium consists of unconsolidated gravel, sand, silt and clay from stream channel and floodplain deposits. These alluvial deposits are found along stream and river channels. The thickness ranges up to 30 feet. This unit represents the perched water table and the upper part of the unconfined zone of the aquifer. Although the alluvium is moderately permeable, it is not a significant contributor to groundwater usage due to its geomorphic distribution.

Pleistocene Modesto and Riverbank Formations. The Modesto and Riverbank formations consist of poorly consolidated gravel with some sand and silt deposited during the Pleistocene. The formations are usually found as terrace deposits near the surface along the Sacramento River and tributaries. The thickness ranges to 50 feet. They are moderately to highly permeable and can yield limited domestic water supplies.

Pliocene Tehama Formation. The Tehama Formation consists of locally cemented silts, sand, gravel, and clay of fluviatile origin derived from the Klamath Mountains and Coast Ranges. The permeability of the formation is moderate to high with yields of 100- to 1,000-gpm.

Pliocene Tuscan Formation. The Tuscan Formation is composed of a series of volcanic mudflows, tuff breccia, tuffaceous sandstone and volcanic ash layers and is the principal water-bearing formation in the subbasin. The formation is described as four separate but lithologically similar units, Units A through D (with Unit A being the oldest), which in some areas are separated by layers of thin tuff or ash units.

Unit A is the oldest water bearing unit of the formation and is characterized by the presence of metamorphic clasts within interbedded lahars, volcanic conglomerate, volcanic sandstone and siltstone. Unit B is composed of a fairly equal distribution of lahars, tuffaceous sandstone, and conglomerate. Coarse cobble to boulder conglomerate predominates the deposit in the eastern and northern parts of mapped unit. Unit C consists of several massive mudflow or lahar deposits with some interbedded volcanic conglomerate and sandstone. Unit D consists of fragmental deposits characterized by large monolithologic masses of andesite, pumice, and fragments of black obsidian in a mudstone matrix. The unit has limited areal extents and may not occur within the Redding Basin. Unit C is the primary surfacial deposit within the subbasin. Surfacial deposits of Unit B are exposed over 15- to 20- percent of the subbasin to the north.

Deposits of the Tehama and Tuscan formations interfinger along the western extents of the subbasin. Deposits of the Chico Formation outcrop in the northern most portion of the subbasin in the vicinity of Little Cow Creek and Cow Creek. DWR (1964) reports that deposits of Tehama and Tuscan formations begin at the northern extents of the subbasin and increase in thickness to approximately 1,000 feet at the confluence of Cow Creek and the Sacramento River. In the vicinity of Palo Cedro, the thickness of the sediments is approximately 500 feet. The thickness of the deposits decreases to the east and deposits of the Chico Formation between Cow Creek and Oak Run Creek in the northern half of the subbasin show that the Tuscan has been totally eroded in those areas.

Recharge Areas

Recharge to the principal aquifer is mostly by infiltration of stream flows. Infiltration of applied water and stream flows and direct infiltration of precipitation are the main sources of recharge into the alluvium (Pierce 1983).

Groundwater Level Trends

Review of hydrographs for long-term comparison of spring-spring groundwater levels indicates a slight decline of approximately 5-feet associated with the 1976-77 and 1987-94 droughts, followed by a gradual recovery in levels to pre-drought conditions of the early 1970's and 1980's. Generally, seasonal fluctuations range from 2- to 8-feet for normal and dry years. Overall, there does not appear to be any increasing or decreasing trend in groundwater levels.

Groundwater Storage

Groundwater Storage Capacity. The storage capacity for the entire Redding Basin is estimated to be 5.5 million acre-feet for 200 feet of saturated thickness over an area of approximately 510 square miles (Pierce 1983). Specific yield data for the Millville Subbasin aquifer system is not available to estimate storage capacity at the subbasin level.

Groundwater Budget (Type B)

Estimates of groundwater extraction are based on surveys conducted by the California Department of Water Resources during 1994 and 1995. Surveys

included land use and sources of water. Estimates of groundwater extraction for agricultural and municipal/industrial uses are 250 and 1,273 acre-feet respectively. Deep percolation of applied water is estimated to be 912 acre-feet.

Groundwater Quality

Characterization. Groundwater in the basin is characterized as bicarbonate type waters with mixed cationic character. Some sodium chloride type waters occur locally. Total dissolved solids concentration is approximately 140 mg/L (DWR unpublished data).

Impairments. High concentrations of total dissolved salts and chlorides are present in underlying marine deposits. Groundwater containing sodium and boron occurs where wells draw from the Chico Formation. Locally high iron and manganese concentrations can occur.

Water Quality in Public Supply Wells

Constituent Group[1]	Number of wells sampled[2]	Number of wells with a concentration above an MCL[3]
Inorganics – Primary	1	0
Radiological	1	0
Nitrates	1	0
Pesticides	1	0
VOCs and SVOCs	1	0
Inorganics – Secondary	1	0

[1] A description of each member in the constituent groups and a generalized discussion of the relevance of these groups are included in *California's Groundwater – Bulletin 118* by DWR (2003).
[2] Represents distinct number of wells sampled as required under DHS Title 22 program from 1994 through 2000.
[3] Each well reported with a concentration above an MCL was confirmed with a second detection above an MCL. This information is intended as an indicator of the types of activities that cause contamination in a given basin. It represents the water quality at the sample location. It does not indicate the water quality delivered to the consumer. More detailed drinking water quality information can be obtained from the local water purveyor and its annual Consumer Confidence Report.

Well Characteristics

	Well yields (gal/min)	
Irrigation	Range: 8 – 500	Average: 254 (2 Well Completion Reports)
	Total depths (ft)	
Domestic	Range: 40 – 650	Average: 156 (487 Well Completion Reports)
Irrigation	Range: 50 – 700	Average: 265 (8 Well Completion Reports)

Active Monitoring Data

Agency	Parameter	Number of wells /measurement frequency
DWR	Groundwater levels	6 wells semi-annually
DWR	Miscellaneous Water Quality	5
Department of Health Services	Miscellaneous Water Quality	9

Basin Management

Groundwater management:	Shasta County adopted a groundwater management ordinance in 1998.
Water agencies	
Public	Redding Area Water Committee, Bella Vista WD, Shasta Co. Water Agency, Shasta Community Service District.
Private	

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Errata

Changes made to the basin description will be noted here.

BELLA VISTA WATER DISTRICT
URBAN WATER MANAGEMENT PLAN

APPENDIX K – 2020 CONSUMER CONFIDENCE REPORT

BELLA VISTA WATER DISTRICTf

2020 CONSUMER CONFIDENCE REPORT

The District is pleased to present the 2020 Consumer Confidence Report. Our unvarying goal is to provide a safe and dependable supply of drinking water to all of our customers. Last year, as in years past, your tap water met all EPA and State drinking water health standards. Once again we are proud to report that our water system has never violated a maximum contaminant level or any other water quality standard.

(Este informe contiene información muy importante sobre su agua para beber. Favor de comunicarse Bella Vista Water District at 11368 East Stillwater Way Redding , California. 530-241-1085 para asistirlo en espanol.)

WHERE OUR WATER COMES FROM

In 2020 our water sources included surface water from the Sacramento River and some groundwater from our five wells. For the 2020 water year which included the months of March 2020 through February 2021, the District received a constrained Water Supply Allocation from the Central Valley Project. This allocation was 75% of historical use for municipal and industrial use and 50% for agricultural use driven by below average precipitation and slightly above average water storage. Although the District had a reduced supply in 2020, supply augmentation from water transfers and groundwater production allowed for a full water supply to meet all customer water demands without the imposition of any water shortage restrictions.

In 2020, surface water from the Sacramento River made up 91.5% of the treated water supply of approximately 3.51 billion gallons (10,785 acre-feet) compared with 94.8% of the treated water supply and 3.37 billion gallons (10,167 acre-feet) in 2019. The maximum daily flow through the Water Treatment Plant in 2020 was 22.1 million gallons (67.8 acre-feet) on August 10th. In 2020 the District captured and recycled approximately 185.5 million gallons (569 acre-feet) of filter backwash water, supplying approximately 4.8% of the treated water supply. This recycled water reduces the amount of water that the District diverts from the Sacramento River or pumps from groundwater wells and provides a much needed reliable source of water during shortages.

The District's wells draw from the Redding Groundwater Basin, Enterprise Subbasin. The wells made up 3.7% of the total supply, or approximately 143.4 million gallons (440 acre-feet) in 2020 compared with 1.7% of the treated water supply and 56.7 million gallons (174 acre-feet) in 2019. The treatment process at each of the five wells consists of oxidation of iron and manganese using chlorine, followed by absorption of the iron and manganese oxides in pressure filters. Chlorine residual is carried through the entire process to aid in maintaining chlorine residual in the distribution system. No iron or manganese was detected in any of the treated well water samples collected in 2020. Well water is warmer than the treated surface water and has a different taste due to its higher mineral content. At times, the mixing of chlorinated well water with treated river water in the distribution system generates a more noticeable taste due to the different physical and chemical properties of the different waters. To ensure the safety of the water the same microbiological testing is completed weekly at various sites throughout the water distribution system, regardless of the water source.

The District received no water through its interties with the Cities of Redding and Shasta Lake during all of 2020.

Source water assessments were performed by the State Water Resources Control Board (State Board), Division of Drinking Water between January 2002 and April 2003. The District's Sacramento River source is considered most vulnerable to the following activities associated with contaminants detected in the water supply: (1) metal plating/finishing/ fabricating, (2) wood/pulp/paper processing and mills, and (3) drinking water treatment plants. The source is considered most vulnerable to the following activities not associated with any detected contaminants: (1) concentrated aquatic animal production facilities, (2) historic waste dumps/landfills, (3) landfills/dumps, (4) historic mining operations, and (5) wastewater treatment plants and disposal facilities (above Shasta Dam). The District's well sources are considered most vulnerable to the following activities not associated with any detected contaminants: (1) lumber processing and manufacturing; (2) septic systems - low density; (3) sewer collection systems; (4) historic waste dumps/landfills; (5) automobile - gas stations; and (6) utility stations - maintenance areas.

A copy of the complete assessment may be viewed at Bella Vista Water District, 11368 E. Stillwater Way, Redding, CA 96003. You may request a summary of the assessment be sent to you by contacting our office at info@bvwd.org or (530) 241-1085, ext. 105.

In 1989 the Federal Surface Water Treatment Rule set forth specific regulations requiring proper treatment of surface waters, as well as specific license requirements for water treatment operators. Although the regulations have changed dramatically, the overall process has not. Currently the District's staff includes 11 individuals with state certification as water treatment operators and 15 with certification as water distribution operators (including 12 individuals with certification as both) who contribute to the operation and maintenance of the District's facilities 365 days per year.

CONTAMINANTS IN WATER

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals, and in some cases radioactive material and can pick up substances resulting from the presence of animals or from human activity. Contaminants that may be present in source water include:

- Microbial contaminants, such as viruses and bacteria that may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.

- Inorganic contaminants, such as salts and metals, that can be naturally-occurring or result from urban storm water runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.

- Pesticides and herbicides that may come from a variety of sources such as agriculture, urban storm water runoff, and residential uses.

- Organic chemical contaminants, including synthetic and volatile organic chemicals that are by-products of industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, agricultural application, and septic systems.

- Radioactive contaminants that can be naturally-occurring or be the result of oil and gas production and mining activities.

STATE AND FEDERAL REGULATIONS

In order to ensure that tap water is safe to drink, the U.S. Environmental Protection Agency (USEPA) and the State Water Resources Control Board (State Board) prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. The U.S. Food and Drug Administration regulations and California law also establish limits for contaminants in bottled water that provide the same protection for public health. Additional information on bottled water is available on the California Department of Public Health website *(https://www.cdph.ca.gov/programs/CEH/DFDCS/Pages/FDBPrograms/FoodSafetyProgram/Water.aspx).*

The tables in this report list all of the drinking water contaminants that were detected during the most recent sampling for the constituent. The State Board allows us to monitor for certain contaminants less than once per year because the concentrations of these contaminants are not expected to vary significantly from year to year. Some of the data, though representative of our water quality, are more than one year old.

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the USEPA's Safe Drinking Water Hotline at 1-800-426-4791.

A NOTE TO THE IMMUNO-COMPROMISED FROM THE UNITED STATES EPA

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. USEPA/Center for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

REGARDING LEAD IN DRINKING WATER

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. Bella Vista Water District is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you do so, you may wish to collect the flushed water and reuse it for another beneficial purpose, such as watering plants. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at http://www.epa.gov/lead.

ARSENIC IN THE DISTRICT'S WATER

Analysis of the District's surface and well waters has shown that it contains low levels of arsenic (less than 10 parts per billion). The arsenic standard balances the current understanding of arsenic's possible health effects against the costs of removing arsenic from drinking water. The U.S. Environmental Protection Agency continues to research the health effects of low levels of arsenic, which is a mineral known to cause cancer in humans at high concentrations and is linked to other health effects such as skin damage and circulatory problems.

ABOUT THE WATER QUALITY TABLES

Bella Vista Water District routinely monitors for constituents in your drinking water according to federal and state laws. The tables in this report show the results of our monitoring for the period through December 31, 2020. Where contaminants are monitored less than once per year, the values included in the report tables represent the results of the most recent analyses. In this table you will find many terms and abbreviations you might not be familiar with. To help you better understand these terms, the following definitions are provided:

Non-Detects (ND) - laboratory analysis indicates that the constituent is not detectable at current testing limits.

Parts per million (ppm) or Milligrams per liter (mg/L) - one part per million corresponds to one minute in 1.9 years or a single penny in $10,000.

Parts per billion (ppb) or Micrograms per liter (µg/L) - one part per billion corresponds to one minute in 1,900 years, or a single penny in $10,000,000.

Picocuries per liter (pCi/L) - picocuries per liter is a measure of the radioactivity in water.

Microsiemens per centimeter (µS/cm) is a unit for reporting the specific electrical conductance of the water.

Nephelometric Turbidity Unit (NTU) - nephelometric turbidity unit is a measure of the clarity of water. Turbidity (measured in NTU) is a measurement of the cloudiness of water and is a good indicator of water quality and filtration performance. Turbidity results which meet performance standards are considered to be in compliance with filtration requirements. Turbidity in excess of 5 NTU is just noticeable to the average person.

Maximum Contaminant Level (MCL) – The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is economically and technologically feasible. Secondary MCLs are set to protect the odor, taste, and appearance of drinking water.

Maximum Contaminant Level Goal (MCLG) - The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. Environmental Protection Agency (USEPA).

Maximum Residual Disinfectant Level (MRDL) - The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

Maximum Residual Disinfectant Level Goal (MRDLG) - The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

Public Health Goal (PHG) B The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency.

Primary Drinking Water Standards (PDWS) - MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

Regulatory Action Level (AL) - the concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.

Treatment Technique (TT) - A required process intended to reduce the level of a contaminant in drinking water.

2020 RESULTS OF WATER QUALITY ANALYSES

Results of Sampling for Microbial Contamination					
Contaminant	**MCL**	**Unit of Measurement**	**PHG (MCLG)**	**Highest Number of Detections**	
				Treated Surface Water	**Treated Well Water**
1. Total Coliform Bacteria (Total Coliform Rule)	Presence of coliform bacteria in no more than one sample per month	presence/ absence	0	None	None
2. Fecal coliform and *E.coli* (Total Coliform Rule)	A routine sample and repeat sample are total coliform positive, and one is also fecal coliform or *E. coli* positive	presence/ absence	0	None	None
3. Fecal Indicators (*E.coli*, enterococci or coliphage) (Total Coliform Rule)	Treatment Technique	n/a	n/a	None	None

Note: BVWD analyzes a minimum of 5 water samples per week throughout the year in the water distribution system for coliform bacteria. A total of 260 coliform bacteria monitoring samples were taken during calendar year 2020.

2020 RESULTS OF WATER QUALITY ANALYSES (continued)

Sampling Results Showing Treatment of Surface Water Source (Sacramento River)					
Contaminant	**Performance Standard / MCL (Treatment Technique)**	**Unit of Measurement**	**Level Found**	**Range**	**Violations**
4. Turbidity	(1) Shall at no time exceed 1 NTU	Based on measurements made at 4 hour intervals while the plant is in operation	Less than 1.0 NTU at all times	0.020 NTU to 0.050 NTU	None
	(2) Less than 0.1 NTU in 95% of the measurements taken each month	Lowest Monthly % of measurements meeting the standard	100	100	None
	(3) Reduction in turbidity of 80% or more	Average monthly percentage reduction in turbidity	98.5	97.1 - 99.1	None
Note: Turbidity is a measure of the cloudiness of the water. We monitor it because it is a good indicator ofr the effectiveness of our filtration system.					

Sampling Results Showing the Detection of Contaminants with a <u>Primary</u> Drinking Water Standard							
Contaminant	**MCL**	**PHG (MCLG)**	**Unit of Measure-ment**	**Sacramento River***		**Well Water****	
				Average Value	**Range**	**Average Value**	**Range**
5. Gross Alpha	15	(0)	pCi/L	2.9	-	3	3
6. Radium 228	5	(0)	pCi/L	1.82	-	0.95	0.2 – 1.6
7. Aluminum	1000	0.6	ppb	226	-	ND	All ND
8. Arsenic	10	0.004	ppb	ND	-	4.07	2 – 8
9. Barium	1000	2	ppb	ND	-	155	ND - 297
10. Chromium, Total	50	(100)	ppb	ND	-	ND	All ND
11. Chromium, Vl	***	0.02	ppb	ND		ND	ND
12. Fluoride	2.0	1	ppm	ND	-	0.048	ND - 0.14
				Sacramento River and Well Water			
				2020 Highest Locational Running Annual Average		**Range for Samples taken in 2020**	
13. TTHM [Total trihalomethanes]****	80	N/A	ppb	41.0		0.0 – 41.5	
14. HAA5- [5 Haloacetic acids]****	60	N/A	ppb	37.0		0.0 – 35.9	
Note: TTHM and HAA5 results are from samples collected from the Distribution System which may include water from both the river and wells.							

* All results from the surface water source (which represents 91.5% of the water produced by the District in 2020) are from samples collected in 2020.

**Well water results reflect the latest results taken from each well; the results include samples collected over the period 2009 through 2020. The dates of the latest samples may be obtained by contacting the District's office.

*** There is currently no MCL for Chromium Vl. The previous MCL of 10ppb was withdrawn on September 11, 2017.

**** The "Running Annual Average" includes samples collected in 2019 and 2020, while the Range includes the results of analysis of samples collected in 2020 only.

2020 RESULTS OF WATER QUALITY ANALYSES (continued)

Sampling Results Showing the Detection of Contaminants with a Secondary Drinking Water Standard

(Aesthetic standards, established by the State Board - Division of Drinking Water)

Contaminant or Analyte	MCL	PHG (MCLG)	Unit of Measure-ment	Sacramento River*		Well Water**	
				Average Level Detected	Range	Average Level Detected	Range
15. Foaming Agents (MBAS)	500	N/A	µg/L	ND	-	ND	ALL ND
16. Total dissolved solids	1,000	N/A	mg/L	76	-	198	149 - 243
17. Specific conductance	1,600	N/A	µS/cm	130	-	296	257-360
18. Chloride	500	N/A	mg/L	3.48	-	36	11 - 70
19. Sulfate	500	N/A	mg/L	3.12	-	2.2	0.8 – 4.9

Sampling Results for Unregulated Contaminants***

(Unregulated contaminant monitoring helps the USEPA and the State Board to determine where certain contaminants occur and whether the contaminants need to be regulated.)

Contaminant or Analyte	MCL	PHG (MCLG)	Unit of Measure-ment	Sacramento River*		Well Water**	
				Average Level Detected	Range	Average Level Detected	Range
20. Vanadium	Notification Level = 50 ppb	N/A	ppb	4.72		0.4	ND – 0.74

Sampling Results for Sodium, Hardness and pH

Contaminant or Analyte	MCL	PHG (MCLG)	Unit of Measurement	Sacramento River*		Well Water**	
21. Sodium	N/A	N/A	ppm	6.1	-	43	25 - 66
22. Hardness	N/A	N/A	ppm	48	-	63	45 - 87
23. pH	6.5 - 8.5	N/A	pH units	7.71	-	7.95	7.8 – 8.1

* All results from the surface water source (which represents 91.5% of the water produced by the District in 2020) are from samples collected in 2020.

**Well water results reflect the latest results taken from each well; the results include samples collected over the period 2010 through 2020. The dates of the latest samples may be obtained by contacting the District's office.

***In 2013 and 2014 the District sampled for a number of additional unregulated contaminants in the water. The results of these samples were either non-detectable or below notification levels. Additional information regarding unregulated contaminants is available by contacting the District's office.

2020 RESULTS OF WATER QUALITY ANALYSES (continued)

Sampling Results Showing the Detection of Lead and Copper						
Contaminant	**PHG (MCLG)**	**Action Level (AL)**	**90th percentile level detected**	**No. of samples collected**	**No. of Sites exceeding Action Level**	**Typical Source of Contaminant**
Lead (ppb)	0.2	15	ND	30	0	Internal corrosion of household water plumbing systems; discharges from industrial manufacturers; erosion of natural deposits
Copper (ppm)	0.3	1.3	0.250	30	0	Internal corrosion of household water plumbing systems; erosion of natural deposits; leaching from wood preservatives
Note: The District is required to conduct lead and copper sampling every three years. These results are from the most recent round of sampling from July 2019. The next round of sampling is scheduled for July of 2022. No schools requested lead sampling in 2020.						

Disinfectant Residuals found in the Distribution System during 2019						
Contaminant	**MCL [MRDL]**	**PHG (MRDLG)**	**Average Value**	**Range**	**Major Sources in Drinking Water**	**Health Effects**
Chlorine (ppm)	4.0 (as Cl_2)	4	0.84	0.13 to 1.40	Drinking water disinfectant added for treatment	Some people who use water containing chlorine well in excess of the MRDL could experience irritating effects to their eyes and nose. Some people who drink water containing chlorine well in excess of the MRDL could experience stomach discomfort.

MRDL = Maximum Residual Disinfectant Level (The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for the control of microbial contaminants.)

MRDLG = The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

TYPICAL SOURCES OF DETECTED CONTAMINANTS	
Contaminant	**Typical Source of Contaminant**
1. Total Coliform Bacteria	Naturally present in the environment
2. Fecal Coliform and *E. coli*	Human and animal fecal waste
3. Fecal	Human and animal fecal waste
4. Turbidity	Soil runoff
5. Gross Alpha	Erosion of natural deposits
6. Radium 228	Erosion of natural deposits
7. Aluminum	Erosion of natural deposits; residue from some surface water treatment
8. Arsenic	Erosion of natural deposits; runoff from orchards; glass and electronics production wastes
9. Barium	Discharge of oil drilling wastes and from metal refineries; erosion of natural deposits
10. Chromium	Discharge from steel and pulp mills and chrome plating; erosion of natural deposits
11. Fluoride	Erosion of natural deposits; water additive which promotes strong teeth; discharge from fertilizer and aluminum factories
12. TTHM [Total trihalomethanes]	By-products of drinking water chlorination
13. Haloacetic Acids	By-products of drinking water chlorination
14. Foaming Agents (MBAS)	Municipal and industrial waste discharges
15. Total dissolved solids	Runoff/ leaching from natural deposits
16. Specific conductance	Substances that form ions when in water; seawater influence
17. Chloride	Runoff/leaching from natural deposits; seawater influence
18. Sulfate	Runoff/leaching from natural deposits; seawater influence
19. Vanadium	Natural sources and from the burning of fuel oils
20. Hexavalent Chromium	Discharge from electroplating factories, leather tanneries, wood preservation, chemical synthesis, refractory production, and textile manufacturing facilities; erosion of natural deposits

OTHER TEST RESULTS OF INTEREST	
Constituent	**Description and Source Information**
21. Sodium	Refers to the salt present in the water and is generally naturally-occurring
22. Hardness	Is the sum of polyvalent cations present in the water, generally magnesium and calcium. These cations are generally naturally-occurring.
23. pH	The pH of a water is a measure of its hydrogen ion activity or acidity. By definition the pH of pure water is 7.0. The pH range of most natural waters is about 6.0 to 8.5.

YOUR VIEWS ARE WELCOME

If you have any questions about this report, please contact Tom Zaharris, District Treatment Superintendent, at (530) 241-1085, ext. 201. We want our valued customers to be informed about their water district. If you want to learn more, please visit the District's web site: www.bvwd.org or attend any of our regularly scheduled Board of Directors meetings. The meetings are typically held on the fourth Monday of each month at 5:30 p.m. at the District office, located at 11368 E. Stillwater Way, Redding, CA 96003. Agendas are posted on the District's website.

Bella Vista Water District is an equal opportunity employer and provider.

BELLA VISTA WATER DISTRICT
URBAN WATER MANAGEMENT PLAN

APPENDIX L – WATER SHORTAGE CONTINGENCY PLAN

WATER SHORTAGE CONTINGENCY PLAN

FOR

BELLA VISTA WATER DISTRICT

Revised June 2021

Prepared for:

Bella Vista Water District

Prepared By:

Provost & Pritchard Consulting Group

EST. 1968
PROVOST&
PRITCHARD
CONSULTING GROUP

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1 - PURPOSES AND PRINCIPLES OF PLAN

The purpose of the Bella Vista Water District (BVWD or District) Water Shortage Contingency Plan (WSCP) is to provide a methodology for analyzing water supply reliability, establishing water shortage stages, identifying appropriate response actions, and documenting protocols for enforcing the WSCP. This WSCP was prepared according to requirements in Sections 10632 & 10635 of the California Water Code. **Table 1** below shows the required components of a WSCP, the relevant water code section, and where they are found in this document.

Table 1: Water Shortage Contingency Plan Requirements

Topic	CA Water Code Section	WSCP Section
Water Supply Reliability Analysis	WC 10632 (a.1)	Section 2
Annual Assessment Procedures	WC 10632 (a.2)	Section 2
Water Shortage Stages	WC 10632 (a.3)	Section 3 Table 2
Shortage Response Actions	WC 10632 (a.4) WC 10632 (b)	Section 4
Communication Protocols	WC 10632 (a.5)	Section 5
Compliance and Enforcement	WC 10632 (a.6)	Section 6
Legal Authorities	WC 10632 (a.7)	Section 7
Financial Consequences of WSCP	WC 10632 (a.8)	Section 8
Monitoring and Reporting	WC 10632 (a.9)	Section 9
WSCP Refinement Procedures	WC 10632 (a.10)	Section 10

The District first adopted a WSCP in 1992 and has updated it several times since then. This updated WSCP includes changes from the 2015 WSCP to meet new State requirements and better serve the District and its water users. All the water uses that are regulated or prohibited under this Plan are considered to be non-essential. Therefore, the continuation of such uses during times of water shortage or other emergency water supply conditions is deemed to constitute a waste of water, which subjects the offender(s) to penalties, as set forth in the WSCP.

2 - PROCEDURES FOR CONDUCTING ASSESSMENT

2.1 Decision Making Process

Regulatory Requirement

§10632(a.2.A) The written decision-making process that an urban water supplier will use each year to determine its water supply reliability.
§10632 (a.2.B) (iv) A defined set of locally applicable evaluation criteria that are consistently relied upon for each annual water supply and demand assessment.

In 2005, BVWD entered a long-term (25-year) renewal contract with the United States Bureau of Reclamation (USBR, Reclamation) (*Contract No. 14-06-200-851A-LTR1*) that authorizes the District to divert up to 24,578 AF annually, subject to shortage provisions, from the Sacramento River via the Central Valley Project (CVP). This is the primary water source for the District. However, Reclamation is often unable to deliver the full contract quantities due to hydrological conditions and environmental regulations. Therefore, the CVP allocations would serve as the primary determinant as to whether the District would expect to see a supply shortage. Traditionally March 1st marks the commencement of the water year for CVP supplies and is also the tentative date for the District to first consider implementing water shortage stages.

Additionally, several hydrologic datasets act as early predictors of the allocation the District can expect from Reclamation. These include the following:

1. Lake Shasta Reservoir Storage
2. Northern Sierra Precipitation and Snowpack
3. Sacramento Valley 40-30-30 Water Year Index
4. Shasta Lake Unimpaired Inflow
5. Regional and national drought indices (lower priority due to the general nature of their predictions)

Refer to the District's 2020 Drought Contingency Plan (Chapter 3 – Drought Monitoring Plan) for additional details on these data sources.

The District Engineer is responsible for collecting and analyzing various hydrologic datasets and assessing water demands versus anticipated supplies. The District Manager will be updated regularly, and the District Board of Directors will also be provided informative briefings at monthly Board meetings.

2.2 Data Inputs and Assessment Methodology

Current Year Demand

Regulatory Requirement

§10632 (a.2.B) (i) Current year unconstrained demand, considering weather, growth, and other influencing factors, such as policies to manage current supplies to meet demand objectives in future years, as applicable.

When assessing current demands, BVWD typically looks at the average of the last three years of unconstrained demand due to the requirements of the USBR M&I Water Shortage Policy. A "Normal Supply" is also defined as the average supply during the last three years of unconstrained supplies. As a result, years with water restrictions are not included in the average. When necessary, other considerations such as new growth, weather, etc. will be considered in estimating demand.

Quantification of Water Supply

Regulatory Requirement

§10632 (a.2.B) The key data inputs and assessment methodology used to evaluate the urban water supplier's water supply reliability for the current year and one dry year.
§10632 (a.2.B) (iii) Current year available supply, considering hydrological and regulatory conditions in the current year and one dry year. The annual supply and demand assessment may consider more than one dry year solely at the discretion of the urban water supplier.
§10632 (a.2.B) (v) A description and quantification of each source of water supply.

BVWD maintains a Federal Water Contract with surface water diverted from the Sacramento River. In 2005, the District entered a long-term (25-year) Water Service renewal contract with the USBR (*Contract No. 14-06-200-851A-LTR1*) that authorizes the District to divert up to 24,578 AF from the Sacramento River supply via the Central Valley Project (CVP). USBR typically announces the initial allocation in February and may refine it over the next several months. The BVWD, also maintains a long-term transfer agreement with the Anderson-Cottonwood Irrigation District (ACID) for 1,536 AF/Y of CVP water, but this is reduced by 25% to 1,152 in Shasta Critical Years[1]. Lastly, the District relies on groundwater pumping from 5 wells for a combined production of approximately 12 acre-feet/day but runs its wells on a limited basis producing less than 300 AF in a normal year.

In order to augment supply on behalf of agricultural customers that would otherwise be subjected to significant shortages, the District adopted a Supplemental Water Program in April of 2009. This program was prompted from frequent, unreliable water supplies as a result of the evolving regulatory environment. The goal of the Program is to acquire additional water supplies in shortage years on behalf of the District's agricultural customers. Participation is on a voluntary basis, and therefore does not obligate the entire customer class. For example, those customers that have permanent crops may choose to participate, while others with pasture irrigation or annual row crops may choose to idle or fallow during shortages.

In the winter months and early spring, District staff reviews the CVP supply forecast, estimates demands, and determines the interest for additional water supplies in the upcoming water year. Once the Supplemental Water Program is activated, District staff then identifies, negotiates, and acquires needed supplies based on the applications received. The most likely source of supplemental water is from willing sellers that are also Central Valley Project contractors. Once a supply of water is obtained, the District then works with the appropriate agencies to obtain necessary approvals, schedule delivery, and transfer the water into the District.

[1] Shasta Critical Year is a term defined in specific water contracts. In general, a Shasta Critical Year occurs when the forecasted inflow to Shasta Lake for a particular water year is equal to or below 3.2 million acre-feet.

Existing Infrastructure Constraints

Regulatory Requirement

§10632 (a.2.B) (iii) Existing infrastructure capabilities and plausible constraints.

The District has a water system that consists of three treated water storage tanks, nine pumping plants, a main treatment plant, five wells, and over 200 miles of pipeline ranging from 4-inch in diameter to 54-inches. All the water is pumped for delivery within the District's local service area. Additionally, surface water is pumped from the Sacramento River at the Wintu Pumping Plant, which is located outside of the District's boundary. From the Wintu Pumping Plant, water is sent to a Surge Tank and then to the Water Treatment Plant (WTP). All water previously described is used for domestic or agricultural purposes.

Plausible constraints could include the following:

1. Distribution System. As additional wells are added at the southern ends of the distribution system, there may be locally high head losses and limited conveyance capacity until the well water reaches larger transmission lines.

2. Water Storage. Water storage is currently limited. During certain times of the year the District only has several hours' worth of storage. Storage could also be problematic if the District is relying solely on its wells and day-to-day flows vary widely due to varying irrigation demands (i.e., large irrigators using water once or twice a week) or if a widespread power outage occurs (see the discussion under Power below). Storage could also become inadequate if the District installs more well capacity.

3. Power. Power outages due to downed power lines or Public Safety Power Shutoff (PSPS) events are a significant problem. The District does not have excess storage to meet demands during an outage if only well water is available. Nor does the District have backup generators at any of its wells. The District only has one portable generator; thus, it could only be used to run one well at a time. In addition, only three District wells have transfer switches for the connection of a portable generator.

   Without additional storage, a power outage affecting multiple wells would require switching the District to surface water use until power could be restored. If the Water Treatment Plant has been off-line for more than a few days, it would require four to six hours to bring the plant back online and begin delivery of treated surface water into the distribution system. Depending on water demands and storage volumes at the time that the outage occurs, the District could quickly exhaust its operational storage and some customers could experience reduced pressures or water outages.

4. Transfers of non-federal (non-project) water. Water transferred to the District from a source other than from another Central Valley Project contractor requires a Warren Act contract that is negotiated with Reclamation in order to utilize federal facilities for the conveyance of non-project water. Additionally, Reclamation requires a separate power contract for conveyance pumping of non-project water through federal facilities (i.e., the Wintu Pumping Plant) since it is not eligible for project use energy.

Seismic Risk Assessment

Legal Requirements

CWC 10632.5
(a) In addition to the requirements of paragraph (3) of subdivision (a) of Section 10632, beginning January 1, 2020, the plan shall include a seismic risk assessment and mitigation plan to assess the vulnerability of each of the various facilities of a water system and mitigate those vulnerabilities.
(b) An urban water supplier shall update the seismic risk assessment and mitigation plan when updating its urban water management plan as required by Section 10621.
(c) An urban water supplier may comply with this section by submitting, pursuant to Section 10644, a copy of the most recent adopted local hazard mitigation plan or multihazard mitigation plan under the federal Disaster Mitigation Act of 2000 (Public Law 106-390) if the local hazard mitigation plan or multihazard mitigation plan addresses seismic risk.

The District is located is an area of moderate seismicity, in the less seismically active western half of Shasta County. The county is subject to low and moderate ground shaking but has not sustained significant property damage or loss of life due to earthquakes in the past 120 years of records. However, the November 26, 1998 local magnitude ML 5.2 earthquake centered near Keswick Dam, west of the District, rocked the District's four-million-gallon water tank on its foundation causing bent anchor bolts and deformed washers. This was the largest recorded earthquake since USGS monitoring began in 1981 and is believed to have been the largest earthquake in the area since 1878.

The 2017 Shasta County Local Hazard Mitigation Plan states that earthquake activity in the area has not been a serious hazard in the past and is unlikely to become a serious hazard in the future. Soils in the area are not classified as being at risk of liquification so any earthquake damage would most likely be due to ground shaking rather than ground failure. The county enforces the California Building Code, which is applicable to new structures and based on predicted earthquake intensities, to minimize risk of loss of life and property damage due to seismic activity. The City of Redding has run earthquake scenarios calculating six percent Building Damage Ratios (repair cost divided by replacement cost, as a percentage) for older structures in the city's downtown and three percent for all other areas of the city. The District service area includes part of the northeastern part of Redding, but not downtown, corresponding to the three percent Building Damage Ratio. A copy of the Shasta County Local Hazard Mitigation Plan can be found at https://www.co.shasta.ca.us/docs/libraries/public-works-docs/hmp-documents/shasta-county-hazard-mitigation-plan-november-2017.pdf. A copy of the section of the Shasta County Local Hazard Mitigation Plan pertaining to seismic risk ("Section 4.34 Earthquake") is included in **Appendix R** of the 2020 Urban Water Management Plan.

All of the District's pump stations, wells, treatment facilities, and its main office have been constructed to meet California's earthquake standards. Nearly all of the facilities either have been extensively modified or built since 1990 to meet existing earthquake standards.

In 2000, the District completed seismic improvements on its four-million-gallon storage tank. The Improvements included the installation of sixty 2-inch anchor bolts and strengthened anchor bolt chairs to bring the tank installation up to the current AWWA tank design standards. In 2015, the District performed seismic improvements on the Surge Tank on Hilltop Drive to also bring that

tank installation up to the current ANSI/AWWA D100 Standard for steel tank design. The Improvements on the Surge Tank included the installation of thirty-five 2-inch anchor bolts and strengthened anchor bolt chairs.

3 - WATER SHORTAGE STAGES

Regulatory Requirement

§10632 (a.3.A) Six standard water shortage levels corresponding to progressive ranges of up to 10, 20, 30, 40, and 50 percent shortages and greater than 50 percent shortage. Urban water suppliers shall define these shortage levels based on the suppliers' water supply conditions, including percentage reductions in water supply, changes in groundwater levels, changes in surface elevation or level of subsidence, or other changes in hydrological or other local conditions indicative of the water supply available for use. Shortage levels shall also apply to catastrophic interruption of water supplies, including, but not limited to, a regional power outage, an earthquake, and other potential emergency events.

As outlined in the new Water Code requirements (10632 a & b.), Water Shortage Contingency Plans must include or be adapted to the six standard water shortage levels, which correspond to the progressive ranges of <10%, 10-20%, 20-30%, 30-40%, 40-50%, and 50+%. These six stages are described in **Table 2.** Stages 5 and 6 can be declared for a short-term (<45 days) or long-term (>45 days) shortage. The various Response Actions that correspond with these stages are addressed in **Section 4** of this plan.

Table 2: Updated Stages of Water Shortage

Stage	Supply Reduction	Water Supply Condition
1	0%-10%	Normal Water Supply (90% to 100% of Normal Water Production)
2	10%-20%	Moderate Water Shortage (80% to 90% of Normal Water Production)
3	20%-30%	Severe Water Shortage (70% to 80% of Normal Water Production)
4	30%-40%	Extreme Water Shortage (60% to 70% of Normal Water Production)
5A	40%-50%	Critical I Water Shortage-Short Term (50% to 60% of Normal Water Production)
5B	40%-50%	Critical I Water Shortage-Long Term (50% to 60% of Normal Water Production)
6A	50+%	Critical II Water Shortage-Short Term (Less than 50% of Normal Water Production)
6B	50+%	Critical II Water Shortage-Long Term (Less than 50% of Normal Water Production)

Notes:
1 – Short term conditions occur for 45 days or less and may be attributed to infrastructure, water quality, or power issues, as well as hydrologic conditions. Long-term conditions are greater than 45 days and are typically due to hydrologic conditions.
2 – "Normal Water Production" refers to the average water production during the last 3 years with unconstrained supplies.

4 - SHORTAGE RESPONSE ACTIONS

4.1 Response Actions by Water Shortage Stage

Regulatory Requirement

§10632 (a.4) Shortage response actions that align with the defined shortage levels

The existing response actions have been reviewed and updated for thoroughness, compliance with existing regulations, and applicability during potential times of drought, most recently observed in 2015 and 2021. The declaration of a Stage is made by the District's General Manager or his/her designee and subject to ratification by the District's Board of Directors in a regular or special session. Typically, all the Response Actions are enacted when a stage is declared; however,the District may adjust the required water use reductions or elect to exclude certain Response Actions when the water shortage stage is declared. Following are the standard Response Actions for each water shortage stage.

Stage 1. Below Normal Water Supply (90% to 100% of Normal Water Production)

Stage 1. Below Normal Water Supply is categorized with a possible reduction percentage of up to 10%. Response Actions may include:

- Water shall be used for beneficial purposes only; all unnecessary and wasteful uses of water are prohibited (*District Policy Manual Section 143*).
- Water shall not be applied to outdoor landscapes in a manner that causes runoff such that water flows onto adjacent property, non-irrigated areas, private and public walkways, roadways, parking lots, or structures. Care shall be taken not to water past the point of saturation.
- Free-flowing hoses are prohibited for all uses. Automatic shut-off devices shall be attached on any hose or filling apparatus in use.
- Leaking customer pipes or faulty sprinklers shall be repaired within five (5) working days or less if warranted due to the severity of the problem or shall not be utilized until repaired.
- All pools, spas, and ornamental fountains/ponds shall be equipped with a recirculation pump and shall be constructed to be leakproof.
- Swimming pool and spa covers encouraged to prevent evaporative water loss.
- Pool draining and refilling shall be allowed only for health, maintenance, or structural considerations.
- Washing streets, parking lots, driveways, or sidewalks, except as necessary for health, aesthetic, or sanitary purposes, is prohibited.
- To reduce evaporation, between March 1 and October 31 the use of sprinkler irrigation systems for all landscape irrigation systems shall be limited to be between the hours of 7:00 p.m. and 9:00 a.m. Sprinkler irrigation systems may be run outside of these hours for testing, but not for more than 15 minutes per cycle and only long enough to verify proper operation and make sprinkler adjustments.
- Irrigated landscaped areas shall include efficient irrigation systems (e.g., drip irrigation, timed sprinklers, rain sensors, low-flow spray heads, etc.).
- Use of potable water for the irrigation of turf or high-water use plants within public street medians and parkways is prohibited.

Stage 2. Moderate Water Shortage (80% to 90% of Normal Water Production)

Stage 2. Moderate Water Shortage is categorized with a possible reduction percentage of 10-20%. All Stage 1 Response Actions are required plus the following:

- Reduce water use by the following specified percentages: Residential and Rural by 10-20%, Multi-family and Public/Institutional customers by 10-20%, commercial customers by 5-10%, and Landscape Irrigation by 15-25%.
- Customers with "smart" irrigation timers or controllers are asked to set their controllers to achieve 90 to 95% of the evapotranspiration (ET) rate.
- Eating or drinking establishments, including but not limited to: Restaurants, cafes, cafeterias, bars, or other public places where food or drink are served and/or purchased shall serve water only upon request.
- Operators of hotels and motels shall offer patrons the option of not having their towels and linens washed daily.
- Water use overuse penalties may be implemented.
- Users of construction meters and fire hydrant meters will be monitored for efficient water use.

Penalties: Water use exceeding the customer's water shortage allocation will be charged at the applicable overuse penalty rate. Any customer in violation of Stage 2 requirements (other than exceeding their water allocation) shall be first notified of the regulations and warned of the penalty associated with continued violation. If the violation is not corrected in a timely manner, any continued violation of mandatory Stage 2 requirements after notice and warning is provided shall be punishable by an administrative fine per day or per occurrence as set in Appendix A of the District's Policy Manual.

Stage 3. Severe Water Shortage (70% to 80% of Normal Water Production)

Stage 3. Severe Water Shortage is categorized with a possible reduction percentage of 20-30%. All the Response Actions in Stage 2 are required plus the following new Response Actions:

- Outdoor irrigation of ornamental landscapes and turf with potable water shall be limited to 3 days a week. Customers whose street addresses end with an odd number may water on Wednesday, Friday, and Sunday. Customers whose street addresses end with an even number may water on Tuesday, Thursday, and Saturday.
- The application of potable water to outdoor landscapes during or within 48 hours after rainfall of 0.20 inches or more is prohibited.
- Flushing of water mains, sewers, or fire hydrants is prohibited except for emergencies and essential operations.
- Water overuse penalties may be implemented; or modified, if already implemented a previous stage.
- Motor vehicles and equipment shall be washed only with buckets or with hoses equipped with automatic shutoff nozzles.

The following Response Actions replace previous less stringent actions:

- Leaking customer pipes or faulty sprinklers shall be repaired within two (2) working days or less if warranted due to the severity of the problem.

- Reduce water use by the following specified percentages: Residential and Rural by 20-30%, Multi-family and Public/Institutional customers by 20-30%, commercial customers by 20%, and Landscape Irrigation by 25-35%.
- Customers with "smart" irrigation timers or controllers are asked to set their controllers to achieve 75% of the evapotranspiration (ET) rate. Drip irrigation systems are excluded from this requirement.

Penalties: Water use exceeding the customer's water shortage allocation will be charged at the applicable overuse penalty rate. Any customer in violation of Stage 3 requirements (other than exceeding their water allocation) shall be first notified of the regulations and warned of the penalty associated with continued violation. If the violation is not corrected in a timely manner, any continued violation of mandatory Stage 3 requirements after notice and warning is provided shall be punishable by an administrative fine per day or per occurrence as set in Appendix A of the District's Policy Manual.

Stage 4 Extreme Water Shortage (60% to 70% of Normal Water Production)

Stage 4. Extreme Water Shortage is categorized with a possible reduction percentage of 30-40%. All the Response Actions in Stage 3 are required plus the following new Response Actions:

- Water use for ornamental ponds, fountains, or other ornamental water feature for aesthetic purposes is prohibited except where necessary to support aquatic life.
- The application of potable water to driveways and sidewalks is prohibited.
- The installation of new turf or landscaping is prohibited.
- Irrigation of ornamental turf with potable water on public street medians is prohibited.
- Water use or overuse penalties may be implemented; or modified, if already implemented a previous stage.
- New connections to the District's water distribution system will be allowed but their water use shall be restricted to the minimum requirements for personal health and safety.

The following Response Actions replace previous less stringent actions:

- Leaking customer pipes or faulty sprinklers shall be repaired within 24 hours or less if warranted due to the severity of the problem.
- Reduce water use by the following specified percentages: Residential and Rural by 30-40%, Multi-family and Public/Institutional customers by 30-40%, commercial customers by 30%, and Landscape Irrigation by 35-50%.

Penalties: Water use exceeding the customer's water shortage allocation will be charged at the applicable overuse penalty rate. Any customer in violation of Stage 4 requirements (other than exceeding their water allocation) shall be first notified of the regulations and warned of the penalty associated with continued violation. If the violation is not corrected in a timely manner, any continued violation of mandatory Stage 4 requirements after notice and warning is provided shall be punishable by an administrative fine per day or per occurrence as set in Appendix A of the District's Policy Manual.

Stage 5A Critical I Water Shortage Short-Term (50% to 60% of Normal Water Production)

Stage 5A Critical I Water Shortage is categorized with a possible reduction percentage of 40-50%. A short-term declaration is for water shortage conditions expected for a duration of 45 days or less. All the Response Actions in Stage 4 are required plus the following new Response Actions:

- Water use for ornamental ponds and fountains is prohibited.
- No potable water from the District's system shall be used for construction purposes including but not limited to dust control, compaction, or trench jetting.

The following Response Actions replace previous less stringent actions:

- Leaking customer pipes or faulty sprinklers shall be repaired within 24 hours. Water service will be suspended until repairs are made.
- Reduce water use by the following specified percentages: Residential and Rural 40% to 50% or more, Multi-family and Public/Institutional customers reduce water use by 40% to 50% or more, commercial customers by 30%, and Landscape Irrigation by 50%.
- Water for flow testing and construction purposes from water agency fire hydrants and blow-offs is prohibited.
- Water overuse penalties will be implemented.

Penalties: Water use exceeding the customer's water shortage allocation will be charged at the applicable overuse penalty rate. Any customer in violation of Stage 5 requirements (other than exceeding their water allocation) shall be first notified of the regulations and warned of the penalty associated with continued violation. If the violation is not corrected in a timely manner, any continued violation of mandatory Stage 5 requirements after notice and warning is provided shall be punishable by an administrative fine per day or per occurrence as set in Appendix A of the District's Policy Manual.

Stage 5B Critical I Water Shortage Long-Term (50%-60% of Normal Water Production)

Stage 5B Critical II Water Shortage is categorized with a possible reduction percentage of 40-50%. A long-term declaration is for water shortage conditions expected for a duration of 45 days or more. All the Response Actions in Stage 5A are required plus the following that replace previous less stringent actions:

- Motor vehicles and equipment shall be washed only at commercial establishments that use recycled or reclaimed water.

Penalties: Water use exceeding the customer's water shortage allocation will be charged at the applicable overuse penalty rate. Any customer in violation of Stage 5 requirements (other than exceeding their water allocation) shall be first notified of the regulations and warned of the penalty associated with continued violation. If the violation is not corrected in a timely manner, any continued violation of mandatory Stage 5 requirements after notice and warning is provided shall be punishable by an administrative fine per day or per occurrence as set in Appendix A of the District's Policy Manual.

Stage 6A Critical II Water Shortage Short-Term (less than 50% of Normal Water Production)

Stage 6A Critical II Water Shortage is categorized with a possible reduction percentage of 50+%. A short-term declaration is for water shortage conditions expected for a duration of 45 days or less. All the Response Actions in Stage 5B are required plus the following new Response Actions:

- Landscape irrigation is prohibited.

The following Response Actions replace previous less stringent actions:

- Leaking customer pipes or faulty sprinklers shall be repaired immediately. Water service will be suspended until repairs are made.
- Reduce water use by the following specified percentages: Residential and Rural by 50% or more, Multi-family and Public/Institutional customers by 50% or more, commercial customers by 30% or more, and Landscape Irrigation by 100%.
- Water use overuse penalties will be implemented; or modified, if already implemented a previous stage.
-

Penalties: Water use exceeding the customer's water shortage allocation will be charged at the applicable overuse penalty rate. Any customer in violation of Stage 6 requirements (other than exceeding their water allocation) shall be first notified of the regulations and warned of the penalty associated with continued violation. If the violation is not corrected in a timely manner, any continued violation of mandatory Stage 6 requirements after notice and warning is provided shall be punishable by an administrative fine of $500.00 per day or per occurrence.

Stage 6B Critical II Water Shortage Long-Term (less than 50% of Normal Water Production)

Stage 6B Critical II Water Shortage is categorized with a possible reduction percentage of 50+%. A long-term declaration is for water shortage conditions expected for a duration of 45 days or more. All the Response Actions in Stage 6A are required plus the following new Response Actions:

- No commitments ("will serves") will be made to provide service for new water service connections.

Penalties: Water use exceeding the customer's water shortage allocation will be charged at the applicable overuse penalty rate. Any customer in violation of Stage 6 requirements (other than exceeding their water allocation) shall be first notified of the regulations and warned of the penalty associated with continued violation. If the violation is not corrected in a timely manner, any continued violation of mandatory Stage 6 requirements after notice and warning is provided shall be punishable by an administrative fine of $500.00 per day or per occurrence.

4.2 Artificial Water Features

Regulatory Requirement

§10632 (a.10) For purposes of developing the water shortage contingency plan pursuant to subdivision (a), an urban water supplier shall analyze and define water features that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains, separately from swimming pools and spas, as defined in subdivision (a) of Section 115921 of the Health and Safety Code.

Artificial water features, herein defined as ponds, lakes, waterfalls, fountains, and other water features for aesthetic purposes, are treated separately from swimming pools and spas in the Response Actions. Evaporation losses from swimming pools and spas can be reduced through the use of covers, yet this is generally not feasible with other artificial water features. Swimming pools can also provide an important source of cooling in the hot local climate.

4.3 Locally Appropriate Supply Augmentation Actions

Regulatory Requirement

§10632 (a.4.A) Locally appropriate supply augmentation actions.

The BVWD has a Water Service Contract with Reclamation for Central Valley Project water; however, it should be noted that while the District's water service contract with the Reclamation provides for rescheduling of water, the Reclamation has denied all of the District's requests to carry-over water from year to year, thus eliminating any safety net possible from storing wet year water for use in future dry years.

Additionally, the District maintains its long-term agreement with Anderson-Cottonwood Irrigation District (ACID); however, these allocations have the potential to be reduced by 25% under ACID's Water Settlement Contract with the Reclamation. As previously addressed, the BVWD has a sufficient water supply during normal and wet years; however, it is considerably disadvantaged during dry years as it relies almost exclusively on its CVP supply.

Groundwater pumping can account for a significant amount of the local supply as the five District wells may produce upwards of 12 acre-feet/day. This has the potential to decrease during particularly dry years. Use of groundwater in droughts is an important supply augmentation measure. Lastly, the District has relied on and participated in short-term water transfers; however, these opportunities are limited, particularly in dry years.

4.4 Locally Appropriate Demand Reductions

Regulatory Requirement

§10632 (a.4.B) Locally appropriate demand reduction actions to adequately respond to shortages.

The District has taken into consideration specific social and geographical aspects of Shasta County in developing the Response Actions. For instance, the District is comprised mostly of large rural residential parcels, and consequently, the vast majority of water is used outdoors, much more so than in other urban agencies. As a result, most of the Response Actions focus on outdoor water use. In addition, due to the very high summer temperatures in the region, restrictions are placed on daytime irrigation.

4.5 Locally Appropriate Operational Changes

Regulatory Requirement

§10632 (a.4.C) Locally appropriate operational changes.

During normal water years, demands are primarily met with surface water and supplemented with well water, as needed. During a critical drought, this would switch to providing water primarily from wells that are supplemented with surface water. This would be a major operational change and require daily visits to the wells for O&M versus once or twice weekly during a normal year. All the wells also have iron and manganese removal systems that require filter backwashing on a regular basis and periodic removal of settled sludge. Thus, with higher groundwater use in a drought, wellhead treatment operations will require substantially more labor.

4.6 Mandatory Restrictions

Regulatory Requirement

§10632 (a.4.D) Additional, mandatory prohibitions against specific water use practices that are in addition to state-mandated prohibitions and appropriate to the local conditions.

In 2015 the State Water Resources Control Board released mandatory water restrictions during the drought that included the following:

- No irrigation with potable water of ornamental turf on public street medians
- No irrigation with potable water outside of newly constructed homes and buildings not in accordance with emergency regulations or other requirements established by the Building Standards Commission and the Department of Housing and Community Development
- No washing of sidewalks and driveways with potable water
- No runoff allowed when irrigating with potable water
- Hoses must have an automatic shutoff nozzle when washing cars
- No use of potable water in decorative water features that do not recirculate the water
- No outdoor irrigation during and within 48 hours following measurable rainfall
- Restaurants may not serve water to customers unless they request it
- Hotels and motels must offer guests the option to not have their linens and towels laundered daily and prominently display this option in each room

The District's response actions (see Section 4.1) include all these measures and go beyond them with other measures related to: beneficial water use, timely leak repair, swimming pools and spas, smart irrigation systems, dedicated irrigation days, construction water, water system flushing, penalties for violations of the required response actions, water overuse penalties, and resrictions on new water connections.

4.7 Gap Between Supply and Demand

Regulatory Requirement

§10632 (a.4.E) For each action, an estimate of the extent to which the gap between supplies and demand will be reduced by implementation of the action.

Each water shortage stage includes response actions that are estimated to provide the needed water savings required. These response actions have also been refined over time and proven to generally provide the reductions needed. If prohibitions at any stage do not result in the required water savings, the District can simply go to the next stage. The District also has flexibility to enforce only some of the response actions in a stage, providing the opportunity to make small adjustments when needed.

5 - COMMUNITY OUTREACH

5.1 Current and Predicted Shortages

Regulatory Requirement

§10632 (a.5) Communication protocols and procedures to inform customers, the public, interested parties, and local, regional, and state governments, regarding, at a minimum, all the following:
(A) Any current or predicted shortages as determined by the annual water supply and demand assessment described pursuant to Section 10632.1.

The BVWD has identified the four following categories as significant points of discussion, regarding current and predicted drought shortages.

- Various causes of drought in the area
- Regulatory impacts on water supplies
- Drought impacts on water supplies
- Constraints on water transfers and exchanges

Additionally, the District will utilize the drought indices and hydrologic datasets outlined **Section 2**. Should a potential shortage be anticipated, the public and BVWD customers will be notified via public notices, announcements on the District's web page (www.bvwd.org), and in their bimonthly billings and warned of the potential for a drought declaration and water conservation measures.

5.2 Shortage Response Actions

Regulatory Requirement

§10632 (a.5.B) Any shortage Response Actions triggered or anticipated to be triggered by the annual water supply and demand assessment described pursuant to Section 10632.1.
Any other relevant communications.

The District's Board of Directors will be kept informed of water shortage conditions to enable them to make timely and appropriate decisions on the following actions:

- Coordination with customers on the development and implementation of plans
- Frequent assessment of water shortage status
- Adoption of resolutions to change water storage stages
- Declaration of a water shortage emergency
- Adoption of an Emergency Water Reduction Plan

These actions are communicated to District customers by way of billing inserts, newspaper advertising, on the District's webpage (www.bvwd.org), and by verbal communication as District staff and personnel interact with the customers.

5.3 Plan Availability

Regulatory Requirement

§10632 (c) The urban water supplier shall make available the water shortage contingency plan prepared pursuant to this article to its customers and any city or county within which it provides water supplies no later than 30 days after adoption of the water shortage contingency plan.

The District will make copies of its Water Shortage Contingency available to its customers, the City of Redding, and Shasta County no later than 30 days after adoption of the plan.

6 - CUSTOMER COMPLIANCE AND ENFORCEMENT

Regulatory Requirement

§10632 (a.6) For an urban retail water supplier, customer compliance, enforcement, appeal, and exemption procedures for triggered shortage Response Actions as determined pursuant to Section 10632.2.

The BVWD Board of Directors, and more specifically the District Engineer, will be responsible for evaluating available data on a consistent basis and adequately determining/implementing the appropriate Response Actions, dependent of the Water Shortage Stage in place.

Section 4 – Shortage Response Actions outlines the various water conservation measures during each water shortage stage, as well as the various enforcements. The penalties for each stage are also outlined in this section and in Appendix A of the District Policy Manual and can vary significantly depending on the activated Water Shortage Stage.

Customers may request an exemption or variance or may appeal enforcement with the General Manager in accordance with the District's Policy Manual. The District's specific policies are outlined below.

Exception and/or Variance Process. Designated staff may, in writing, grant temporary variances for prospective uses of water after determining that, due to unusual circumstances, to fail to grant such variance would cause an emergency or hardship condition affecting health, sanitation, or fire protection of the applicant or the public. The Board of Directors shall ratify or revoke any such variance or adjustment at its next scheduled meeting. Any such variance or adjustment so ratified may be revoked by later action of the Board of Directors. No such variance shall be retroactive or otherwise justify any violation of the water use restrictions occurring prior to issuance of temporary variance. It must be recognized that due to a declared water shortage emergency, the District has limited ability to grant exceptions and/or variances to the Water Shortage Contingency Plan.

7 - LEGAL AUTHORITY OF THE PLAN

Regulatory Requirement

§10632 (a.7.A) A description of the legal authorities that empower the urban water supplier to implement and enforce its shortage Response Actions specified in paragraph (4) that may include, but are not limited to, statutory authorities, ordinances, resolutions, and contract provisions.

This WSCP adheres with the California Water Code 10632. This document is also required by State law as outlined in the Water Code, which states that, "Every urban water supplier shall prepare and adopt a water shortage contingency plan as part of its urban water management plan…" (WC 10632). As an established California Water District, BVWD has the authority to implement the WSCP, declare water shortages, and implement shortage response actions including statutory authorities, ordinances, resolutions, and contract provisions.

7.1 Declaring a Water Shortage Emergency

Regulatory Requirement

§10632 (a.7.B) A statement that an urban water supplier shall declare a water shortage emergency in accordance with Chapter 3 (commencing with Section 350) of Division 1.

The BVWD will follow the protocols outlined in this Plan should it become necessary to declare a water shortage emergency. The process will follow the pertinent sections of the California Water Code and be noticed for a public hearing, typically at a Board of Directors meeting.

7.2 Supplier Coordination

Regulatory Requirement

§10632 (a.7.C) A statement that an urban water supplier shall coordinate with any city or county within which it provides water supply services for the possible proclamation of a local emergency, as defined in Section 8558 of the Government Code.

The District Manager or designated staff will be available and responsible for coordinating with City and County officials within the District's service area should there be a necessary proclamation for a local water emergency.

8 - REVENUE REDUCTIONS AND EXPENSE INCREASES

The various revenue sources available to the District during droughts include, but are not limited to water sales, system connection fees, interest income, special assessments, reserves, and other non-operating revenues, such as grant funding when available. In addition, there may be special outside funding sources made available to water agencies during a water emergency (e.g., Stages 4 through 6).

8.1 Potential Revenue Reductions and Expense Increases

Regulatory Requirement

§10632 (a.8) A description of the financial consequences of, and responses for, drought conditions, including, but not limited to, all of the following:
(A) A description of potential revenue reductions and expense increases associated with activated shortage Response Action described in paragraph (4)

Potential revenue reductions may include, but are not limited to:

- Decreased water sales to residential, rural, commercial, and public/institutional users
- Decreased water sales to agricultural water users

Potential expense increases may include, but are not limited to:

- Higher CVP water costs due to reduced water deliveries
- Higher costs for increased groundwater production and treatment
- Higher costs for pumping groundwater from greater depths
- Purchases of higher priced transfer water

8.2 Mitigation Actions

Regulatory Requirement

§10632 (a.8.B) A description of mitigation actions needed to address revenue reductions and expense increases associated with activated shortage Response Actions described in paragraph (4).

Several mitigation actions are specifically tailored to offset or soften the financial impact of drought to the District including the following:

1. M&I Rate Stabilization Fund. The District currently maintains a specific M&I Rate Stabilization Fund to help mitigate the revenue impacts of a prolonged drought. This fund has been built up by placing a small portion of urban water user fees into this fund during normal supply years to help offset higher costs during droughts.

2. Supplemental Water Program. This voluntary program allows agricultural water users to purchase supplemental water supplies secured by the District on behalf of participants. This program is only offered during water shortages and the water costs are always higher than typical District costs. This water is sold at cost to participating Agricultural customers ensuring that the District does not lose money on the transaction.

8.3 Cost of Compliance

Regulatory Requirement

§10632 (a.8.C) A description of the cost of compliance with Chapter 3.3 (commencing with Section 365) of Division 1.

In a drought emergency, the District anticipates that there will be expenses incurred that would not otherwise be incurred in a normal water year. These include:

- Higher water costs associated with the cost of water transfers or water purchases to augment its water supplies,
- Increased operational and maintenance expenses associated with running its wells more that they are run in a normal year,
- Costs for special notifications to its customers (e.g., printing and mailing of special notices, publishing notices in the paper, advertising using radio or television),
- Costs for special programming of its billing software to implement drought charges and penalties,
- Payroll costs for additional staff or staff overtime to handle a higher-than-normal volume of customer service requests,

In a drought emergency, the District also anticipates that revenues may decrease due to a reduction in water sales.

The District's rate schedules the volumetric rates accurately reflect the unit cost for the production, treatment, and distribution of water to its customers. This means that the reductions in revenues associated with reductions in demand are offset by similar reductions in operational costs. In addition, the District's Supplemental Water Program for its agricultural customers passes through the full costs for the acquisition and delivery of water purchased for agricultural use. Higher water expenses associated with the production of more well water, water transfers, and water purchases are not passed through to the District's M&I customers. Instead, the District maintains a M&I Rate Stabilization Fund that can be tapped to cover increased expenses.

In water shortage emergencies, at Stages 2 and above, the District may impose overuse penalty charges. The intent of these charges is to deter the overuse of water (use in excess of customer allocations). The revenues generated from the overuse charges are used to help offset the increased expenses.

Based on the District's experience during the 2015 drought, the combined effect of having water rates that accurately reflect water costs, passing costs for supplemental agricultural water through to the agricultural water users, having a M&I Rate Stabilization Fund, and the revenues generated from overuse charges the District is well situated to comply with Chapter 3.3 without unacceptable use of existing reserves.

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9 - MONITORING AND REPORTING REQUIREMENTS

Regulatory Requirement

§10632 (a.9) For an urban retail water supplier, monitoring and reporting requirements and procedures that ensure appropriate data is collected, tracked, and analyzed for purposes of monitoring customer compliance and to meet state reporting requirements.

The BVWD currently, and historically, has always been in compliance with the state reporting requirements. The District uses meters to monitor all of the District's water deliveries, which assists in assuring customer compliance. Additionally, the District maintains a protocol for receiving and addressing complaints of non-compliance and misuse.

The procedures for monitoring reductions throughout the six different water shortage stages are outlined below:

1. In normal water supply conditions (Stage 1) production and pumping totals are reported monthly to the District Engineer.
2. During Stage 2, 3, or 4 water shortage conditions, weekly production and pumping amounts are reported to the District Engineer to compare the weekly data to the targets to verify that reduction goals are being met.
3. During Stage 5a, 5b, 6a, or 6b water shortage, a daily production and pumping report is provided to the District Engineer to verify that goals are being met.

10 - MONITORING AND EVALUATING THE PLAN

Regulatory Requirement

§10632 (a.10) Reevaluation and improvement procedures for systematically monitoring and evaluating the functionality of the water shortage contingency plan in order to ensure shortage risk tolerance is adequate and appropriate water shortage mitigation strategies are implemented as needed.

The District first adopted its WSCP in 1992 and has revised and re-adopted it several times to incorporate refinements and improvements. In addition, this WSCP incorporates important lessons learned during the historic drought of 2013-2015. The WSCP will be re-evaluated at least every five years and at the end of each drought period to assess its performance. If deemed necessary, it will be modified and improved based on lessons learned. The Plan may also be updated in the middle of a drought year if needed.