

**Alternative to GSP
Big Valley Groundwater Basin
to satisfy the
Sustainable Groundwater Management Act**

December 30, 2016

**Lake County Watershed Protection District
assisted by CDM Smith**

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Executive Summary

In 2014, California adopted the Sustainable Groundwater Management Act (SGMA), CA Water Code (CWC) Section 10720-10737, requiring that all groundwater basins in California be managed sustainably. The CA Department of Water Resources (DWR) in January 2016 issued a final set of regulations to achieve the Act and a priority list, with boundary maps (updated October 2016), of the State's 515 groundwater basins.

Lake County currently has thirteen groundwater basins being managed under the Lake County Groundwater Management Plan (GMP) produced for the Lake County Watershed Protection District (District) by the contractor CDM and adopted by the Lake County Watershed Protection District's Board in 2006 in response to AB 3030 and SB 1983. The Big Valley groundwater basin has been calculated by DWR through the California Groundwater Bulletin 118 basin evaluation to be a medium priority basin with a score of 15.8 (number 105 in the priority list). In this priority classification the SGMA legislation requires the formation of a Groundwater Sustainability Agency (GSA) for the "management and use of groundwater in a manner that can be maintained during the planning and implementation horizon without causing undesirable results", and a Groundwater Sustainability Plan (GSP) for the basin. The legislation also allows an Alternative to be submitted if the District believes that a basin can show a sustainable yield over a 10-year period and can include continuous data from the end of that 10 year period to current conditions, **or** has a Groundwater Management Plan, **or** is an adjudicated basin. Whichever Alternative is chosen, it must satisfy the objectives of SGMA as detailed in California Code of Regulations (CCR) §354 Article 5 and §356 Article 7. To comply with SGMA, the District will produce an Alternative to the formation of a GSA and GSP for the Big Valley basin based on the Lake County GMP.

Groundwater is the primary source of agricultural water within the Big Valley. The limitation on this resource has been known for decades. The geology in the Clear Lake basin, of which Big Valley is a part, results in groundwater basins of limited storage capacity. Since nearly all stream flow ceases in the summer months, there is little groundwater recharge occurring during the high use period. Major anthropological changes to the basin in the 1960s including damming of Adobe Creek and Highlands Creek (tributary to Adobe Creek), Adobe Creek and Kelsey Creek channelization, and extensive in-stream gravel mining reduced usable storage by about 1,330 acre feet. For the above reasons groundwater monitoring, on a semi-annual and for some wells on a monthly basis, has been an ongoing responsibility of the District. And the purpose of the monitoring is to share the data with water users so they can make decisions to ensure the resource is sustainable.

It is the District's belief that the Big Valley groundwater basin is no longer overdrafted, on the contrary, its water reliability has increased over the years. There are a number of changes that have occurred in the last twenty years with respect to groundwater knowledge and use that corroborate this belief, not least is the production of the Big Valley GMP, see BV GMP, followed by the Lake County GMP, see GMP, and associated studies. The Alternative to be submitted, an adopted GMP, has been the cornerstone of groundwater management by the District since 2006 and contains much of the functional equivalence to the regulations in SGMA CCR Articles 5 and 7. The GMP has proved to be a valuable management tool. It is the document that set us on the path to sustainability and will avoid duplication and redundancy and will provide an efficiency of time and resources for the State and Lake County governments. Successful stewardship actions that have been taken by the District based on the GMP have led to more than 10 years of groundwater sustainability without exceeding locally defined thresholds for any of the following six CCR-identified Undesirable Results.

- Chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply
- Significant and unreasonable reduction of groundwater storage
- Significant and unreasonable seawater intrusion
- Significant and unreasonable degraded water quality
- Significant and unreasonable land subsidence
- Surface water depletions that have significant and unreasonable adverse impacts on beneficial uses of the surface water.

On December 6th, 2016, DWR made available an Alternative Elements Guide (Guide) to clarify all the requirements of SGMA that must appear in an Alternative. This document follows the Guide and provides additional description for each Alternative element when required. A consultant engineering company, the same as produced the GMP, WIA and WDF, CDM Smith, assisted in current data analysis to demonstrate sustainability for the Scotts Valley basin. The acronyms used in the Guide are for the following documents:

APP1	Appendix 1 to this document, Lake County Groundwater Use and Storage Memo, 2016, CDM Smith.
APP2	Appendix 2 to this document, Figures 1-8.
APP3	Appendix 3 to this document, Land Use 2001 and 2013.
APP4	Appendix 4 to this document, Water Well Distribution.

APP5	Appendix 5 to this document, California State Groundwater Elevation Monitoring, CASGEM, Monitoring Plan, 2012, Lake County Watershed Protection District and associated documents.
APP6	Appendix 6 to this document, Plans, Regulations, Ordinances, Policies.
APP7	Appendix 7 to this document, LCWPD Authority.
APP8	Appendix 8 to this document, Building, Use and Planning Reviews.
GMP	Lake County Groundwater Management Plan, 2006, CDM.
BVGMP	Big Valley Groundwater Management Plan, 1999, Big Valley Groundwater Management Zone Commission.
BVGRI	Big Valley Groundwater Recharge Investigation, 1967, Soil .. Mechanics and Foundation Engineers Inc.
BVGRIU	Big Valley Groundwater Recharge Investigation Update, 2003, Christensen Associates Inc.
WIA	Lake County Water Inventory and Analysis, 2006, CDM
WDF	Lake County Water demand Forecast, 2006, CDM
KCDS	Kelsey Creek Detention Structure documents
KCWA	Kelsey Creek Watershed Assessment, 2010, Lake County Watershed Protection District.
CLIWMP	Clear Lake Integrated Watershed Management Plan, 2010, Lake County Watershed Protection District.
CASGEM	California State Groundwater Elevation Monitoring, CASGEM, Monitoring Plan, 2012, Lake County Watershed Protection District.
SVWQC GAR	Sacramento Valley Water Coalition Groundwater Assessment Report, 2014, CH2MHill.
LCWPDUR	Lake County Watershed Protection District Groundwater Update Reports.
LCWPDWEB	

<http://www.co.lake.ca.us/Government/Directory/WaterResources/HydrologicInformationLinks.htm>,

Background to Alternative

Lake County Watershed Protection District (District) has a long history of sustainable groundwater management. In 1998 the District, then known as the Lake County Flood Control and Water Conservation District with the assistance of the Big Valley Groundwater Management Zone Commission

agreed to produce a Groundwater Management Plan for the Big Valley groundwater basin. This document was adopted by the District May 18, 1999. In 2000 the Local Groundwater Assistance Act, AB 303, funded the District to inventory existing groundwater conditions and uses and to develop a GMP for the County. Meanwhile the District obtained funding to update the Big Valley Groundwater Recharge Investigation, BVGRI, that had defined the hydrogeology of Big Valley in 1967. In 2003 the Big Valley Groundwater Recharge and Investigation Update, BVGRIU, was produced to support the planning and groundwater management that was continuing in Big Valley. The Lake County Groundwater Management Plan (GMP) was adopted in 2006 to provide guidance in managing the groundwater resources of the County. This was in response to proactively meeting the recommendations in AB 3030, SB 1983 and the 2003 update to Bulletin 118. This included documenting the current status of water use and supply, identifying areas of need, and developing recommendations to ensure a supply of high quality water into the future. To promote a collaborative, county-wide approach, the District included local stakeholders in each of these efforts.

The GMP (CDM 2006), together with the *Lake County Water Inventory and Analysis*, (CDM 2006), WIA, and the *Lake County Water Demand Forecast* (CDM 2006), WDF, served to improve the understanding of the water resources in Lake County and provide a framework for the County and other water users to implement effective water resource management programs. The GMP was produced from numerous information sources listed under References in this document and from DWR data.

The District has been monitoring groundwater levels semi-annually in cooperation with DWR since 1961. Since then wells have been added to the monitoring database to evaluate the success of groundwater management projects. Some wells are monitored monthly. In 2009 the State Legislature created the California Statewide Groundwater Elevation Monitoring Program (CASGEM) to capture and evaluate groundwater monitoring data to track seasonal and long-term trends. The Lake County data have been imported to CASGEM since 2011. The District currently monitors 38 wells within the Big Valley groundwater basin which is located entirely within Lake County.

The District has no reason to believe that the groundwater resources in the Big Valley are not being managed sustainably.

Agency Information

Lake County Watershed Protection District

The agency that will uphold SGMA and produce an Alternative for the Big Valley groundwater basin is the Lake County Watershed Protection District. The District has jurisdiction over the entire basin.

Legal Authority. The Lake County Flood control and Water Conservation District was authorized by California Water Code (CWC), Chapter 65, to protect and maintain water resources within Lake county. The District became the Lake County Watershed Protection District (District) with the enacting of SB 1136, Chapter 108 of the CWC, see Appendix 7. The District is part of the County Department of Public Works and reports to the Board of Directors who are also the County Board of Supervisors. Because of the District's responsibilities regarding water resources, it is an authorized groundwater management agency as defined by the CWC §10753 (a) and (b).

It is the purpose of the Lake County Watershed Protection District to:

- control and impound the flood and storm waters of the District (County),
- conserve and protect waters of the District (County),
- protect, develop and improve the quality of all waters within the District (County) for all beneficial uses.

District responsibilities include:

- Water Resources Planning: plan for groundwater and watershed management;
- Flood Control: administer the National Flood Insurance Program for Lake County, plan and implement flood control projects, and maintain levees and creeks;
- Operations and Maintenance: operate and maintain the Kelsey Creek Detention Structure, Adobe Creek Reservoir, Highland Springs Reservoir, Highland Springs Park; and the Middle Creek Flood Control Project; and
- Prevent other environmental damage.

Mailing address: Lake County Watershed Protection District

255 North Forbes St., Room 309, Lakeport, CA 95453

Management point of contact for sustainable groundwater management is:

Will Evans, Deputy Director Water Resources, 255 North Forbes St., Lakeport, CA 95453, 707-263-2344, will.evans@lakecountyca.gov, assisted by:

Carolyn Ruttan, Invasive Species Program Coordinator, 255 North Forbes St., Lakeport, CA 95453, 707-263-2256, carolyn.ruttan@lakecountyca.gov.

Cost of Implementing the Plan

Groundwater management activities are funded through several budget units implemented by the Lake County Watershed Protection District (LCWPD). Overall groundwater management planning and policy analysis is funded through Budget Unit 8109 – Watershed Protection District (General Fund). The Lake County Budget states:

LCWPD ... provides technical assistance with groundwater planning; (and) maintenance of a data base of groundwater well levels county-wide.

The past three years of groundwater related expenses from this budget unit are provided below. We anticipate continuing to fund groundwater management activities from this budget unit on the same level moving forward.

Groundwater Expenses from Budget Unit 8109 – Watershed Protection District (General Fund)

	FY13-14	FY14-15	FY15-16
Groundwater Management	\$12,783.53	\$22,692.29	\$7,077.60
Groundwater Monitoring	\$3,280.05	\$3,567.33	\$6,947.90

Specific management of groundwater in Big Valley is funded through Budget Unit 8105 – Flood Control Zone 5. The Lake County Budget states:

Zone 5 currently funds maintenance and operation of the Kelsey Creek Detention Structure (constructed in 1987) and maintenance needs on Kelsey Creek in the immediate vicinity of the structure. Zone 5 also funds implementation of the Big Valley Groundwater Management Plan that was adopted by the Board of Directors in 1999. The plan makes specific recommendations to protect and supplement the existing groundwater supply. Implementation of the plan, including groundwater monitoring and updating studies, is pursued by staff and the Big Valley Ground Water Management Zone Commission

The past three years of expenses from this budget unit are provided below. We anticipate continuing to fund groundwater management activities from this budget unit on the same level moving forward.

Groundwater Expenses from Budget Unit 8105 – Flood Control Zone 5

	FY13-14	FY14-15	FY15-16
Groundwater Management	\$2,974.67	\$52.43	\$0
Groundwater Monitoring	\$1,031.20	\$396.62	\$2,282.46

In summary, Lake County plans on allocating similar levels of funding as part of the implementation of our Groundwater Sustainability Plan Alternative. Total annual funds allocated on Groundwater Management will be approximately \$20,000 with another \$7,000 in funding dedicated towards Groundwater Monitoring

Description of Alternative Plan Area

The Alternative Plan Area for Big Valley (CASGEM 5-15) basin is a 37.8 square mile (24,212 acres) area south and adjacent to Clear Lake, the largest lake entirely within California. The basin shares a common boundary with Scotts Valley basin, the other medium priority basin in Lake County, that is flagged to be edited by DWR and flagged as questionable as to whether the two basins (Scotts and Big) are hydraulically connected or not. The Big Valley basin is shown on the map, Appendix 2, Figure 1. The Big Valley basin is entirely under the jurisdiction of the LCWPD.

The area is a notable part of the Westside Sacramento Integrated Regional Water Management Plan, and the Sacramento Valley Water Quality Coalition that produced a Groundwater Quality Assessment Report in 2014, see SVWQC GAR.

The Big Valley area has no incorporated cities, one large community – Kelseyville and one small community – Finley. The property owners in Big Valley include:

Big Valley Basin stakeholders

- Farmers, ranchers, business owners, private property owners in Kelseyville and Finley
- Foreclosed property owned by banks
- Big Valley Rancheria Band of Pomo Indians

- County of Lake
- Lampson Field Airport
- City of Lakeport Municipal Sewer District #1
- Lake County Board of Education
- Lake County Watershed Protection District
- Alcove School District
- Kelseyville County Waterworks District No. 3
- Kelseyville Unified School District
- CHP
- Kelseyville Cemetery District
- Kelseyville Fire Protection District
- Kelseyville School District
- Lake County Special Districts
- CA State Parks, Clear Lake State Park

The Big Valley Rancheria has its land partially in the Big Valley basin with a tribal population of approximately 225.

The community of Kelseyville receives water from groundwater wells. These wells are owned and operated by the Kelseyville County Water Works District No.3, KCWWD #3. Their water treatment and distribution system currently includes:

- o 1,021 service connections (1,405 Single Family Dwelling (SFD) equivalents) as of 8/2016
- o serving a population of 2,234 residents.
- o Four wells
- o Over 29,000 ft. of distribution pipeline.
- o One (1) 1,000,000 gallon storage tank, and two (2) 250,000 gallon storage tanks.

The community of Finley is serviced by the County Service Area #6, CSA #6. When this two well system was found to be in need of an upgrade, it received the upgrade through an intertie (14,000 feet of pipe) with the KCWWD #3 system in 2006. CSA #6 abandoned one well in 2013, and the other well is used for standby. CSA #6 has:

- o 226 service connections (248 SFD equivalents) as of 8/2016
- o serving 394 residents.

Land Use Elements and Plans

Big Valley is one of the most intensely farmed areas in Lake County with two major tributaries to Clear Lake, Kelsey Creek and Adobe Creek running over the basin. Kelsey Creek contributes approximately 16% of the stream flow to the lake. Land use plans, regulations, ordinances and policies are shown in Appendix 6.

Many Lake County Land Use Plans incorporate water as a finite resource and govern the land over a groundwater basin by determining what uses and degree or size of uses can be allowed in the area in order to ensure human health and safety and environmental health over the long term.

Lake County Community Development Department. 2008. Lake County General Plan.

Lake County Community Development Department. 1995. Kelseyville Area Plan.

Lake County Community Development Department. 2015. Draft Lake County Housing Element.

Lake County Community Development Department. 2004. Chapter 28, Groundwater, Regulation of the Extraction and Exportation of Groundwater from Lake County. Lake County Code.

Lake County Community Development Department. 2006. Chapter 30, Grading Ordinance. Lake County Code.

Lake County Environmental Health Department. 2014. Chapter 9, Health and Sanitation, Article VIII Regulation of Wells and Preservation of Groundwater. Lake County Code.

Lake County Community Development Department. 2000. Chapter 24, Surface Mining and Reclamation. Lake County Code.

Lake County Watershed Protection District. 2010. Clear Lake Integrated Watershed Management Plan.

Lake County Watershed Protection District. 2010. Kelsey Creek Watershed Assessment.

Lake County Office of Emergency Services. 2011. Natural Hazard Mitigation Plan Update.

Lake County Planning Department. 1992. Lake County Aggregate Resource Management Plan, An Element of the Lake County General Plan. 2000.

Lake County Community Development Department. 2014. Chapter 21, Zoning Ordinance. Lake County Code.

http://www.co.lake.ca.us/Government/DepartmentDirectory/Community_Development/Zoning_Ordinance.htm.

The Lake County General Plan, 2008, Chapter 11 Water Resources ensures the following: “The primary purpose of the Water Resources Element is to ensure

that Lake County's surface and groundwater resources are protected and sustained." In addition, Big Valley is covered in the Kelseyville Area Plan, 1995. The Area Plan is of interest because of its age, the General Plan has many policies derived from a sustainable groundwater goal.

From the 2015 Draft Housing Element: "In general, the ability of each Sewer or Water District to accommodate additional housing demand is closely tied to financial constraints. The willingness of current customers to increase current service charges or to assume new costs for the expansion of existing water and sewer systems plus the success in obtaining State or federal grants or loans will primarily dictate the ability to increase service capacities to accommodate new housing." Lake County has no significant influx in people, it has no significant development projects in the pipeline. In fact, the results of the most serious fires (2015 and 2016) in the County's history have set the County back in terms of economic growth. The County is classed a Severely Disadvantaged Community with a median household income 56% of the statewide average.

Land use plans, policies, rules and regulations currently take a proactive view of water as a finite and limited resource. The Lake County Community Development Department has a review process for all proposed land use and development that evaluates the potential for those uses and developments to create surface and /or groundwater quantity or quality degradation. See Appendix 8, Building Permit application, Planning Data Form and Request for Review. Water quality impacts could come from point and non-point sources. The County coordinates this review process with other appropriate agencies where feasible to assure a comprehensive review, Lake County Department of Water resources being one of those agencies. When completed the review process results in conditions placed on the land use or development so as to reduce impacts, including impacts to groundwater, to a non-significant level and where feasible to improve water quality.

The Big Valley Alternative Plan will not change the water supply assumptions in the Lake County General Plan or other plans that are already very conservative.

The density of wells is shown in Appendix 2, Figure 1, and was also provided by DWR, see Appendix 4, Density of wells spreadsheet. This data does not incorporate the wells that are abandoned, never used demolished.

The process for permitting new or replacement wells in Lake County is contained in the Lake County Code of Ordinances, Chapter 9 Health and Sanitation, Article VIII Regulation of Wells and Preservation of Groundwater, see Appendix 6. The Lake County Well Permit application along with

Information on Contaminated Wells is given to every person asking about groundwater wells from the Lake County Department of Environmental Health. This information is available on that Department's website and Appendix 6.

Conjunctive Use Programs

Conjunctive Use Programs in the Big Valley basin are already contributing water to the basin. One such program is the Kelsey Creek Detention Structure on Kelsey Creek one mile upstream from Clear Lake. Attached is some information pertaining to the Kelsey Creek Detention Structure. Here is a summary of the documents:

- Groundwater Recharge Benefit – prepared in 2006, this document maps and explains the area benefitting from the groundwater recharge project.
- KCDS Feasibility Study – prepared in 1980 by California DWR, this was the first study of the project prior to its construction in 1987. This study discusses an 8 foot high flashboard dam to be utilized for 3 weeks at the end of April and early May. The actual structure is a 10 foot tall concrete and metal structure with three large radial gates. Based on the records, the structure has been operated as early as December going back to at least 1992 as a way to mitigate the effects of the '87-'92 drought.
- Estimated Recharge Rates – prepared in 2000, this spreadsheet provides estimates for groundwater recharge rates provided by the structure at various water depths.
- Operation Criteria – this is a working document that explains to staff how to operate the structure. With the recent retirement of our long time Water Resources Engineer, Tom Smythe, and the Threatened Species listing of the Clear Lake Hitch in 2014, we are in the process of making revisions to this operation schedule. Items highlighted in red are subject to change.

The Kelsey Creek Detention Structure has been one of the Districts major tools for managing Big Valley groundwater for three decades and demonstrates that the District has been sustainably managing the groundwater in Big Valley for quite some time. It was constructed to increase groundwater recharge and raise the streambed level upstream of the structure. When control gates are open, it forms a dam across the creek approximately 2 feet high. When control gates are closed, it forms a dam approximately 10 feet high. There are two

permanent rock and concrete fish ladders on either side of the structure that allow fish passage over the 2 foot dam.

In addition to the detention structure, between it and the Renfro crossing (a few hundred feet upstream) four drop structures were installed in the creek between 1989 and 1995. They consist of a linear arrangement of concrete slabs across the creek bed each creating a structure about 2 feet high. These structures have since filled in with gravel. This rise in the stream bed replaces some of the groundwater storage lost due to channel down-cutting as a result of gravel mining (Tom Smythe, personal communication).

The drop in the Kelsey Creek channel level after 1960 and the partial recovery following the moratorium on gravel mining in 1981 can be seen from water levels for well number 13N-09W-15B2, located approximately 600 feet north of Kelseyville Main Street and 320 feet laterally from Kelsey Creek. This well is in hydrologic contact with Kelsey Creek, so the well surface level corresponds to the water level in Kelsey Creek. Spring well levels show an approximate 15 foot drop in the level of Kelsey Creek by the 1970s, and a rise of about 3 feet after 1987.

A recharge project that was first talked about in the BVGMP, 1999, and is yet to be implemented is the Adobe Creek Conjunctive Use Project (ACCU). The ACCU Feasibility Study by Christensen Associates Inc. in 2002 shows the project to be feasible with a groundwater recharge yield of 700 acre feet per year. This project has been championed for many years with an unsuccessful grant proposal made in 2005 and 2015 and another grant proposal made for fiscal year 2016/2017. The result of the latest grant proposal will be known before Jan 1, 2017. The cost of this project is \$1,013,088.

From the 2016 California Stream Flow Enhancement Program, Wildlife Conservation Board Prop 1 Grant Application:

The Project consists of modifying the existing primary spillway of Highland Springs Reservoir to allow for more storage of early winter flows for release in the spring, summer and fall months. The Highland Creek Reservoir was constructed by the Soil Conservation Service (SCS) in cooperation with the Lake County Watershed Protection District (District) in 1964-65 to reduce flood risk in western Big Valley and the community of Finley.

The Project involves installation of operable slide gates on the primary spillway structure that will allow the level of the reservoir to be raised 7.5 feet. Overall storage will be increased in the reservoir during the late winter and spring and water released through the remainder of the year.

- Two hundred acre-feet of water will be reserved for release in the spring to supplement natural flows to improve spawning and rearing conditions for the Clear Lake Hitch. This release will be coordinated

with and under the direction of the California Department of Fish and Wildlife (DFW). It is believed these releases will significantly benefit the Clear Lake Hitch in years with dry spring weather and flows in Adobe Creek are severely limited, and possibly non-existent.

- Seven hundred acre-feet of water will be released in late spring, summer and fall to recharge groundwater on the western side of Big Valley. This is approximately 19% of the annual consumptive use of groundwater in the area directly benefited by the Project. This should significantly increase groundwater levels, reduce energy consumption for pumping, and improve groundwater quality. Higher groundwater levels also improve base flow conditions in Adobe Creek. Higher groundwater levels improve resiliency during droughts and to the anticipated impacts of climate change.

Project Construction is anticipated to occur during the 2018 construction season (July through September).

Notice and Communication

The property owners and water users in Big Valley were publically noticed for the production of the Lake County Groundwater Management Plan. The GMP took two years to produce with much discussion with water users. Whenever a group of people are asked to come together for a discussion on water, Lake County has a good response from interested people.

In order to produce this Alternative Plan the subject was noticed to the Lake County community on November 18th, 2016, and brought to the Lake County Board of Supervisors general meeting on November 22nd at which time the public was asked to comment. After a half hour discussion the Board, sitting as the Board of Directors of the Lake County Watershed Protection District, approved the action for writing an Alternative Plan and the contract with CDM Smith to assist with the Plan. The minutes and video of this meeting, when available, will become a part of this Alternative submission.

As was the procedure for the writing of the Lake County GMP in 2005 to 2006, notice and communication are high on the priority list. Very little can be done without stakeholder input since it is the stakeholders that produce the greatest debit part of the water budget equation. And the individual stakeholders cannot know the credit side of the equation since they cannot see the overall budget. For this reason it was suggested that the highest level of decision-making in the County, the supervisors, be the decision-makers for groundwater management. During regular Board of Supervisors weekly meetings, the Supervisors can become the Board of Directors of the Lake County Watershed Protection District as needed to guide the development and

implementation of the GMP and, in particular, to enable adaptive management for the resource.

It will continue to be the policy of the District to inform all water users, as necessary, at the Board of Supervisors regular weekly meetings, of groundwater conditions and updates particularly in drought situations. These Board hearings are videoed and printed and available on the County website. The last years' semiannual updates given at the Board hearings are shown in LCWPD groundwater update reports.

Basin Setting

All elements of the Hydrogeologic Conceptual Model can be found in the GMP, the WIA, the WDF, the BVGMP, the BVGRI, the BVGRIU, the KCWA, the CLIWMP, the Kelsey Creek Detention Structure Documents, the CASGEM Monitoring Plan in Appendix 5, the SVWQC GAR, and the LCWPD GW Update Reports.

To understand these acronyms please see pages 2-3.

Basin boundaries have been recently updated by DWR. Major geologic features are not mentioned as significant players affecting groundwater flow.

Identification of data gaps

No evidence of data gaps has been noted in any of the references for Big Valley.

This is not to say that there are no data gaps because there is always a need for more data to calibrate models. More monitoring wells would be desirable.

Subsidence

The following link to the Groundwater Information Center Interactive Map shows most of the monitored wells in Big valley are above their historical low, and the Big Valley basin is at a low estimated potential for subsidence.

<https://gis.water.ca.gov/app/gicima/>

There is old, anecdotal evidence for ground water subsidence of 3.6 to 5.8 inches documented for a well near Finley. There are reports of a few wells going dry during the drought years of 1977 and 1992. Other than this there is no data to show land subsidence.

**Summary of Recent, Historical, and Estimated Potential for Future
Land Subsidence in California, 2014**

		BIG VALLEY	SCOTTS VALLEY
CASGEM prioritization	Basin area, acres	24,212	7,320
	Basin area, sq. miles	37.8	11.4
	Irrigated acres	6,800	1,525
	Estimated groundwater use, AF	12,832	5,124
	Total wells	1,091	647
	2010 population	6,344	6,553
	B-118-80 Overdraft designation	Not Analyzed	Evidence of Overdraft
Long-term Groundwater Level Data	No. of Wells At or Below Historical Low	7	1
	Total No. of Wells with Long-term Record (>10 yrs)	61	4
	Percent of Wells At or Below Historical Level	11%	25%
	No. of Wells with Long-term Record per sq. mile	161	35
	Estimated Potential for Subsidence from GW, ranking level	2	2
	Estimated Potential for Land Subsidence	Low-medium	Low-medium
	Long-term GW level trends	10 to 30% GW level at or below historical low	10 to 30% GW level at or below historical low
Recent and Historical Land Subsidence	Documented subsidence	No	No
	Documented subsidence ranking	0	0
	Active extensometers	No	No
	Active GPS station	No	No
Documented Subsidence Data Ranking		0	0
Potential for Future Subsidence Ranking		2	2

Overall Estimated Potential for Future Subsidence		Low	Low
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Interconnected Surface Water Systems

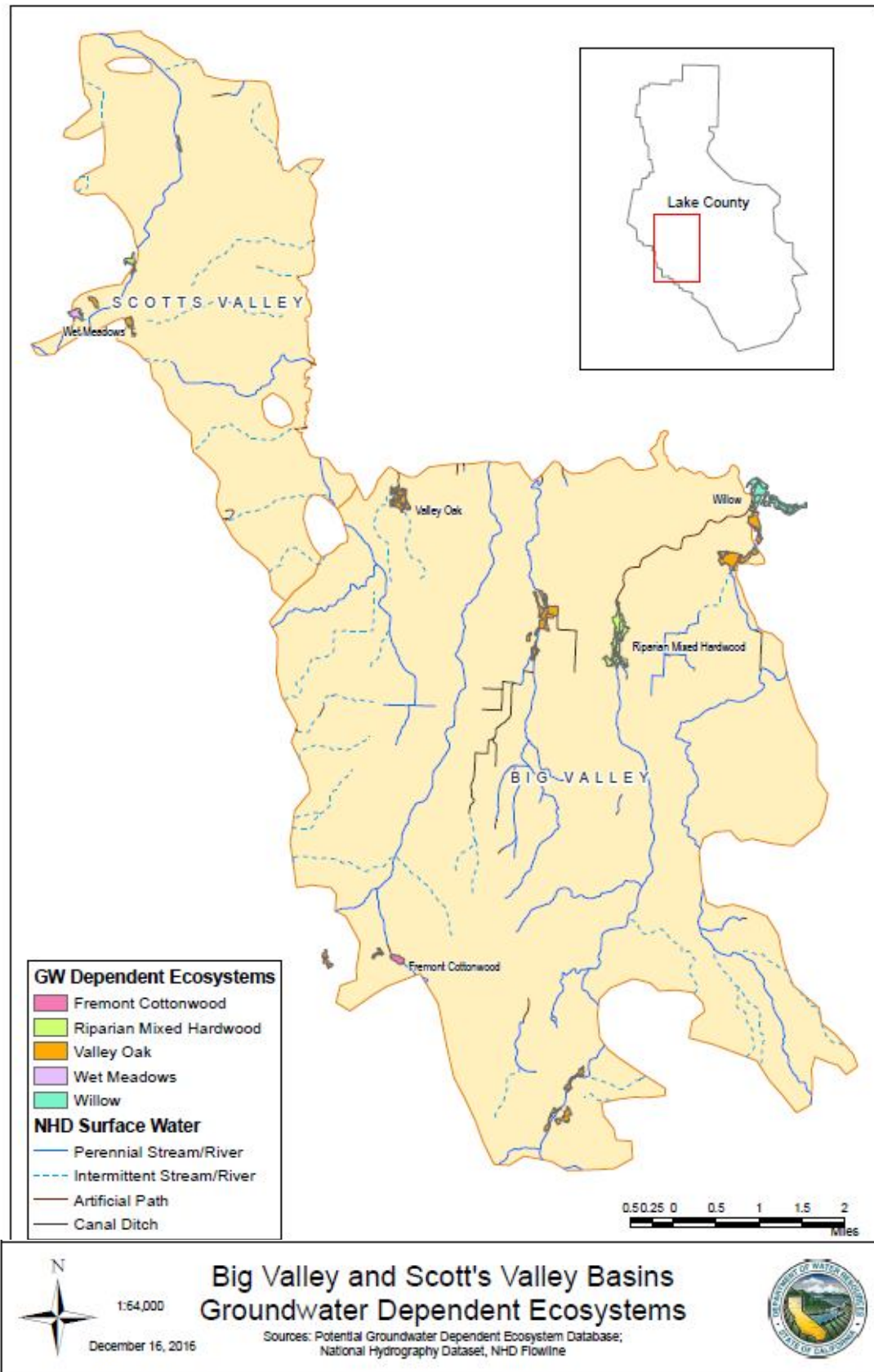
Information for the interconnection of surface water systems to groundwater is available from many sources.

From Bill Ehorn, DWR: We do not have any data to provide on this topic at this time. It is probable that all of the streams are interconnected with groundwater within these 2 basins (Big Valley and Scotts Valley).

The connection with stream surface water is clear, what is not clear is the connection to Clear Lake and the connection of Big Valley with Scotts Valley.

Groundwater Dependent Ecosystems in the Basin

The tributaries to Clear Lake, Adobe Creek, Kelsey Creek, Manning Creek and Cole Creek are most likely all connected to the Big Valley groundwater basin. They undoubtedly contribute water to the basin. What is a little more unclear is the basins contribution to the creeks and their riparian habitats. During different climatological regimes such as severe drought this connection could be significant.



Water Year Type

Water year is from October 1 through November 30 and is called by the calendar year of the 9-month period.

How Historical Conditions have Impacted the Agency's Ability to Operate the Basin Sustainably

Historical conditions have only allowed adaptive management of the GMP. The GMP has built on one groundwater study after another until the data for Big Valley basin fills volumes and is the tool to accomplish sustainable groundwater management.

Evaluation of Reliability of Water Supply

Recent changes in the crops grown in Big Valley have reduced the demand for groundwater. Pear acreage has declined in Lake County from a peak of about 8,000 acres in 1980 to about 2,200 acres in 2007. Most pear orchards that have been taken out of production by law have to be removed. Much of that acreage does not continue in agricultural production. Lake County's winegrape acreage more than tripled to 8,300 acres from 1990 to 2007 but a significant portion of this increase was in mountainous areas using groundwater local to these areas, see Crop Acreage for Both Basins and Agriculture Data Request. In addition pears require 2-5 times as much irrigation water as do winegrapes on an area basis. University of California Cooperative Extension and the Lake County Winegrape Commission continue to provide education on improved water monitoring and irrigation methods, and farmers have adopted a wide variety of tools to improve irrigation water use efficiency that were not available in the past. Winegrape growers use drip irrigation and some walnut growers use low flow irrigation systems that reduce the area of wet soil surface and therefore reduce evaporative water loss. Farmers use a variety of instruments to measure plant and soil water status, and farmers and local agencies support a network of weather stations with internet accessible weather data, so farmers can match water use to current weather conditions.

The Lake County Winegrape Commission's (LCWC) Research & Education Committee continues to focus on the Sustainable Winegrowing Program (SWP). In 2012, the LCWC implemented two new programs: Certified California Sustainable Winegrowing (CCSW-Certified) and the Master Vigneron Academy (MVA). Today Lake County is home to more than 30 wineries and 180 growers with over 9,400 acres producing winegrapes. "We have gone from historical to traditional to professional," notes Peter Molnar, Past Chair of the LCWC. "Sustainable growing efforts are central to Lake

County's approach. While more than 70 percent of Lake County growers have participated in the Code of Sustainable Winegrape Practices Self-Assessment Workbook, the LCWC wants to see our growers take the next step in sustainable winegrowing by obtaining third-party certification."

To that end, the LCWC recently launched a pilot program in collaboration with the California Sustainable Winegrowing Alliance (CSWA) designed to assist owners of small vineyards become certified sustainable through reduced administrative fees and a cost share model to assist with the auditing process.

All these changes are reducing water demand.

Projected Hydrology shall Utilize 50 years of Climatological Data

Projected hydrology has drawn on 50 years of data starting with the Big Valley Ground-Water Recharge Investigation of 1967, see BVGRI. Lake County is not expected to feel the effects of sea level rise. Climate change is being felt in Lake County and from the Lake County Natural Hazard Mitigation Plan Update, 2011, see Appendix 6, the section on drought once again raises the importance of conservation outreach to water users.

Projected Water Budgets

Projected water budgets rely on:

- DWR land use data of 2013, see Appendix 3,
- Lake County GIS updates through the Lake County Community Development Department for zoning changes and land use permits,
- Lake County Assessor / Records Office for property ownership,
- Lake County Special Districts for County Service Area # 6 and Kelseyville County Waterworks District # 3 groundwater use and connections,
- City of Lakeport Water Division and Sewer Division groundwater use and wastewater reuse and connections,
- Precipitation , streamflow and river level data from http://www.co.lake.ca.us/Government/Directory/Water_Resources/Hydrologic_Information/Links.htm,

- Lake County Agricultural Crop Report for the most recent year, 2015,
- Lake County Farm Bureau participation in the Sacramento Valley Water Quality Coalition for the Irrigated Lands Regulatory Program for irrigation water use,
- Lake County Environmental Health for well permits and demolitions.

An excellent resource for climate change in the Clear Lake basin that includes Big Valley is the CLIWMP, Chapter 9 Climate Change, see CLIWMP. From the CLIWMP:

“Climate change is already affecting California.” Along with rising sea levels, the state has seen “increased average temperatures, more extreme hot days, fewer cold nights, a lengthening of the growing season, shifts in the water cycle with less winter precipitation falling as snow, and both snowmelt and rainwater running off sooner in the year” (CNRA 2009) (Figure 9-1).

This chapter discusses statewide climate change information and predictions and attempts to “downscale” them to the Clear Lake Watershed.

Climatic Variable	Trend
Temperature	Increase
Annual Precipitation	Slight increase
Variability in Annual Precipitation	Increase
Variability in Peak Flows	Increase
Size of Peak Flows (three day discharge)	Increase
Average Annual Runoff	Increase
April to June Runoff	No change

Table 9-1 Changes in climate variables likely to have occurred in the Clear Lake watershed over the past century.

Lake County is not expected to feel the effects of sea level rise.

Quantification of the Water Budget

The Big Valley water budget has been quantified using a volumetric model in the BVGRIU to understand groundwater storage and the “applied water “ methodology in the WIA because it was necessary for that analysis to be consistent with the DWR Water Plan Update 2005. The District continues to use this methodology for the semiannual reports to water users, see LCWPD GW Update Reports.

DWR has produced Water Balance Data by Detailed Analysis Unit, DAU, for 2005 to 2010. DAU 174 includes both Scotts Valley and Big Valley, the individual basin data is not yet available. See Developed Water Use Balance.

The total number of groundwater wells by type that have been reported to DWR are shown in Appendix 4, Big Valley Wells by type.

Sustainability Goal

Maintaining sustainability is one of the most important management objectives of the Lake county GMP. It is why the District has regular communication with water users, see LSWPD Groundwater Update Reports; and through the various permitting processes for land use, has the opportunity to influence planning activities, see Appendix 6 and 8.

Undesirable Results

The 2006 Big Valley water inventory found that long term trends in well levels indicate that annual groundwater extractions are not exceeding annual groundwater recharge. And this is true to the present day. This inventory was only possible because of the high number of monitored wells, 38, and twelve of those are monitored every month. Big Valley has experienced the undesirable results of stream channelization and stream channel gravel mining during the early and middle part of the 20th century. Channelization increases flow velocities and hydraulic scour, causing channels to down cut. Gravel removal in Kelsey Creek and Adobe Creek caused more hydraulic scouring. The reduced surface elevation of the channel bottom relative to the surrounding land surface and shallow underlying groundwater levels resulted in decreased groundwater storage and increased groundwater seepage to the stream channel and lower groundwater levels. Kelsey Creek experienced the greatest drop in channel level due to straightening and deepening its mouth in 1962 and extensive gravel mining which continued until 1980. The drop in the creek channel level after 1960, and the partial recovery following the moratorium on gravel mining in 1981, see Appendix 6, can be seen from water levels for well number 13N-09W-15B2, located approximately 600 feet north of Kelseyville Main Street and 320 feet laterally from Kelsey Creek. Spring well levels show an approximate 15 feet drop in the level of Kelsey Creek by the 1970s, and a rise of about 3 feet after 1987. And water levels continue to increase.

It is this experience of lowered groundwater levels that the community does not want to repeat and rather wants to restore groundwater storage capacity, time period for water percolation and recharge volume increase.

Of the six undesirable results listed in SGMA, two are very unlikely to occur in the Big Valley basin and have not been covered in this Alternative;

- Significant and unreasonable seawater intrusion,
- Significant and unreasonable land subsidence.

The chronic lowering of groundwater levels by overdrafting and the reduction in groundwater storage are both results that can be quantified by monitoring well levels and stream channel health and function. This is already a responsibility of the District.

Surface water depletions due to lower precipitation, shorter interval precipitation, damming of creeks, and greater use of surface water are also being watched by the District so that proactive measures can be taken. Stream gauges are monitored daily, see LCWPDWEB. Suspicious changes in stream flow or diversion lead to the District being notified for investigation with the assistance of the Regional Water Quality Control Board.

Significant degraded water quality occurs naturally in Lake County due to its geology. In Big Valley elevated levels of iron, manganese, or hardness are common. These parameters do not pose health threats; however, they are associated with nuisance properties and regulated with secondary drinking water standards for such conditions as taste, odor, staining of clothing, and /or scale formation in plumbing fixtures. These minerals can also cause clogging of irrigation systems, especially micro-irrigation systems. Increased hardness levels require the use of additional soap or detergents and can increase treatment costs for either homeowners who use water softeners or municipal wastewater treatment plants that must treat the increased rate of waste load in the waste inflow stream. Water treatment systems, or frequent replacement of irrigation fixtures, may be required in agricultural systems. Boron, which is injurious to many agricultural crops at levels of 0.75 to 1.0 mg / L, is generally present in Big Valley at moderate levels ranging from 0.10 to 0.67 mg / L. In some areas of Big Valley, nitrate levels have been rising since the late 1950s suggesting nitrate loading from fertilizer or animal / human waste. Nitrate is regulated for human health concerns and has an applicable primary drinking water standard of 10 mg / L N. Levels in some Big Valley wells are approaching 7.5 mg / L N.

DWR has periodically monitored water quality in Big Valley since the late 1930s and up to 2007. Regulation of large public drinking water systems is by

the State Water Resources Control Board, Division of Drinking Water. The California Drinking Water Source Assessment and Protection Program requires large public drinking water systems to complete a drinking water source assessment that includes an inventory of possible contaminating activities and a vulnerability ranking to potential contamination (CDHS 1999).

There is plenty of opportunity with the amount of groundwater quality analysis being shared with the District to be aware of changes in water quality condition.

There are currently no undesirable conditions occurring in Big Valley relating to groundwater imbalance or groundwater quality because the District is managing its groundwater resources sustainably through a number of cooperating programs.

The District is able to demonstrate that undesirable results related to one or more sustainability indicators are not present and are not likely to occur in the Big Valley basin due to an active groundwater monitoring program and the State and local regulations, policies and practices in place that ensure groundwater is considered a limited resource, and a resource that can be contaminated. The District shall not be required to establish criteria for undesirable results related to the sustainability indicators.

Minimum Threshold

The District has demonstrated that undesirable results relating to one or more sustainability indicators are not present and are not likely to occur in the Big Valley basin for the reasons above. The District shall not be required to establish minimum thresholds related to the sustainability indicators.

Measurable Objectives

Basin Management Objectives (BMOs) in the GMP are listed as:

- Maintain high groundwater levels to prevent geothermal water intrusion;
- Determine and maintain a safe yield of groundwater for use within the basin;
- Identify and monitor the relationship between basin groundwater extraction and impacts on groundwater supplies within and adjacent to the basin;
- Develop data and information that identify impacts on groundwater in adjacent areas that might be affected by groundwater use;
- Establish mitigation measures to offset identified adverse impacts of groundwater extraction;

- Establish quantitative limitation on groundwater extractions for particular areas and establish criteria for well spacing and operations to limit adverse impacts of groundwater extraction on basin wells;
- Protect the recharge area for the volcanic ash aquifer located north of Wight way;
- Protect the creek beds of Adobe Creek, Kelsey Creek and Manning Creek to optimize their recharge capabilities;
- Continue to operate the Kelsey Creek detention structure to maximize groundwater recharge, allow creek bedload movement, minimize operating costs, and maintain passage for the Clear Lake Hitch; and
- Expanding the monitoring program to include wells that provide a more accurate assessment of groundwater levels, including wells that provide an increased area of coverage.

BMOs are flexible guidelines for the management of groundwater resources that describe specific actions to be taken by stakeholders to meet locally developed objectives at the basin or sub-area scale.

An important feature of the BMO method of groundwater management is that it is intended to provide a flexible approach that can be adapted to changing local conditions and increased understanding of the groundwater resource.

Development of effective BMOs require local participation to incorporate the best local understanding of the resource and the needs and issues affecting the groundwater users. Stakeholders include domestic and agricultural well owners, water agencies, local government representatives, and other interested parties.

The District developed draft BMOs for the individual groundwater basins prior to each basin's stakeholder meeting to facilitate the discussions. The stakeholders discussed their specific groundwater basin issues and concerns and provided feedback to modify and refine the draft BMOs.

BMOs can be quantitative or qualitative. Quantitative BMOs are typically based on numeric thresholds and define specific actions that need to be implemented when conditions exceed the predetermined thresholds. Qualitative BMOs describe objectives or goals within a groundwater basin. Quantitative BMOs require a comprehensive understanding of the hydrogeology and hydrology of a groundwater basin including surface and groundwater connections and sufficient monitoring of water levels, quality, and subsidence. This would be necessary for a basin that is being overdrafted to set voluntary or regulatory use requirements on the groundwater. Qualitative BMOs are likely to prescribe improved understanding and monitoring of groundwater and maintain a confidence level on sustainability.

Stakeholders at the Big Valley Groundwater Basin meeting indicated that issues and objectives for Big Valley were outlined in the existing *Big Valley Groundwater*

Management Plan (1999). Additionally, stakeholders identified large summer well drawdowns and the intrusion of geothermal water as issues of concern in the basin.

BMOs for the Big Valley basin were developed through review of the *Big Valley Groundwater Management Plan*. Table 3-6 identifies BMOs for the Big Valley Groundwater Basin. The BMOs focus on maintaining long term groundwater resources by increased monitoring of groundwater levels, quality, and subsidence. Consistent monitoring would improve understanding of the Big Valley Groundwater Basin's water quality and help identify effects of groundwater extraction on adjacent water users and on other resources. BMOs for the Big Valley basin also emphasize protection of recharge areas to sustain high groundwater levels into the future.

The current objective of the District with regard to the Alternative Plan is to maintain the basin's groundwater sustainability for a 20 year Plan implementation period. The Table 3-6 objectives have been largely implemented although there is always more to do. The amount of well level monitoring must be maintained or increased dependent on funding and / or increase in efficiency of monitoring. The wells that are monitored monthly should be considered for quarterly monitoring since the monthly frequency results in a large amount of statistical noise. If the wells that are monitored monthly are to be monitored quarterly then more wells could be brought online for this changed frequency at no increased cost.

The four sustainability indicators that are being measured and analyzed in order to determine sustainability in Big Valley are:

- Chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply,
- Significant and unreasonable reduction of groundwater storage,
- Significant and unreasonable degraded water quality, and
- Surface water depletions that have significant and unreasonable adverse impacts on beneficial uses of the surface water.

The data that is being collected to make the sustainable determination is all of the following analyzed together:

- groundwater well levels measured at least semiannually at the peak of recharge in April (the highest level for that water year) and at the low of use after the summer / early fall in October (the lowest level for that water year).
- analysis of the well level data provides statistical trend lines both for depletion of supply and reduction in groundwater storage.

- stream gauge data on Kelsey Creek provides a component of recharge.
- precipitation data from Big Valley farmers provides a component of recharge.
- well permit data and well log information.
- Water Agency number of connections, water use and water quality.
- SWRCB, Division of Drinking Water water quality

The possibility of drought impacting trend-lines or greater rainfall over short periods impacting trend-lines has been factored into operational flexibility. The District already monitors twelve wells on a monthly basis and will monitor the semi-annual wells at additional times when it feels that due to the climate or other factors a more complete assessment needs to be made.

The District has no need or wish to establish a representative measurable objective for groundwater elevation as a proxy to all the data that is already being gathered.

This Alternative Plan for the Big Valley groundwater basin that is currently sustainable is a plan to maintain that sustainability over 20 years of implementation.

Some of the additional Plan elements listed in CWC Section 10727.4 that are important to sustainable groundwater and have been implemented are;

Wellhead protection: Lake County Code Article VIII Regulation of Wells and Preservation of Groundwater

Migration of Contaminated Groundwater: Lake County Environmental Health, Information about Contaminated Wells

Well Abandonment and Well Destruction: Lake County Code Article VIII Regulation of Wells and Preservation of Groundwater

Conjunctive Use Project: Adobe Creek Conjunctive Use Project has been proposed in the 2016/17 grant cycle for Prop 1 funds.

Well Construction Policies: Lake County Environmental Health Well Permit Application Package

Water Conservation: Special Districts Water Conservation

Review Land Use Plans: Lake County Community Development Department, Planning Data Form and Request for Review

Impacts on Groundwater Dependent Ecosystems: the District and other stakeholders monitor the riparian habitat along streams looking for changes that would impact groundwater recharge.

Monitoring Network

The current monitoring program for the Big Valley basin has been in existence since the 1960s. The communities of Kelseyville and Finley and the agricultural community of Big Valley are well aware of the limitations of both surface and groundwater. This is largely due to historical knowledge of groundwater insufficiency and an interest in preventing this unacceptable condition. The existing water resource monitoring and management has evolved because water users understand the limits of this finite resource. In many cases someone's agricultural well is taking water from the same aquifer as that same person's domestic well. The community and basin area is small enough to practice sustainability because there is a willingness to share knowledge and use that knowledge for long-term planning. There has been extensive characterization of the groundwater aquifers in the alluvial deposits of Big Valley and their seasonal and decadal changes.

The Big Valley Watershed Council updated their mission statement in 2007 to the following:

"We are citizens, who reside in the watershed, own property here, or otherwise have an interest in its well-being. Our purpose is to protect, enhance, and improve the surface and groundwater resources, stabilize historic channel elevations, and enhance the natural systems of the Kelsey Creek Watershed. Our goal is to provide cooperative management and protection. To this end, we will evaluate and recommend solutions to watershed problems that benefit both the users and the watershed." Water resource monitoring is allowing operational flexibility because of the sharing of data. Our water users, use water wisely in order for it to be sustainable for generations.

Big Valley groundwater basin has been a part of the CASGEM system of monitoring since CASGEM was placed online in 2009. Since 2010 elevation data has been entered into CASGEM. Groundwater monitoring for quality has been performed by DWR up to 2007. Limited water quality monitoring has been done since that time.

Water quality monitored wells are:

Big Valley: 13N09W08N002M

13N09W08B001M

13N09W02G004M

13N09W12M001M

13N09W21F002M

13N09W22C003M

13N09W22J001M

Kelsey Creek

Water elevation monitored wells are: 48 wells of which 10 have been discontinued over the years. Two more wells are to be brought into the CASGEM system in 2017. Of the 38 semi-annual monitored wells, twelve are monitored monthly. The District is providing the CASGEM Monitoring Plan and Well Measurement Procedure as part of this Alternative Plan.

Another important monitoring program and a large part of the water budget are surface water flow and precipitation. There are two USGS stream gages on Kelsey Creek, one near the mouth at Clear Lake and the other approximately nine miles upstream. The flow rate for each gage is reported real-time and on the County's Water Resources webpage,

http://www.co.lake.ca.us/Government/Directory/Water_Resources/Hydrologic_Information/Links.htm.

Average annual flow rates are also calculated. The average annual flow at the gages, when compared, is very similar, 84.5 cfs. near the mouth of Clear Lake and 85.7 cfs. upstream. Because the upstream location gages a smaller portion of the watershed, it should carry less streamflow than the downstream location. However, water is being lost through evaporation and outflow to groundwater. The section of Kelsey Creek between the two gages is therefore important for groundwater recharge of Big Valley aquifers.

Observational monitoring is an important activity for the Chi Council during the migration of Clear Lake hitch (otherwise known as Chi), *Lavinia exilicauda chi*. This fish is now on the State Threatened Species List and since being a Species of Concern has had a large following of people monitoring the tributaries to Clear Lake to observe the presence or otherwise of the hitch. This group regularly monitors Adobe Creek and Kelsey Creek since these are two

of the most important hitch spawning creeks. When creek flow stops they may mount hitch rescue parties with the CDFW to rescue stranded hitch. All this observational data is collected, <http://lakelive.info/chicouncil/>.

Agricultural interests and PWS systems are in the communication loop with the District to understand and act on impacts. The Scotts Valley basin is adjacent to Big Valley but their hydraulic connectivity is unknown.

Another important element to the District's knowledge of surface water changes is property owners' requests to investigate changes based on local observation. Such requests including complaints come to the Community Development Department who pass water related issues to the District, or the District will receive this information directly. Such issues can range from observations of people wasting water, contaminating water, diverting water, using water for illegal purposes, and unauthorized changes to riparian communities.

The District is always looking to improve the monitoring network by adding wells to improve data confidence, removing anomalous wells, adding wells in previously unmonitored areas to improve groundwater knowledge, increasing or decreasing the frequency of monitoring.

The District is also searching for opportunities to increase the number of streamflow gauges on the larger streams in the area. If it is successful and is granted funds to implement the ACCU project, the District will, as part of the project, install streamflow gauges in Highland Springs reservoir and downstream in the recharge area to verify the success of the project.

One of the best ways of monitoring impacts to the beneficial uses or users of groundwater is by listening to the users. The County, being relatively small, with very few levels of bureaucracy, is easily approached. The same is true for inter- and intra-departmental communication where there is little compartmentalization when it comes to natural resources and we don't need permission to share data. Lake County Special Districts has in the last drought years placed moratoriums on water and wastewater connections when critically low water table levels threaten their managed water systems, and weather experts are predicting dry conditions continuing into the next water year. These moratoriums are immediately known by other Lake County departments.

Monitoring water quality has been an ongoing program by the District since 1985. DWR has been collecting water quality data from the Big Valley basin since 1944. The BVGRIU found chemistry indicating the presence of hydrothermal waters in some discrete areas of Big Valley, however the data

were insufficient to relate water quality to changes in water well levels. Increasing nitrate levels have been found in some Big Valley wells potentially from fertilizer, livestock, or human waste, however there was insufficient data to identify a source. DWR stopped water quality analysis in 2007. Data from the public water system using Big Valley basin groundwater shows no impairment to water in 2015. Pesticides have not been detected in any Lake County wells.

The adjacent basin is Scotts Valley, also a medium priority basin, with very little information to ascertain hydraulic connectivity.

Developing a more comprehensive groundwater monitoring network will take grant funding for dedicated monitoring wells and water quality sampling and analysis.

Assessment and Improvement of Monitoring Network

The District shall review the monitoring network semi-annually after well level monitoring. At this time every well in the monitoring network, currently 38, whether it is in the CASGEM system or not shall be evaluated for:

- reliability,
- ease of access and measurement,
- usage observation,
- limitations on monitoring
- frequency of monitoring,
- ownership changes,
- value in terms of location and depth.

The above evaluation of individual wells shall then allow evaluation of the well monitoring network in terms of data gaps or data uncertainty. This evaluation will include:

- sufficiency of number of wells that are being monitored,
- wells to be discontinued,
- wells to be brought into the monitoring network,

- frequency of monitoring,
- review of the use and analytical manipulation of data,
- review of the analytical certainty of basin sustainability.

Another part of the monitoring network is providing data on surface water in the form of streamflow, river level and precipitation. This data is being recorded real-time by the USGS. This data is used for projected actions to maximize groundwater recharge and forecasting the water budget.

Funding opportunities are always being sought to increase the number of monitoring sites in Big Valley so that the data is more statistically confident.

Monitoring data shall be stored in an access database controlled by the District. The District uses ArcGIS for all mapping. It is very familiar with the CASGEM system and the importing of District data to that system.

Projects and Management Actions

The District has implemented many of the management actions and projects that have been suggested over the years. It is because of GMP implementation that the Big Valley basin is sustainable, see Measurable Objectives above, page 23. A major project that is to be implemented is the Adobe Creek Conjunctive Use, ACCU, Project. This project is waiting for funding.

Management actions will include remaining aware of SGMA legislation to ensure compliance, and continuing to improve the monitoring network to improve confidence in the current sustainability.

The options for addressing overdraft in the BVGRIU have largely been implemented so that many actions are now regulated in the Lake County Code, see Appendix 6. Other regulations shall be considered when required.

The ACCU Project is supported by the Adobe Creek Conjunctive Use Feasibility Study produced by Christensen Associates Inc. for the District in 2002.

The District is considering adding a requirement for new agricultural, municipal and industrial groundwater users to allow the District to monitor wells. This requirement would be a part of permitted projects requiring a use permit and /or CEQA review. As part of mitigation for the project, the developer would be required to provide access to groundwater monitoring in

perpetuity or for a limited period like 10 years. The permittee could also be required to pay a monitoring fee.

Annual Reports and Periodic Evaluations by the District

An annual report or a submission of the Alternative Plan every 5 years shall be made to DWR. This Alternative Plan will be the first “Report”.

The District evaluates the Plan at each semi-annual monitoring cycle at which time a report is written, noticed to all water users and presented at a public hearing. Any changes to be required of water users shall be discussed at this time. Any significant changes in water use shall be discussed. Changes to the monitoring plan including acquisition of additional data sources shall be brought to the public's attention.

The District's report shall describe new SGMA legislation and its impact on the District's Alternative Plan. The District is always pleased to review the basin's sustainability on site with DWR.

References

Alternative Elements Guide for Big Valley

Big Valley Groundwater Recharge Investigation, March 1967

Big Valley Groundwater Management Plan, May 1999

Adobe Creek Conjunctive Use Project, Feasibility Study and Initial Study, April 2002

Big Valley Groundwater Recharge Investigation Update, May 2003

Lake County Groundwater Management Plan, 2006

Lake County Water Inventory and Analysis, 2006

Lake County Water Demand Forecast, 2006

This SGMA Alternative submission is based on other documents as listed on pages 2-3 and 9.