Exhibit B

Executive Summary

ES.1. Introduction & Plan Area (Chapters 1 – 3)

The Big Valley Groundwater Basin (BVGB, Basin, or Big Valley) lies on the border of Modoc and Lassen counties in one of the most remote and untouched areas of California. The sparsely populated Big Valley has a rich biodiversity of wildlife and native species who live, feed and raise young on the irrigated lands throughout the Basin. The snow-fed high desert streams entering the Basin have seasonal hydrographs with natural periods of reduced flows or complete cessation of flows late in the summer season. The Pit River is the largest stream and is so named because of the practice, employed by the Achumawi and other Native American bands that are now part of the Pit River Tribe, of digging pits to trap game that came to water at the river. Farming and ranching in Big Valley date back to the late 19^{th} and early 20^{th} centuries when families immigrated to Big Valley and made use of the existing water resources. A large amount of the land in the Basin is still owned and farmed by the families that homesteaded here.

Historically, agriculture was supplemented by a robust timber industry which was a key component of the economy for Big Valley which also supported four lumber mills. Due to regulations and policies imposed by state and federal governments, the timber industry has been diminished over time and subsequently caused a great economic hardship to the Big Valley communities. Stakeholders realize that the Sustainable Groundwater Management Act of 2014 (SGMA) will unfortunately cause a similar decline to agriculture. The change in land management has transformed once thriving communities in the Basin to "disadvantaged" and "severely disadvantaged" communities. Viable agriculture is of paramount importance to the residents of Big Valley because it supports the economy and unique character of the community. As required by SGMA, stakeholders have developed a sustainability goal:

> The sustainability goal for the Big Valley Groundwater Basin is to maintain a locally governed, economically feasible, sustainable groundwater basin and surrounding watershed for existing and future legal beneficial uses with a concentration on agriculture. Sustainable management will be conducted in context with the unique culture of the basin, character of the community, quality of life of the Big Valley residents and the vested right of agricultural pursuits through the continued use of groundwater and surface water.

Lassen and Modoc counties are fulfilling their unfunded, mandated roles as Groundwater Sustainability Agencies (GSAs) to develop this Groundwater Sustainability Plan (GSP) after exhausting its administrative challenges to the California Department of Water Resources' (DWR's) determination that Big Valley qualifies as a medium-priority basin. Both counties are disadvantaged, have declining populations and have no ability to cover the costs of GSP development and implementation.

The Basin, shown on **Figure ES-1**, encompasses an area of approximately 144 square miles (92,057 acres) with Modoc County representing 28 percent and Lassen County comprising 72 percent of the Basin by area. The Basin includes the towns of Adin and Lookout in Modoc County and the towns

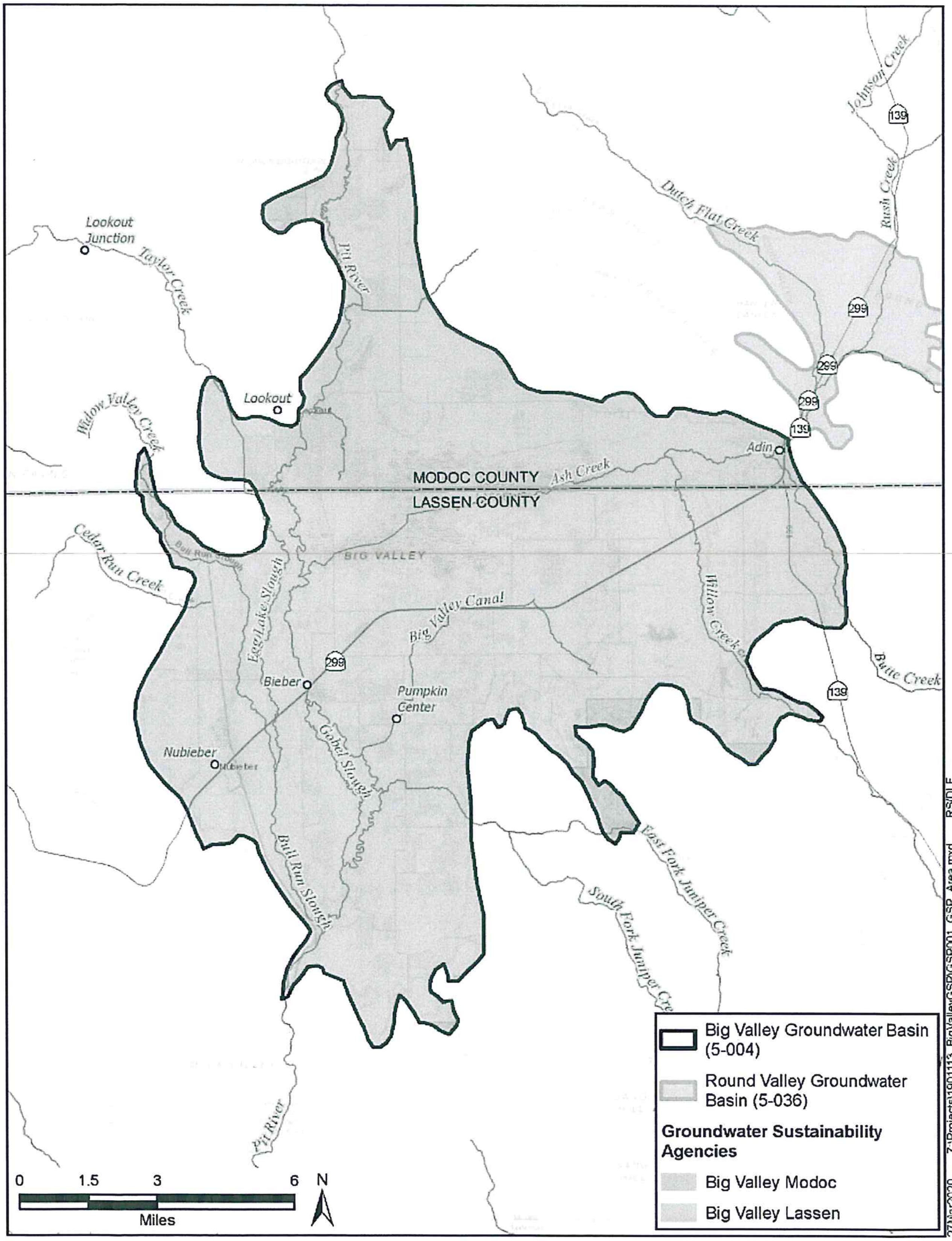

Figure ES-1 Groundwater Sustainability Agencies in Big Valley Groundwater Basin.
Source: DWR 2018d

of Bieber and Nubieber in Lassen County. The Ash Creek State Wildlife Area straddles both counties occupying 22.5 square miles in the center of the Basin in the marshy/swampy areas along Ash Creek. Land use in the BVGB is detailed in **Table ES-1**.

Table ES-1 2016 Land Use Summary by Water Use Sector

Water Use Sector	Acres	Percent of Total
Community[a]	250	<1%
Industrial	196	<1%
Agricultural	22,246	24%
State Wildlife Area[b]	14,583	16%
Managed Recharge	-	0%
Native Vegetation and Rural Domestic[c]	54,782	60%
Total	**92,057**	**100%**

Notes:

[a] Includes the use in the communities of Bieber, Nubieber and Adin

[b] Made up of a combination of wetlands and non-irrigated upland areas

[c] Includes the large areas of land in the Valley which have domestic wells interspersed

Source: See Chapter 6 – Water Budget for explanation of approach

ES.2. Basin Setting (Chapters 4 – 6)

Hydrogeologic Setting

The topography of BVGB is relatively flat within the central area with increasing elevations along the perimeter, particularly in the eastern portions where Willow and Ash creeks enter the Basin. This low relief in the Basin results in a meandering river morphology and widespread flooding during large storm events. The Basin is underlain by a thick sequence of sediment derived from the surrounding mountains of volcanic rocks and is interbedded with lava flows and water-lain tuffs. The volcanic material is variable in composition and is Miocene to Holocene age (23 million to several hundred years ago). The compositions of the lava flows are primarily basalt[1] and basaltic andesite[2], while pyroclastic[3] ash deposits are rhyolitic[4] composition. In general, the Basin boundary drawn by DWR can be described as the contact between the valley alluvial deposits and the surrounding mountains of volcanic rocks. During development of this GSP, the Basin boundary has been found to be grossly inaccurate in many areas and is not clearly isolated from areas outside the valley floor. The mountains outside of the groundwater Basin capture and accumulate precipitation, which produces runoff that flows into BVGB. Moreover, DWR (1963) suggested that these mountains serve as "upland recharge areas" and provide subsurface recharge to BVGB *via* fractures in the rock and water bearing formations that may underlie the volcanics.

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[1] Basalt is an extrusive (volcanic) rock with relatively low silica content and high iron and magnesium content.

[2] Andesite is an extrusive rock with intermediate silica content and intermediate iron and magnesium content.

[3] Pyroclastic rocks are formed during volcanic eruptions, typically not from lava flows, but from material (clasts) ejected from the eruption such as ash, blocks, or "bombs."

[4] Rhyolitic rocks are extrusive with relatively high silica content and low iron and magnesium. Rhyolites are the volcanic equivalent of granite.

The Pliocene-Pleistocene age (5.3 million to 12 thousand years ago) Bieber Formation (TQb), shown in **Figure ES-2**, is the main formation of aquifer material defined within BVGB, and DWR (1963) estimates that it ranges in thickness from a thin veneer to over 1,000 feet. The formation was deposited in a lacustrine (lake) environment and is comprised of unconsolidated to semi-consolidated layers of interbedded clay, silt, sand, gravel and diatomite. The coarse-grained deposits (gravel and sand) are aquifer material[5] and are part of the Big Valley principal aquifer. The "physical bottom" has not been clearly encountered or defined but may extend 4,000 to 7,000 feet or deeper. The "practical bottom" of the aquifer is 1,200 feet because that depth encompasses the known production wells and water quality may be poorer below that depth. As required by SGMA, 1,200 feet is used as the "definable bottom" for this GSP. A single principal aquifer is used for this GSP because distinct, widespread confining beds were not identified in the subsurface, which, if present, would create multiple aquifers.

The Natural Resources Conservation Service (NRCS) Hydrologic Soils Group (HSG) classifications provide an indication of soil infiltration potential and ability to transmit water under saturated conditions, based on hydraulic conductivities of shallow, surficial soils. Characterizing these soils is important because water must first penetrate the shallow subsurface to provide any chance of groundwater recharge. According to the HSG dataset, the Basin is composed of only soils with "slow" or "very slow" infiltration rates. While the soils are not highly permeable, some research has found that water can penetrate through these soils which means that managed aquifer recharge projects such as on-farm recharge may be viable.

Groundwater Conditions

Historic groundwater elevations are available from a total of 22 wells in Big Valley, six located in Modoc County and 16 in Lassen County. In addition to these 22 wells, five well clusters were constructed in late 2019 and early 2020 to support the GSP. Groundwater level hydrographs from the historic wells show that most areas of the Basin have remained stable, and a few areas have seen some decline averaging only 0.53 feet per year of groundwater level decline in the last 38 years.[6]

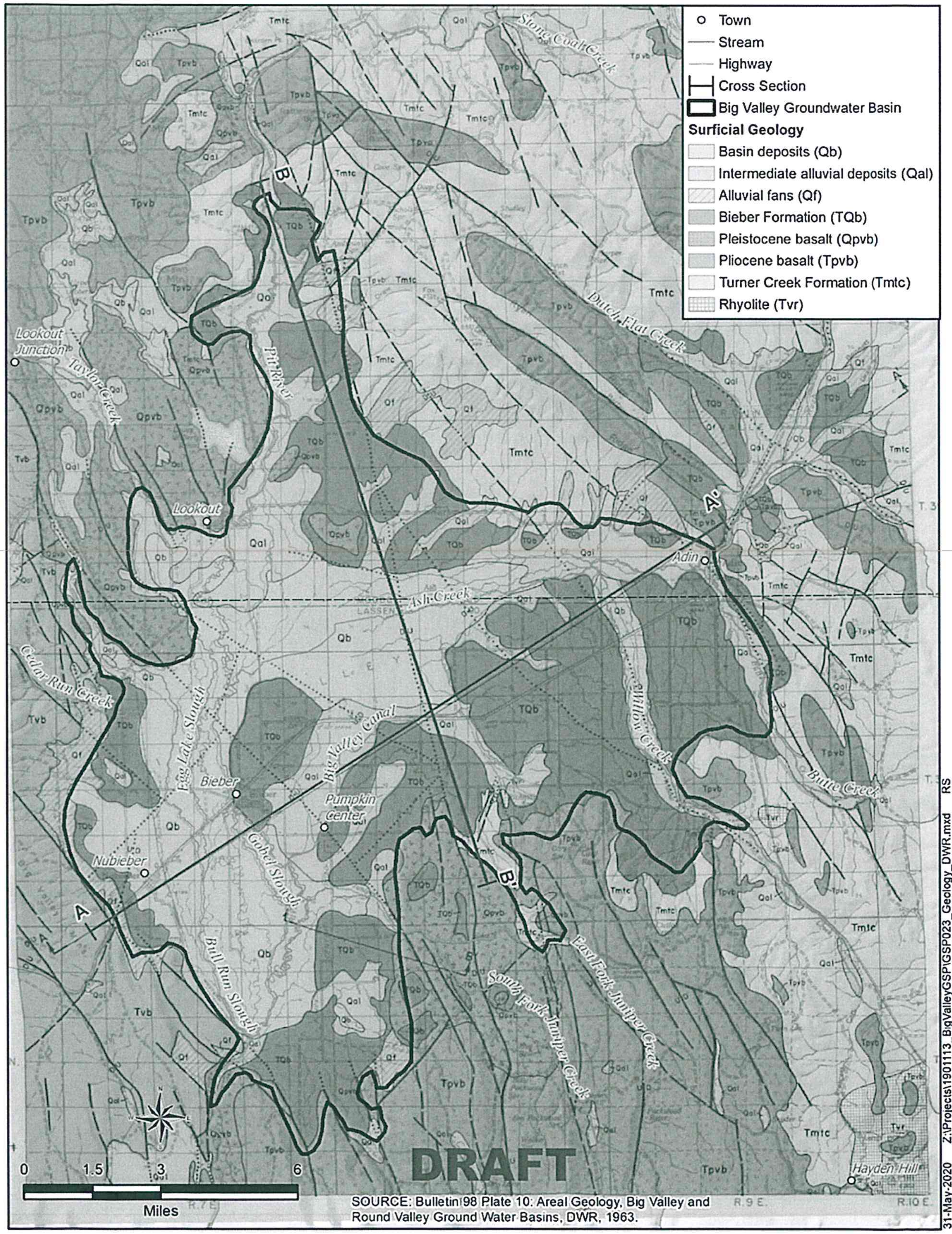
To determine the annual and seasonal change in groundwater storage, groundwater elevation surfaces[7] were developed for spring and fall for each year between 1983 and 2018. **Figure ES-3** shows this information graphically, along with the annual precipitation. This graph shows that groundwater storage generally declines during dry years and stays stable or increases during normal or wet years. During the period from 1983 to 2000, groundwater levels dipped in the late 1980's and early 1990's, then recovered during the wet period of the late 1990's. After 2000, while most wells are still stable, a few wells have generally declined resulting in a reduction in overall groundwater storage. The amount of decline represents a reduction in storage of less than 2 percent of groundwater storage.[8]

[5] Meaning the sediments contain porous material with recoverable water.

[6] Average slope of the trend lines in Appendix 5A.

[7] Groundwater elevation surfaces are developed from the known groundwater elevations at wells throughout the Basin and then estimating/interpolating elevations at intermediate locations *via* a mathematical method known as kriging. The kriging elevation surface is based on a grid covering the entire basin that has interpolated groundwater elevation values for each node of the grid.

[8] Based on assessment in Section 5.2, indicating storage has been reduced by about 96,000 AF since 1983 and using a total storage of about 5.2 million AF (92,057 acre basin area * 1,200 feet to definable bottom * 5% specific yield)



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4095 **Figure ES-2 DWR 1963 Local Geologic Map.**
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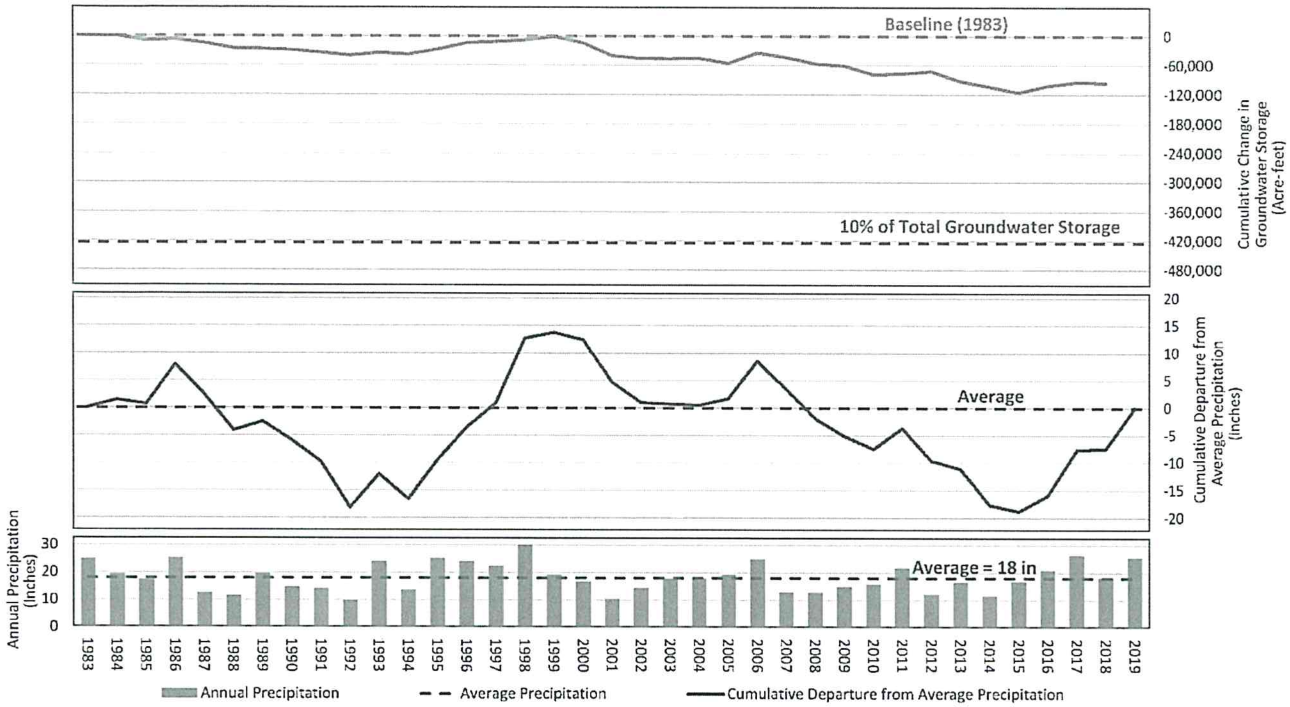


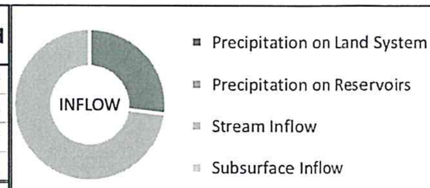
Figure ES-3 Cumulative Change in Groundwater Storage and Precipitation

Groundwater in the BVGB is generally of good to excellent quality. (DWR 1963, United States Bureau of Reclamation [Reclamation] 1979) An analysis of available historic water quality indicates that some naturally occurring constituents associated with volcanic formations and thermal waters are slightly elevated. These elevated concentrations are extremely isolated and primarily not above thresholds that are a risk to human health nor does the water quality affect beneficial uses. There are no contamination plumes or cleanup sites that are likely to affect groundwater quality for beneficial use.

Water Budget

A historic water budget was developed for the 1983-2018 timeframe, shown in **Figure ES-4.** From this water budget analysis, a rough estimate for the sustainable yield is about 39,300 acre-feet per year (AFY) and a rough estimate of overdraft is 5,000 AFY.

item	Flow Type	Origin/ Destination	Component	Estimated
TOTAL BASIN WATER BUDGET				Acre-Feet
(1)	Inflow	Into Basin	Precipitation on Land System	136,800
(14)	Inflow	Into Basin	Precipitation on Reservoirs	500
(13)	Inflow	Into Basin	Stream Inflow	371,100
(27)	Inflow	Into Basin	Subsurface Inflow	1
(32)	Inflow	*(1)+(14)+(13)+(27)*	*Total Inflow*	*508,400*
(5)	Outflow	Out of Basin	Evapotranspiration	154,000
(24)	Outflow	Out of Basin	Stream Evaporation	400
(23)	Outflow	Out of Basin	Reservoir Evaporation	700
(19)	Outflow	Out of Basin	Conveyance Evaporation	-
(18)	Outflow	Out of Basin	Stream Outflow	358,500
(29)	Outflow	Out of Basin	Subsurface Outflow	-
(33)	Outflow	*(5)+(24)+(23)+(19)+(18)+(29)*	*Total Outflow*	*513,600*
(34)	Storage Change	(32)-(33)	Change in Total System Storage	(5,000)



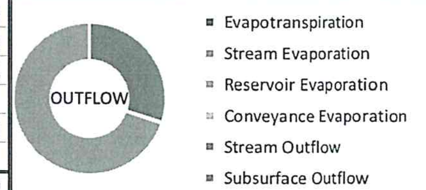


Figure ES-4 Average Total Basin Water Budget 1984-2018

ES.3. Sustainable Management (Chapters 7 – 9)

Sustainable Management Criteria

Sustainable Management Criteria (SMC) define the conditions that constitute sustainable groundwater management. The following is a description of the SMC for each of the six sustainability indicators:

- **Groundwater Levels:** Do not allow groundwater levels to decline to a level where the energy cost to lift groundwater exceeds the economic value of the water for agriculture. A depth of 140 feet below fall 2015 groundwater level for each well in the monitoring network was determined to be the depth at which groundwater pumping becomes uneconomical for agricultural use.
- **Groundwater Storage:** Groundwater levels are used as a proxy for this sustainability indicator because change in storage is directly correlated to changes in groundwater levels.
- **Seawater Intrusion:** This sustainability indicator does not apply to Big Valley
- **Water Quality:** Due to the existence of excellent water quality in the Basin, significant amount of existing water quality monitoring, generally low impact land uses and a robust effort to conduct conservation efforts by agricultural and domestic users, per §354.26(d), SMCs were not established for water quality because undesirable results are not present and not likely to occur. At the 5-year update of this GSP, data from various existing programs will be assessed to determine if degradation trends are occurring in the principal aquifer.
- **Land Subsidence:** Based on evaluation of subsidence data from a continuous GPS station and Interferometric Synthetic Aperture Radar (InSAR) data provided by DWR, no significant subsidence has occurred. Therefore, per §354.26(d), SMCs were not established for subsidence because undesirable results are not present and not likely to occur. At the 5-year update of this GSP, subsidence data will be assessed for any trends that can be correlated with groundwater pumping.

- **Interconnected Surface Water:** Data for this sustainability indicator is limited. Currently there is no evidence to suggest that undesirable results have occurred or are likely to occur. At the 5-year update, water level and streamflow data from newly constructed wells and proposed stream gages will be assessed. Thresholds will be considered if trends indicate that undesirable results have occurred or are likely to occur in the subsequent 5 years.

Monitoring Network

Monitoring networks are developed to promote the collection of data of sufficient quality, frequency and distribution to characterize groundwater and related surface water conditions in the Basin and to evaluate changing conditions that occur as the Plan is implemented. The GSAs developed monitoring networks for the parameters listed below. **Figure ES-5** shows the water level monitoring networks.

- Groundwater levels
- Groundwater storage *via* groundwater levels as proxy
- Shallow groundwater for interconnection of groundwater and surface water
- Groundwater quality
- Land subsidence
- Streamflow and climate
- Land use

Projects and Management Actions

Through an extensive planning and public outreach process, the GSAs have identified an array of projects and management measures that may be implemented to meet sustainability objectives in the BVGB. Some of the projects can be implemented immediately while others will take significantly more time for necessary planning and environmental review, navigation of regulatory processes and implementation. The various projects and estimated timeline can be found in **Table ES-2**.

ES.4. Plan Implementation (Chapters 10 – 11)

The GSP lays out a roadmap for addressing the activities needed for GSP implementation. Implementing this GSP requires the following activities:

- **GSA Administration and Public Outreach:** The fundamental activities that will need to be performed by the GSAs are public outreach and coordination of GSP activities. Public outreach will entail updates at County Board of Supervisors' meetings and/or public outreach meetings. At a minimum the GSAs will receive and respond to public input on the Plan and inform the public about progress implementing the Plan as required by §354.10(d)(4) of the Regulations. Coordination activities would include ensuring monitoring is performed, annual reports to DWR, 5-year GSP updates and coordinating projects and management actions.

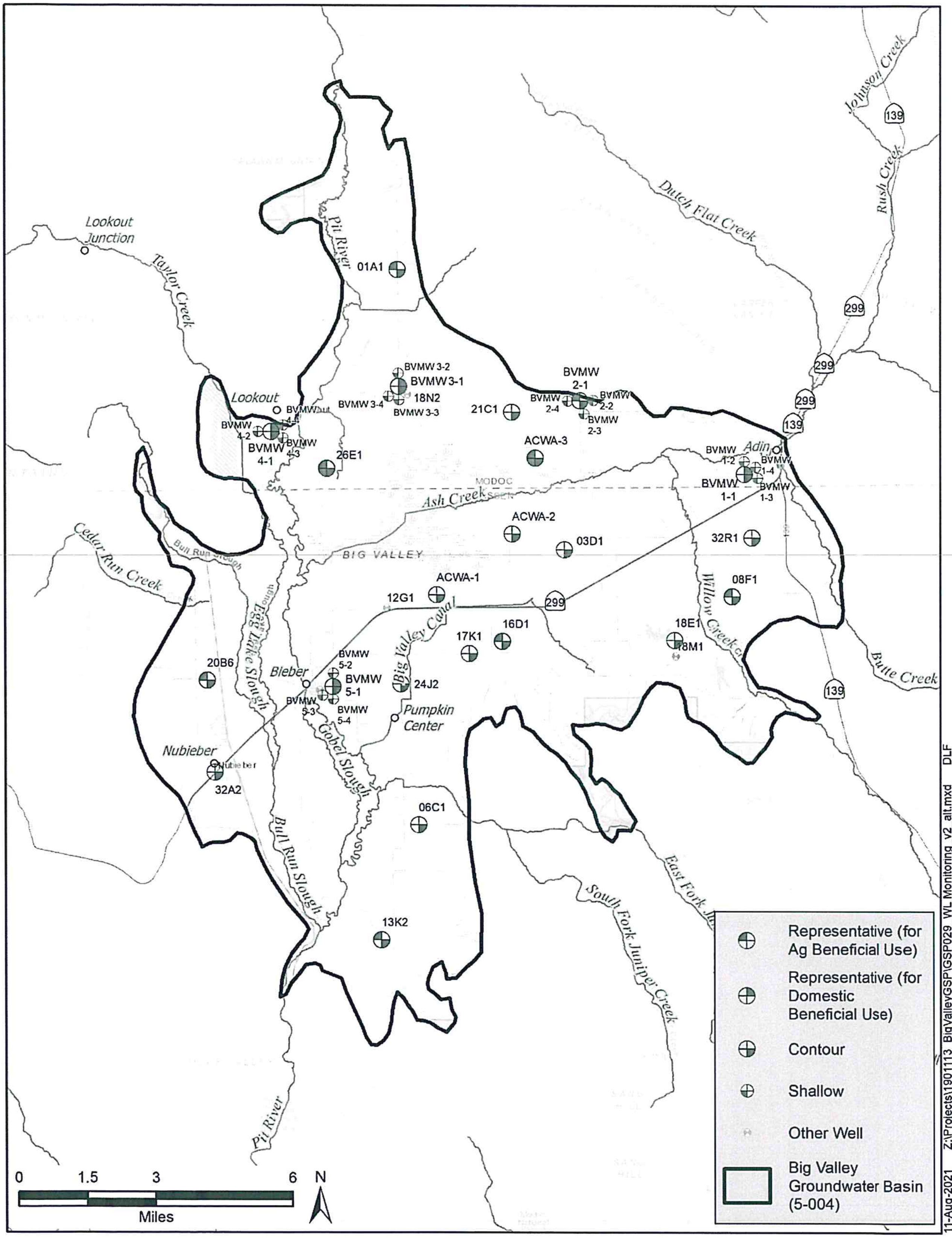


Figure ES-5 Groundwater Level Monitoring Networks

Table ES-2 Projects and Potential Implementation Timeline

No.	Category	Description	Estimated Time for Potential Implementation (years)		
			0-2	2-8	>8
1	9.1 Recharge Projects	AgMAR	X	X	X
2		Drainage and Basin Recharge	X	X	X
3		Ag Injection Wells			X
4	9.2 Research and Data Development	Stream Gages	X		
5		Refined Water Budget	X	X	
6		Agro-Climate Station	X		
7		Voluntary Installation of Well Meters	X	X	
8		Adaptive Management	X	X	X
9		Mapping and Land Use	X	X	
10	9.3 Increased Storage Capacity	Expanding Existing Reservoirs		X	
11		Allan Camp Dam			X
12	9.4 Improved Hydrologic Function	Forest Thinning and Management	X	X	X
13		Juniper Removal	X	X	X
14		Stream and Meadow Restoration	X	X	X
15	9.5 Water Conservation	Irrigation Efficiency	X	X	
16		Landscaping and Domestic Water Conservation	X	X	
17		Conservation Projects	X	X	
18	9.6 Education and Outreach	Public Communication	X		
19		Information and Data Sharing	X	X	
20		Fostering Relationships	X		
21		Compiling Efforts	X	X	
22		Educational Workshops	X		
22		Educational Workshops	X		

Note: AgMAR = Agricultural Managed Aquifer Recharge

- **Monitoring and Data Management:** Data collection and management will be required for both annual reporting and 5-year updates. Monitoring data that will be collected and stored in the data management system (DMS) for reporting will include water levels, precipitation, evapotranspiration, streamflow, water quality, land use and subsidence.
- **Annual Reporting:** According to §356.2 of the Regulations, the Big Valley GSAs are required to provide an annual report to DWR by April 1 of each year following the adoption of the GSP. The first annual report will be provided to DWR by April 1, 2022 and will include data for the prior Water Year (WY), which will be WY 2021 (October 1, 2020 to September 30, 2021), despite DWR's definition of a WY being inconsistent with what works for Big Valley. The Annual Report will establish the current conditions of groundwater within the BVGB, the status of the GSP implementation and the trend towards maintaining sustainability.
- **Plan Evaluation (5-Year Update)**: Updates and amendments to the GSP can be performed at any time, but at a minimum the GSAs must submit and update and evaluation of the plan every 5 years (§356.4). While much of the content of the GSP will likely remain unchanged for these

5-year updates, the Regulations require that most chapters of the plan be updated and supplemented with any new information obtained in the preceding 5 years.

Cost of Implementation

Cost is a fundamental concern to the GSAs and stakeholders in the BVGB, as the Basin is disadvantaged and there is little to no revenue generated in the counties to fund the state-mandated requirements of SGMA. Therefore, the GSAs will rely on outside funding to implement this unfunded, mandated Plan.