3.4.3.2 Relationship to Other Sustainability Indicators

Minimum thresholds are selected to avoid undesirable results for other sustainability indicators. In the Basin, groundwater levels are directly related to groundwater storage and groundwater dependent ecosystems outside of streams as discussed above. The relationship between groundwater level minimum thresholds and measurable objectives for other sustainability indicators are discussed below.

- **Groundwater Storage –** Groundwater levels are closely tied to groundwater storage, with high groundwater levels associated with high groundwater storage. The undesirable result for groundwater storage is measured and thus, defined as the occurrence of an undesirable result for groundwater elevations.
- **Depletions of Interconnected Surface Water –** Groundwater level defines the steepness of the hydraulic gradient between ISW and saturated groundwater, and hence the rate, volume, and direction of ISW depletion. Dropping groundwater levels can result in increased ISW depletion. Minimum thresholds for the depletion of ISWs are set in shallower wells along the streams. Minimum thresholds for chronic groundwater level decline set in deeper wells or further from the streams may not have direct and immediate impacts on streamflow depletion of ISWs. However, it should be acknowledged that long-term indirect impacts may be relevant to minimum thresholds set at such deeper and further wells. If minimum thresholds occur in the Basin, it is possible that the changes in the gradients caused by such declines impact or increase surface water depletion in ISWs.
- **Seawater Intrusion –** This sustainability indicator is not applicable in this Basin.
- **Groundwater Quality –** A significant and unreasonable condition for degraded water quality is exceeding drinking water standards for constituents of interest (COIs) in supply wells due to PMAs proposed in the GSP. Although lowering of groundwater levels does not directly cause degraded quality, groundwater quality could potentially be affected by projects and management action-induced changes in groundwater elevations and gradients. These changes could potentially cause poor quality groundwater to flow towards supply wells that would not have otherwise been impacted.
- **Subsidence –** Subsidence has not historically been observed in the Basin. The groundwater level SMC will ensure that there is no onset of subsidence in the future. The minimum threshold for water level is sufficiently close to historic water levels that under the hydrogeologic conditions prevalent in Ukiah Valley, no significant subsidence can occur due to lowering of water levels within the limits set by the minimum threshold.

3.4.4 Measurable Objectives – Chronic Lowering of Groundwater Levels

The MO is defined individually as the desired groundwater level for each RMP. Due to variant temporal coverage of groundwater elevation measurement at RMPs, different methods are used to set MOs similar to MTs. The MO elevation is set at the average observed groundwater elevation in Fall if the RMP has a longer historical measurement than the common CASGEM period starting from 2014 to 2015. Otherwise, the 75th percentile of the Fall depth to groundwater measurement is used as the MO. The 75th percentile represents a deeper depth to groundwater level than the average used in the other method. MOs are adjusted using a similar well-specific margin to MTs to account for the uncertainty in measuring the minimum and maximum annual groundwater level measurements. Comparison of measured groundwater elevations at RMPs and monitoring wells

is conducted based on the measurement frequency as explained in **Section 3.4.2**. Measurable objectives are shown in **Table 3.4** and **Figure 3.2**.

Based on the limited data available, the basin has not historically experienced a significant long-term decline in groundwater elevations. It is not in overdraft and has only experienced seasonal groundwater level decline during critical summer periods. Therefore, the historical average conditions will represent a sustainable basin that can provide the same benefits it has provided historically with no significant impacts on the beneficial uses and users in the basin. For the RMPs that do not have groundwater elevation measurements covering the most recent drought, their historical record will consist mostly of normal and wet water years from 2016 to 2020. Therefore, the 75th percentile of Fall groundwater elevations in those RMPs represents normal conditions and a healthy and recharged groundwater basin. This would also better correlate with the MOs set for other RMPs with longer historical records. As more data is gathered and better temporal coverage is available for these RMPs that cover multiple different water year types, the GSA may revise the MOs and use the average of historical records available for these wells.

The difference in groundwater levels between the measurable objective and primary trigger gives a margin of operational flexibility, or margin of safety, for variation in groundwater levels due to seasonal, annual, or drought variations. Groundwater levels might drop in drought years but rise in wet years to recharge the aquifer and offset the effects of drought years.

3.4.5 Path to Achieve Measurable Objectives – Chronic Lowering of Groundwater Levels

The GSA will support achievement of the measurable objectives by monitoring groundwater levels and coordinating with agencies and stakeholders within the Basin to implement PMAs. The GSA will review and analyze groundwater level data to evaluate any changes in groundwater levels resulting from groundwater pumping or recharge projects in the Basin. Using monitoring data collected as part of GSP implementation, the GSA will develop information (e.g., hydrograph plots) to demonstrate that projects and management actions are operating to maintain or improve groundwater level conditions in the Basin and to avoid unreasonable groundwater levels. Should groundwater levels drop to a trigger or minimum threshold as the result of GSA project implementation, the GSA will implement measures to address this occurrence. This process is illustrated in **Figure 3.4** that depicts the high-level decision making that goes into developing SMC, the monitoring to determine if criteria are met, and actions to be taken based on monitoring results.

To manage groundwater levels, the GSA will partner with local agencies and stakeholders to implement PMAs. PMAs are presented in further detail in **Chapter 4**. Implementation timelines and approximate costs are discussed in **Chapter 5**. Examples of possible GSA actions include stakeholder education and outreach and support for impacted stakeholders.

Where the cause of groundwater level decline is unknown, the GSA may choose to conduct additional or more frequent monitoring or initiate additional modeling. The need for additional studies on groundwater levels will be assessed throughout GSP implementation. The GSA may identify knowledge requirements, seek funding, and help to implement additional studies.

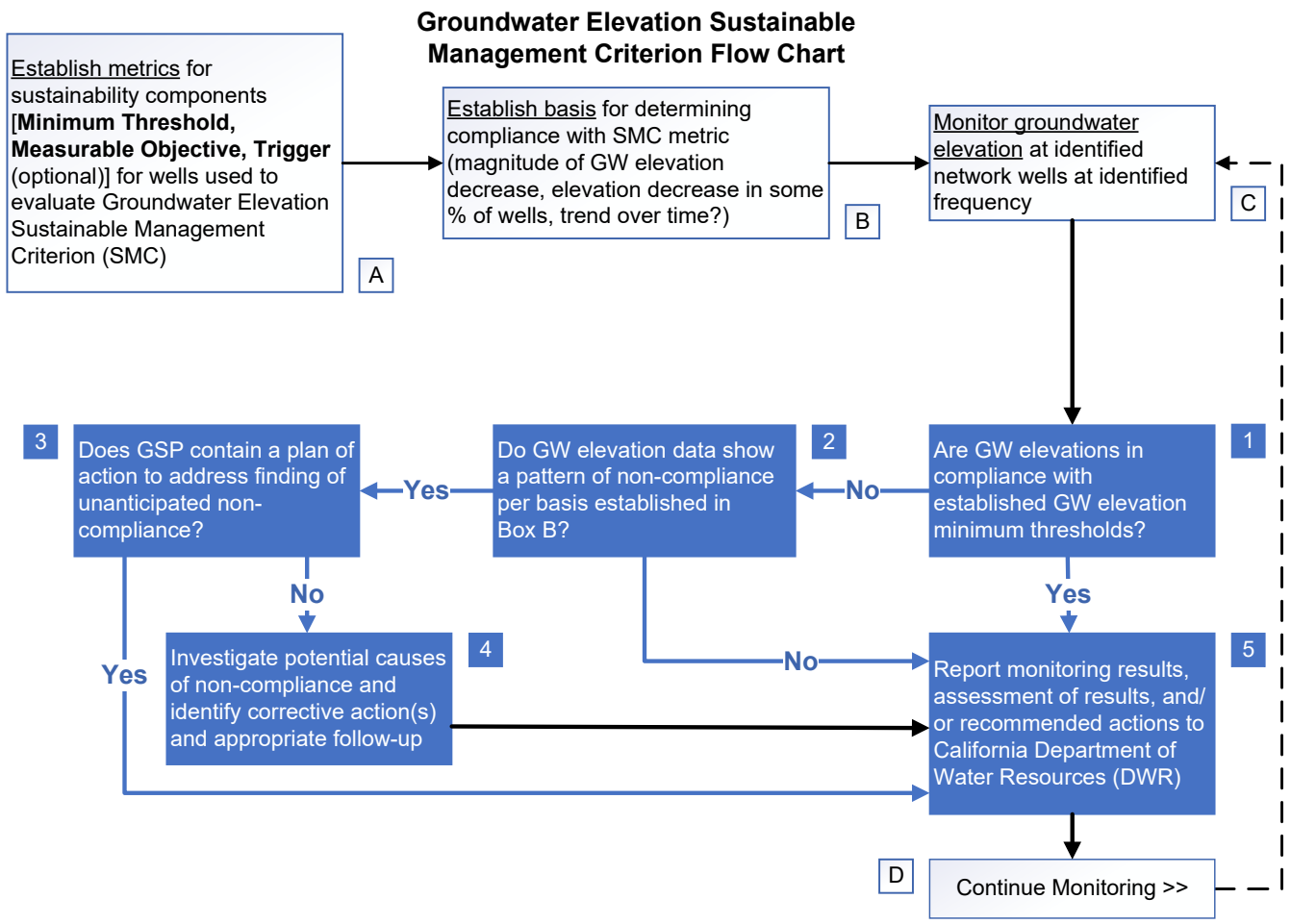

Figure 3.4: Groundwater level sustainable management criteria flow chart.

Interim Milestones

Three Interim Milestones (IMs) at five-year intervals were defined by dividing the range of operational flexibility between the MO and MT at each RMP into 4 regions, such that the Basin makes linear progress towards MOs in each five-year increment. For clarity, in five years following Plan submission (2027), it is projected that the Basin will make 25% progress towards MOs; in 10 years following Plan submission (2032), it is projected that the Basin will make 50% progress; in 15 years following Plan submission (2037) it is projected that the Basin will make 75% progress; and finally, in 20 years following Plan submission (2042), it is projected that the Basin will meet its long-term sustainability goal. Thus, the IMs in 2042 are equal to the MOs.

3.5 Sustainable Management Criteria - Reduction of Groundwater in Storage

Due to the direct correlation between groundwater levels and storage, groundwater levels are selected as the proxy for groundwater storage. Hence, the SMC for reduction of groundwater in storage are identical to the ones set for the chronic lowering of groundwater levels. According to the United States Geological Survey (USGS), estimates of groundwater storage rely on groundwater level data and sufficiently accurate knowledge of hydrogeologic properties of the aquifer. Direct measurements of groundwater levels can be used to estimate changes in groundwater storage (USGS 2020). As groundwater levels fall or rise, the volume of groundwater storage changes accordingly, where unacceptable groundwater level decline indicates unacceptable storage loss. The hydrogeologic model outlined in **Chapter 2** provides the needed hydrogeologic properties of the aquifer.

Protecting against chronic lowering of groundwater levels will directly protect against the chronic reduction of groundwater storage because the lowering of groundwater levels would directly lead to a predictable reduction of groundwater storage. There cannot be a reduction in groundwater storage without a commensurate, observable reduction in water levels. There are currently no other state, federal, or local standards that relate to this sustainability indicator in the Basin.

3.5.1 Undesirable Results – Reduction of Groundwater in Storage

An undesirable result from the reduction of groundwater in storage occurs when reduction of groundwater in storage interferes with beneficial uses of groundwater in the Basin. Since groundwater levels are being used as a proxy, the undesirable result for this sustainability indicator occurs if the Fall low groundwater level observations in more than a third of the RMPs in the Basin fall below their respective minimum thresholds for two consecutive years. **Table 3.4**, as defined by the undesirable result for the chronic lowering of groundwater levels. This should avoid significant and unreasonable changes to groundwater storage, including long-term reduction in groundwater storage or interference with the other sustainability indicators.

3.5.1.1 Potential Causes of Undesirable Results

Possible causes of undesirable reductions in groundwater storage are increases in well density or groundwater extraction or increases in frequency or duration of drought conditions. Similar impacts

can be generated from a significant changes in aquifers and surface water interactions in the basin such as changes to Coyote Valley Dam and Potter Valley Project releases.

3.5.1.2 Effects of Undesirable Results on Beneficial Uses and Users

As before, potential effects of undesirable results on beneficial uses and users of groundwater due to reduced groundwater storage are identical to those outlined due to chronic lowering of groundwater levels **Section 3.4.2.2**.

3.5.2 Minimum Thresholds – Reduction of Groundwater in Storage

The minimum threshold for groundwater storage for this GSP is the minimum threshold for groundwater levels. Information used to establish minimum thresholds and measurable objectives for groundwater levels can be found in **Section 3.4**.

3.5.2.1 Relationship to Other Sustainability Indicators

Since groundwater storage is defined in terms of water level, **Section 3.4.3.2** for the water level indicator equally applies to define the relationship of the groundwater storage SMC to other sustainability indicators.

3.5.3 Measurable Objectives – Reduction of Groundwater in Storage

The measurable objective for groundwater storage is the measurable objective for groundwater levels as described in **Section 3.4.4**. The path to achieve measurable objectives and interim milestones for the reduction in groundwater storage sustainability indicator are the same measurable objectives and interim milestones as for the chronic lowering of groundwater levels sustainability indicator described in **Section 3.4.5**.

3.6 Sustainable Management Criteria - Seawater Intrusion

Due to the distance between the Basin and the Pacific Ocean, bays, deltas, or inlets, seawater intrusion is not present and is not likely to occur within the Basin in the future and therefore, it is not an applicable sustainability indicator in the Basin.

3.7 Sustainable Management Criteria - Degraded Groundwater Quality

Groundwater quality in the Basin is generally well-suited for the municipal, domestic, agricultural, and other existing and potential beneficial uses designated for groundwater in the Basin Plan, as discussed in **Section 2.2.2.4** and in the water quality assessment in **Appendix 2-F**.

SMC are defined for nitrate and specific conductivity, which are consistent with the threats to groundwater quality highlighted in the Staff Report for the North Coast Hydrologic Region Salt and Nutrient Management Planning Groundwater Basin Evaluation and Prioritization.[3] The GSA is committed to monitor for other naturally occurring COIs, namely boron, iron and manganese, which have been shown to occur in parts of the Basin. As part of the sustainability goal for the Basin, the specific objective for groundwater quality is to maintain a groundwater resource that meets the water quality needs of beneficial uses and users in the Basin, as regulated by federal and state water quality standards and regional water quality objectives. Avoiding significant degradation of groundwater quality is central to protecting uses that rely on groundwater. Categories of beneficial uses of groundwater in the North Coast Region, as listed in the Basin Plan, include municipal and domestic supply, agricultural supply, industrial supply, aquaculture, and Native American culture. Specific uses of groundwater in the Basin include groundwater use for irrigation in agriculture, a significant part of the local economy, as stock water, and as a municipal and domestic water source. Importantly, beneficial uses also include groundwater dependent ecosystems and instream habitat where and when groundwater contributes to streamflow.

The role of the GSA is to provide additional local oversight of groundwater quality, collaborate with appropriate parties to implement water quality PMAs, and to evaluate and monitor, as needed, water quality effects of PMAs implemented to meet the requirements of other SMC. All future PMAs implemented by the GSA will be evaluated and designed to avoid causing undesirable groundwater quality outcomes. Federal and state standards for water quality, water quality objectives defined in the Basin Plan, and the management of known and suspected contaminated sites within the Basin will continue to be managed by the relevant agency. Groundwater in the Basin is used for a variety of beneficial uses which are protected by NCRWQCB through the water quality objectives adopted in the Basin Plan.

Available historical and current groundwater quality monitoring data and reporting efforts have been used to establish and document conditions in the Basin, as discussed in **Section 2.2.2.4**. These conditions provide a baseline upon which to compare future groundwater quality and identify any changes observed, including those due to GSP implementation. Groundwater quality monitoring in the Basin in support of the GSP will rely on the existing and planned wells in the monitoring network, as described in **Section 3.7.1**. Groundwater quality samples will be collected and analyzed in accordance with the monitoring protocols outlined in **Section 3.7.1.3**. The monitoring network will use information from existing programs in the Basin that either already monitor for the COIs or programs where these constituents could be added as part of routine monitoring efforts in support of the GSP. New wells will be incorporated into the network as necessary to obtain information to fill spatial gaps in data or to gather data that cannot be collected at existing wells. Because water quality degradation is typically associated with increasing rather than decreasing concentration of constituents, the GSA uses the term “maximum threshold” (MaxT) in the context of water quality instead of “minimum threshold.” The use of the term maximum threshold for this SMC is equivalent to the use of the term minimum threshold in other SMC or in the SGMA regulations.

[3] https://www.waterboards.ca.gov/northcoast/board_info/board_meetings/04_2021/pdf/3/210316_CJW_er_Groundwater%20Basins%20-%20Staff%20Report.pdf

3.7.1 Groundwater Quality Monitoring Network

3.7.1.1 Description of Monitoring Network

The objective of the groundwater quality monitoring network design is to capture sufficient spatial and temporal detail to understand groundwater quality in the Basin. The monitoring network data will provide an ongoing water quality record for future assessments of groundwater quality. The spatial and temporal coverage of the groundwater quality monitoring network and the data it collects will be designed to allow the GSA to take an effective and efficient adaptive management approach in protecting groundwater quality, to minimize the risk for exceeding maximum water quality thresholds, to support the GSA in implementing timely water quality projects and actions, and ultimately to meet water quality objectives throughout the Basin.

The monitoring network will use information from existing programs in the Basin that already monitor for the COIs, or programs where these constituents could be added as part of routine monitoring efforts in support of the GSP. Apart from a few open contamination sites, the Basin currently has very good groundwater quality, as described in **Section 2.2.2.4**. Existing wells used for monitoring groundwater quality in the Basin include public water supply wells, monitoring wells at the City of Ukiah wastewater treatment plant, monitoring wells at known groundwater contamination sites within the Basin, and TSS-funded wells drilled for GSP monitoring (**Table 3.6**). Existing wells perforated within a single aquifer are considered to be included in the monitoring network (**Figure 3.5** and **Table 3.7**). Coordination will be conducted between existing monitoring programs and the GSA to develop an agreement for data collection responsibilities, monitoring protocols, and data reporting. Groundwater quality samples will be collected and analyzed in accordance with the monitoring protocols outlined in **Section 3.7.1.3**. GSA-owned wells (TSS-funded wells) will be monitored following the same monitoring protocols and determined frequency.

The frequency and timing of groundwater quality monitoring will be evaluated to ensure that the evaluation of seasonal, short-term, and long-term trends is possible. Groundwater quality sampling frequencies have been recommended for trend monitoring and surveillance for different aquifer types, flow mediums, and well depths. For the conditions in the Basin, an annual frequency, or per study design is recommended.[4] However, sample frequency requirements may change based on a number of factors including the variability in groundwater quality data and future changes in land use.

In the current groundwater quality monitoring network, eighteen wells are assigned to monitor nitrate on an annual basis and specific conductivity once every three years. From these wells, five are measuring Aquifer I water quality and thirteen wells are sampling Aquifer II. Sixteen wells are designed to monitor iron, manganese, and boron once every three years. Four of these sixteen wells sample Aquifer I and the rest measures the quality of Aquifer II.

[4] https://acwi.gov/sogw/ngwmn_framework_report_july2013.pdf

Table 3.6: Elements of the groundwater quality monitoring network.

Constituent	# of wells in Aquifer I	# of wells in Aquifer II	Sampling Frequency (Months)	Program
Boron	5	8	36	DDW Monitoring (SDWIS), WWTP NPDES Monitoring (CIWQS), GSA Monitoring
Iron	5	8	36	DDW Monitoring (SDWIS), WWTP NPDES Monitoring (CIWQS), GSA Monitoring
Manganese	5	8	36	DDW Monitoring (SDWIS), WWTP NPDES Monitoring (CIWQS), GSA Monitoring
Nitrate as N	6	9	12	DDW Monitoring (SDWIS), WWTP NPDES Monitoring (CIWQS), GSA Monitoring
Specific Conductivity	6	9	12	DDW Monitoring (SDWIS), WWTP NPDES Monitoring (CIWQS), GSA Monitoring

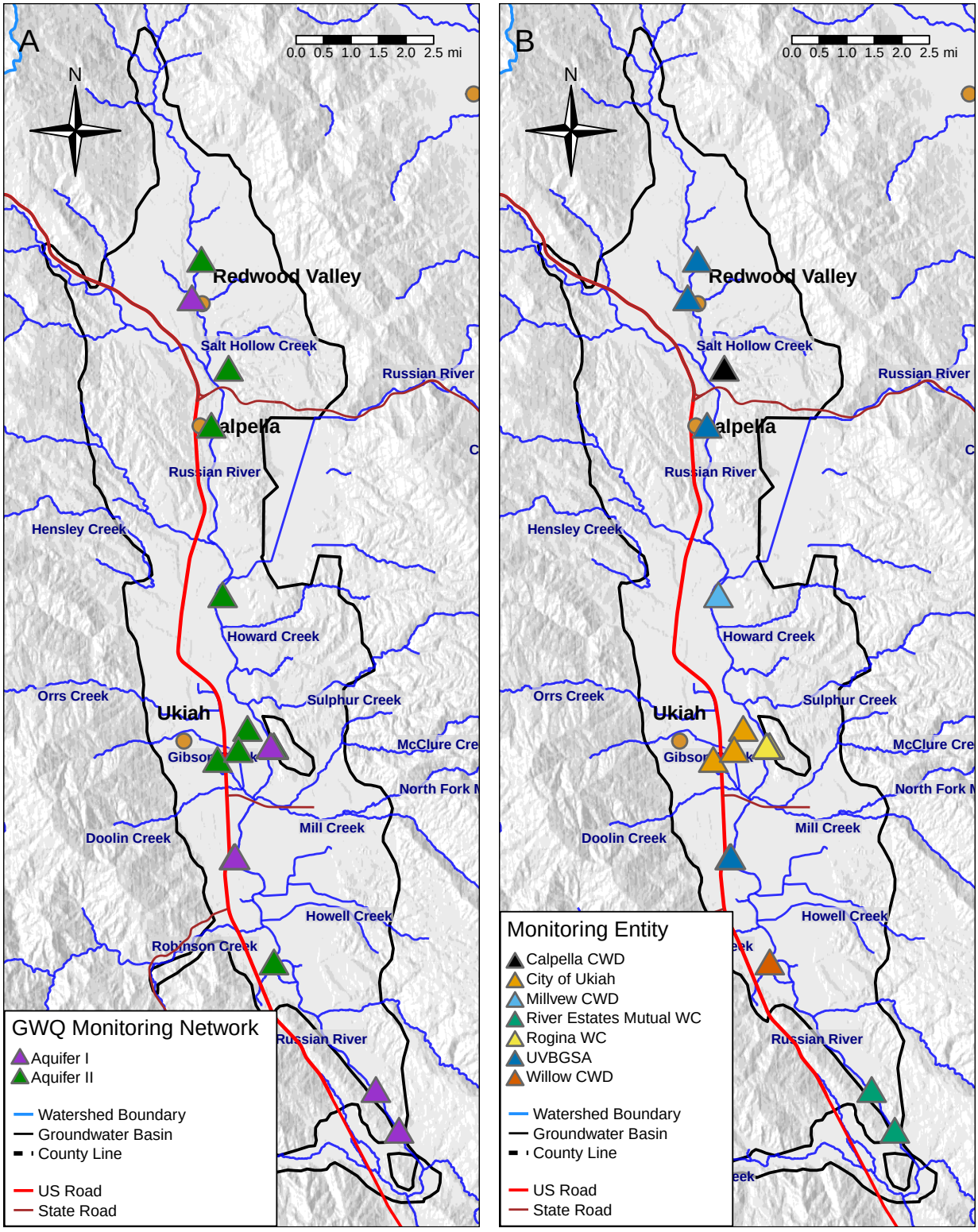

Figure 3.5: Groundwater quality monitoring network for (a principal aquifer I, and, (2) principal aquifer II.

Table 3.7: Groundwater quality monitoring network wells and COI sampling frequency.

Montoring Well Information					Monitoring Frequency (Months)				
Well ID	Monitoring Entity	Aquifer	Top of Perforation	Bottom of Perforation	Iron	Manganese	Nitrate	Specific Conductivity	Boron
2300605-001	River Estates Mutual WC	Aq-I	0	10	36	36	12	36	36
2300605-003	River Estates Mutual WC	Aq-I	0	10	-	-	12	36	-
2310003-004	City of Ukiah	Aq-II	15	115	36	36	12	36	36
2310003-028	City of Ukiah	Aq-II	-	-	-	-	12	36	-
2310003-029	City of Ukiah	Aq-II	-	-	-	-	12	36	-
2310002-001	Rogina WC	Aq-II	18	98	36	36	12	36	36
2310002-002	Rogina WC	Aq-II	45	124	36	36	12	36	36
2310002-005	Rogina WC	Aq-I	27	48	36	36	12	36	36
2310002-009	Rogina WC	Aq-I	-	-	36	36	12	36	36
2310006-009	Millvew CWD	Aq-II	28	43	36	36	12	36	36
2300507-001	Calpella CWD	Aq-II	148	400	36	36	12	36	36
2310005-001	Willow CWD	Aq-II	22	82	36	36	12	36	36
2310005-004	Willow CWD	Aq-II	35	100	36	36	12	36	36
UVBGSA-01a	UVBGSA	Aq-I	25	35	36	36	12	36	36
UVBGSA-06b	UVBGSA	Aq-I	55	75	36	36	12	36	36
UVBGSA-05	UVBGSA	Aq-II	20	70	36	36	-	-	36
UVBGSA-07	UVBGSA	Aq-II	20	70	36	36	12	36	36

3.7.1.2 Assessment and Improvement of Monitoring Network (Reg. § 354.38)

While the current selection provides sufficient coverage to assess overall groundwater quality in the basin, there exist areas and localities where wells were not available to monitor one or both principal aquifers. An assessment of the monitoring results for both spatial density and monitoring frequency suitability based on the proposed monitoring network will be performed to determine the need for expansion of the network with additional wells. This assessment is planned within the first five years of GSP implementation. Further evaluations of the monitoring network will be conducted on a five-year basis, particularly with regard to the sufficiency of the monitoring network in meeting the GSP's monitoring objectives. The monitoring network may be modified or expanded in the future based on an evaluation of the data collected or changes in land use.

3.7.1.3 Protocols for Data Collection and Monitoring (Reg. § 352.2)

Sample collection will follow the USGS National Field Manual for the Collection of Water Quality Data (Wilde, 2008) and Standard Methods for the Examination of Water and Wastewater (Rice, Bridgewater, American Public Health Association, & Water Environment Federation., 2012), as applicable, in addition to the general sampling protocols listed below.

The following section provides a brief summary of monitoring protocols for sample collection and testing for groundwater quality. Establishment of these protocols will ensure that data collected for groundwater quality are accurate, representative, reproducible, and contain all required information. All sample collection and testing for water quality in support of this GSP is required to follow the established protocols for consistency throughout the Basin and over time. All testing of groundwater quality samples will be conducted by laboratories with certification under the California Environmental Laboratory Accreditation Program (ELAP). These monitoring protocols will be updated as necessary and will be re-evaluated every five years.

Wells used for sampling are required to have a distinct identifier, which must be located on the well housing or casing. This identifier will also be included on the sample label to ensure traceability.

Event Preparation:

- Before the sampling event, coordination with any laboratory that will be used for sample analysis is required. Coordination must include scheduling laboratory time for sample testing, and a review of the applicable sample holding times and preservation requirements that must be conducted before the sampling event.
- Sample labels must include the sample ID, well ID, sample date and time, personnel responsible for sample collection, any preservative in the sample container, the analyte to be analyzed, and the analytical method to be used. Sample containers may be labeled prior to, or during, the sampling event.

Sample Collection and Analysis:

- Sample collection must occur at, or close to, the wellhead for wells with dedicated pumps and may not be collected after any treatment, from tanks, or after the water has traveled through long pipes. Prior to sample collection, the sample collector should clean all sampling equipment and the sampling port. The sample equipment must also be cleaned with any change at each new sample location or well.

- Sample collection in wells with low-flow or passive sampling equipment must follow protocols outlined in the EPA's low-flow (minimal drawdown) ground-water sampling procedures (Puls & Barcelona, 1996) and USGS Fact Sheet 088-00 (USGS Fact Sheet 088-01, 2000), respectively. Prior to sample collection in wells without low-flow or passive sampling equipment, at least three well casing volumes should be purged prior to sample collection to make sure ambient water is being tested. The sample collector should use best professional judgment to ensure that the sample is representative of ambient groundwater. If a well goes dry, this should be noted, and the well should be allowed to return to at least 90% of the original level before a sample is collected.
- Sample collection should be completed under laminar flow conditions.
- Samples must be collected in accordance with appropriate guidance and standards and should meet specifications for the specific constituent analyzed and associated data quality objectives.
- In addition to sample collection for the target analyte (e.g., nitrate), field parameters, including temperature, pH, and specific conductivity, must be collected at every site during well purging. Field parameters should stabilize before being recorded and before samples are collected. Field instruments must be calibrated daily and checked for drift throughout the day.
- Samples must be chilled and maintained at a temperature of 4°C and maintained at this temperature until delivered to the laboratory responsible for the analysis.
- Chain of custody forms are required for all sample collection and must be delivered to the laboratory responsible for analysis of the samples to ensure that samples are tested within applicable holding limits.
- Laboratories must use reporting limits that are equivalent, or less than, applicable data quality objectives.

3.7.2 Undesirable Results – Degraded Groundwater Quality

Significant and unreasonable degradation of groundwater quality is the degradation of water quality that would impair beneficial uses of groundwater within the Basin or result in failure to comply with groundwater regulatory thresholds including state and federal drinking water standards and Basin Plan water quality objectives. Based on the State's 1968 antidegradation policy[5], water quality degradation that is not consistent with the provisions of Resolution No. 68-16 is degradation determined to be significant and unreasonable. Furthermore, the violation of water quality objectives is significant and unreasonable under the state's antidegradation policy. The NCRWQCB and the State Water Board are the two entities that determine if degradation is inconsistent with Resolution No. 68-16.

Federal and state standards for water quality, water quality objectives defined in the Basin Plan, and the management of known and suspected contaminated sites within the Basin will continue to be managed by the relevant agency (NCRWQCB). The role of the GSA is to provide local oversight of groundwater quality, collaborate with appropriate parties to implement water quality projects and actions, and to evaluate and monitor, as needed, water quality effects of projects and actions implemented to meet the requirements of other sustainable management criteria.

Groundwater in the Basin is used for a variety of beneficial uses including agriculture, domestic use, and municipal water supply. Groundwater is also an important component of streamflow and its water quality benefits GDEs and instream environmental resources. These beneficial uses, among others, are protected by the NCRWQCB through the water quality objectives adopted in the Basin Plan. Project and management actions implemented as a result of the GSP need to consider, and monitor for, potential impacts to groundwater quality that could cause degradation below these water quality objectives and affect key beneficial uses of groundwater in the Basin.

The COIs identified in the Basin, and their associated regulatory thresholds, are listed in **Section 2.2.2.4**. Undesirable results are experienced if the maximum thresholds are exceeded at 50% or more of the groundwater quality monitoring wells sampled in the respective sampling period for any COIs with a defined maximum threshold.

3.7.2.1 Potential Causes of Undesirable Results

Future GSA activities with potential to affect water quality may include changes in location and magnitude of Basin pumping, declining groundwater levels, and groundwater recharge projects. Altering the location or rate of groundwater pumping could change the direction of groundwater flow which could result in movement of the known existing plumes or future contaminant plumes toward supply wells.

Land use activities not associated with the GSA that may lead to undesirable groundwater quality include future contamination from urban and industrial sources, the application of fertilizers, certain agricultural practices, and/or waste discharges that may result in exceedances of water quality objectives in groundwater. Existing leaks from USTs in the Basin are currently monitored and managed, and though additional degradation is not anticipated from these known sources, new leaks may cause undesirable results due to constituents that, depending on the contents of a UST, may include petroleum hydrocarbons, solvents, or other contaminants. Agricultural activities in

[5] State Water Resources Control Board. "Resolution No. 68-16: Statement of Policy with Respect to Maintaining High Quality of Waters in California," California, October 28, 1968.

the Basin are dominated by grape, pear, pasture, and cannabis production. The risk for fertilizer-associated nitrate leaching from these activities has been historically low and nitrate pollution was not observed in historical water quality data (**Section 2.2.2.4**). NCRWQCB Resolution NO. R1-2021-0006 listed the Basin as high priority for the threat of water quality degradation from salts and nutrients. The prioritization system used as the basis for the resolution relies on several attributes that can potentially contribute to salts and nutrients production and threat but does not indicate an existing problem or threat within the basin. The prioritization is intended to be used to direct NCRWQCB resources and focus in the near future according to the resolution and does not indicate any requirement for the Basin to develop a SNMP at this stage.

3.7.2.2 Effects of Undesirable Results on Beneficial Uses and Users

Concerns over potential or actual non-attainment of the beneficial uses designated for groundwater in the Basin are and will continue to be related to certain constituents measured at elevated or increasing concentrations, and the potential local or regional effects that degraded water quality can have on such beneficial uses. As mentioned in **Section 2.1.1.1**, DACs and SDACs cover most of the Basin. Therefore, impacts on other beneficial users indicated below represent impacts on DACs and SDACs.

The following provides greater detail regarding the potential impact of poor groundwater quality on the major classes of beneficial users:

- **Municipal Drinking Water Users –** Under California law, agencies that provide drinking water are required to routinely sample groundwater from their wells and compare the results to state and federal drinking water standards for individual chemicals. Groundwater quality that does not meet state drinking water standards may render the water unusable or may cause increased costs for treatment. For municipal suppliers, impacted wells potentially may be taken offline until a solution is found, depending on the configuration of the municipal system in question. Where this temporary solution is feasible, it will add stress to and decrease the reliability of the overall system.
- **Rural and/or Agricultural Residential Drinking Water Users –** Residential structures not located within the service areas of the local municipal water agency will typically have private domestic groundwater wells. Such wells may not be monitored routinely and groundwater quality from those wells may be unknown unless the landowner has initiated testing and shared the data with other entities. Degraded water quality in such wells can lead to rural residential use of groundwater that does not meet potable water standards and results in the need for installation of new or modified domestic wells and/or well-head treatment that will provide groundwater of acceptable quality.
- **Agricultural Users –** Irrigation water quality is an important factor in crop production and has a variable impact on agriculture due to different crop sensitivities. Impacts from poor water quality may include declines in crop yields, crop damage, changes in the crops that can be grown in an area, and other effects.
- **Environmental Uses –** Poor quality groundwater may result in the migration of contaminants that could affect groundwater dependent ecosystems or instream environments and their resident species. Poor quality groundwater may also add nutrients to water bodies that produce adverse ecological effects, including eutrophication.

Table 3.8: Constituents of interest and their associated maximum thresholds and measurable objectives.

Constituent	Reason for Concern	Maximum Threshold	Measurable Objective
Nitrate as N	Tracking sustainability	5 mg/L, trigger only 10 mg/L	7.5 mg/L
Specific Conductivity	Tracking sustainability	450 micromhos, trigger only 900 micromhos	675 micromhos
Boron	Naturally occurring	-	-
Iron	Naturally occurring	-	-
Manganese	Naturally occurring	-	-

3.7.3 Maximum Thresholds – Degraded Groundwater Quality

Maximum thresholds for groundwater quality in the Basin were defined using existing groundwater quality data, beneficial uses of groundwater in the Basin, existing regulations, including water quality objectives under the Basin Plan, Title 22 MCLs and SMCLs, and consultation with the GSA advisory committee and stakeholders (see **Section 2.2.2.4**). As a result of this process, five COIs were defined in the Basin: boron, iron, manganese, nitrate, and specific conductivity. Concentrations of each of these five constituents were obtained from existing data derived from existing monitoring programs. From these five constituents, boron, iron, and manganese are known to be naturally occurring in the basin at higher concentrations than their water quality objectives. Therefore, they will be monitored as part of the monitoring network and results will be communicated with appropriate regulatory entities. However, sustainable management criteria are not set for boron, iron, and manganese since their concentrations are not representative of the general water quality of the Basin and are impacted significantly by natural processes and local geological conditions that are not controllable by the GSA.

Maximum thresholds for the other two COIs (nitrate and specific conductivity) are set at the MCL (nitrate as N) or SMCL (specific conductivity) established in Title 22 of the California Code of Regulations (**Table 3.8**).

Triggers

The GSA will use concentrations of the identified COIs as triggers for preventative action in order to proactively avoid the occurrence of undesirable results and maintaining the good water quality within the basin. Trigger values are identified for nitrate and specific conductivity, as indicated in **Table 3.8** and set at 50 percent of a constituent's maximum threshold. Both triggers are set to lower values than measurable objectives set below to provide the GSA with sufficient time for coordination and developing and implementing management actions to maintain groundwater quality at or below the measurable objectives and at existing conditions.

3.7.4 Information and Methodology Used to Establish Maximum Thresholds and Measurable Objectives

COIs were specifically selected due to measured exceedances in the past 30 years (boron, iron, manganese), importance for tracking sustainability in the future (nitrate and specific conductivity), and/or stakeholder input and prevalence as a groundwater contaminant in California (nitrate and specific conductivity). A detailed discussion of the concerns associated with elevated levels of each constituent of interest is described in **Section 2.2.2.4**. As the COIs were identified using current and historical groundwater quality data, this list may be reevaluated during future GSP updates. In establishing maximum thresholds for groundwater quality, the following information was considered:

- Feedback about water quality concerns from stakeholders.
- An assessment of available historical and current groundwater quality data from production and monitoring wells in the Basin.
- An assessment of historical compliance with federal and state drinking water quality standards and Basin Plan water quality objectives.
- An assessment of trends in groundwater quality at selected wells with adequate data to perform the assessment.
- Information regarding sources, control options, and regulatory jurisdiction pertaining to COIs.
- Input from stakeholders resulting from the consideration of the above information in the form of recommendations regarding maximum thresholds and associated management actions.

The historical and current groundwater quality data used in the effort to establish groundwater quality maximum thresholds are discussed in **Section 2.2.2.4**. Based on a review of these data, applicable water quality regulations, Basin water quality needs, and information from stakeholders, the GSA reached a determination that the state drinking water standards (MCLs, SMCLs, and WQOs) are appropriate to define maximum thresholds for groundwater quality. The established maximum thresholds for groundwater quality protect and maintain groundwater quality for existing or potential beneficial uses and users. Maximum thresholds align with state drinking water standards, which are derived from the MCLs in Title 22 of the California Code of Regulations. The more stringent water quality objectives for specific conductivity, specified in the Basin Plan, are reflected in the trigger values defined for this constituent. New COIs may be added with changing conditions and as new information becomes available.

Method for Quantitative Measurement of Maximum Thresholds

Groundwater quality will be measured in wells in the monitoring network, as discussed in **Section 3.5.1**. The maximum threshold values for constituent concentrations are shown in **Table 3.8**. **Figure 3.6** shows corresponding rulers for nitrate and specific conductivity, including the associated maximum thresholds, range of measurable objectives, and triggers.

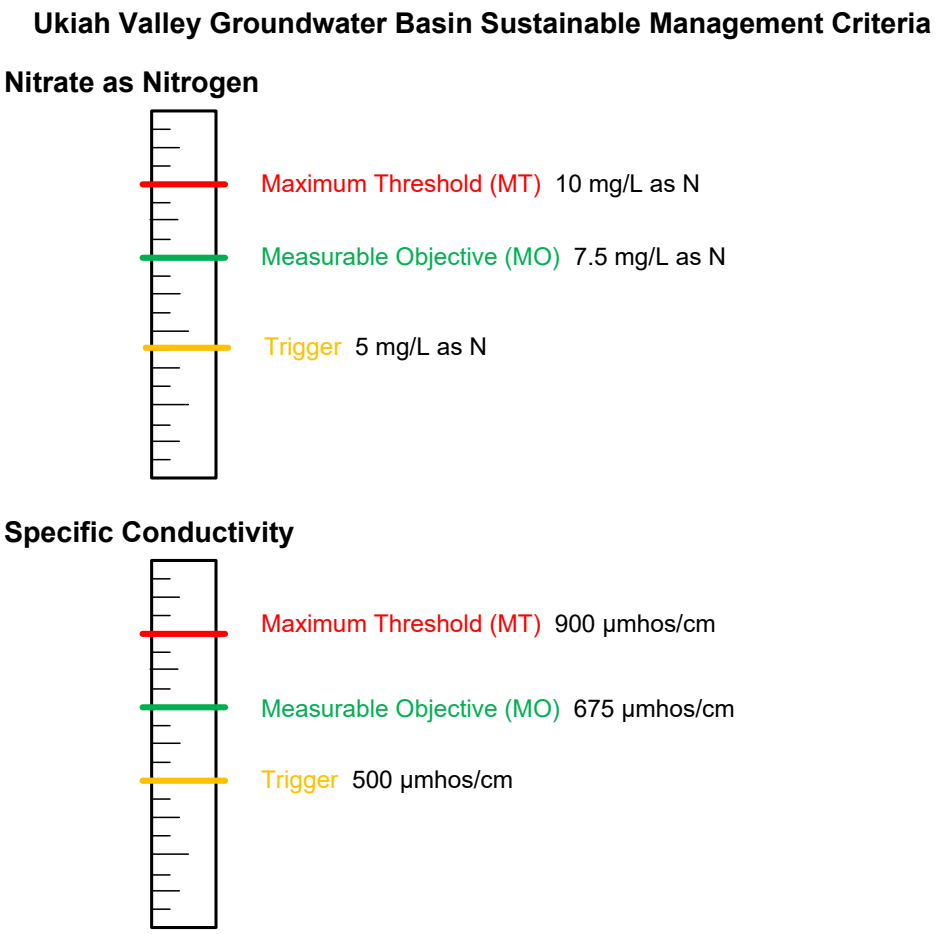

Figure 3.6: Degraded water quality sustainable management criteria.

3.7.4.1 Relationship to Other Sustainability Indicators

Groundwater quality cannot typically be used to predict responses of other sustainability indicators. However, groundwater quality may be affected by groundwater levels and reductions in groundwater storage. In addition, certain implementation actions may be limited by the need to achieve minimum thresholds for other sustainability indicators.

- **Groundwater Levels –** Declining water levels can potentially lead to increased concentrations of COIs in groundwater, may alter the existing hydraulic gradient, and may result in movement of contaminated groundwater plumes. Changes in water levels also may mobilize contaminants that may be present in unsaturated soils. The maximum thresholds established for groundwater quality may influence groundwater level minimum thresholds by affecting the location or number of projects, such as groundwater recharge, in order to avoid degradation of groundwater quality.
- **Groundwater Storage –** Groundwater quality that is at or near maximum thresholds is not likely to influence pumping.
- **Depletion of Interconnected Surface Waters –** Groundwater quality that is at or near maximum thresholds may affect stream water quality.
- **Seawater Intrusion –** This sustainability indicator is not applicable in this Basin.
- **Subsidence –** Groundwater quality minimum thresholds do not impact subsidence in the Basin.

3.7.5 Measurable Objectives - Degraded Groundwater Quality

Measurable objectives for water quality are established to provide an indication of desired water quality at levels that are sufficiently protective of beneficial uses and users while considering a reasonable margin of operational flexibility from the maximum thresholds. Measurable objectives are defined on a well-specific basis, with consideration for historical water quality data. To establish a quantitative measurable objective that protects uses and users from unreasonable water quality degradation, the GSA has decided to establish a list of COIs, which include boron, iron, manganese, nitrate, and specific conductivity. As for the MaxT, measurables objective are defined for constituents that are determined not to be significantly driven by natural processes, namely nitrate and specific conductivity. Naturally occurring COIs (boron, manganese, and iron) will be continuously monitored and tracked and changes in their concentrations and trends will be communicated with appropriate authorities.

Specifically, for nitrate and specific conductivity, the measurable objective is to maintain groundwater quality at a minimum of 90% of wells monitored for water quality at under 75% of the maximum threshold. GSA identified this unified approach as appropriate because there has been no significant number of exceedances in concentrations of nitrate and measured levels of specific conductivity in the Basin historically. Therefore, the set measurable objectives maintain a reasonable margin of operational flexibility from the maximum thresholds while maintaining acceptable groundwater quality in the basin. As mentioned above, triggers are set at lower concentrations than measurable objectives to help the GSA maintain groundwater quality at existing conditions and at or below the measurable objectives.

3.7.6 Path to Achieve Measurable Objectives - Degraded Water Quality

The GSA will support the protection of groundwater quality by monitoring groundwater quality conditions and coordinating with other regulatory agencies that work to maintain and improve the groundwater quality in the Basin. All future projects and management actions implemented by the GSA will comply with state and federal water quality standards and Basin Plan water quality objectives and will be designed to maintain groundwater quality for all uses and users and avoid causing unreasonable groundwater quality degradation. The GSA will review and analyze groundwater monitoring data as part of GSP implementation in order to evaluate any changes in groundwater quality, including those changes resulting from groundwater pumping or recharge projects in the Basin. The need for additional studies on groundwater quality will be assessed throughout GSP implementation. The GSA may identify knowledge requirements, seek funding, and help to implement additional studies.

Using monitoring data collected as part of project implementation, the GSA will develop information (e.g., time-series plots of water quality constituents) to demonstrate that PMAs are operating to maintain or improve groundwater quality conditions in the Basin and to avoid unreasonable groundwater quality degradation. Should the concentration of a constituent of interest increase to its maximum threshold (or a trigger value below that threshold), the GSA will determine an appropriate response based on the process illustrated in **Figure 3.7**, which depicts the high-level decision making that goes into developing SMC, the monitoring to determine if criteria are met, and actions to be taken based on monitoring results. Exceedances of the COIs water quality objectives will also be referred to the NCRWQCB. Where the cause of an exceedance is unknown, the GSA may choose to conduct additional or more frequent monitoring.

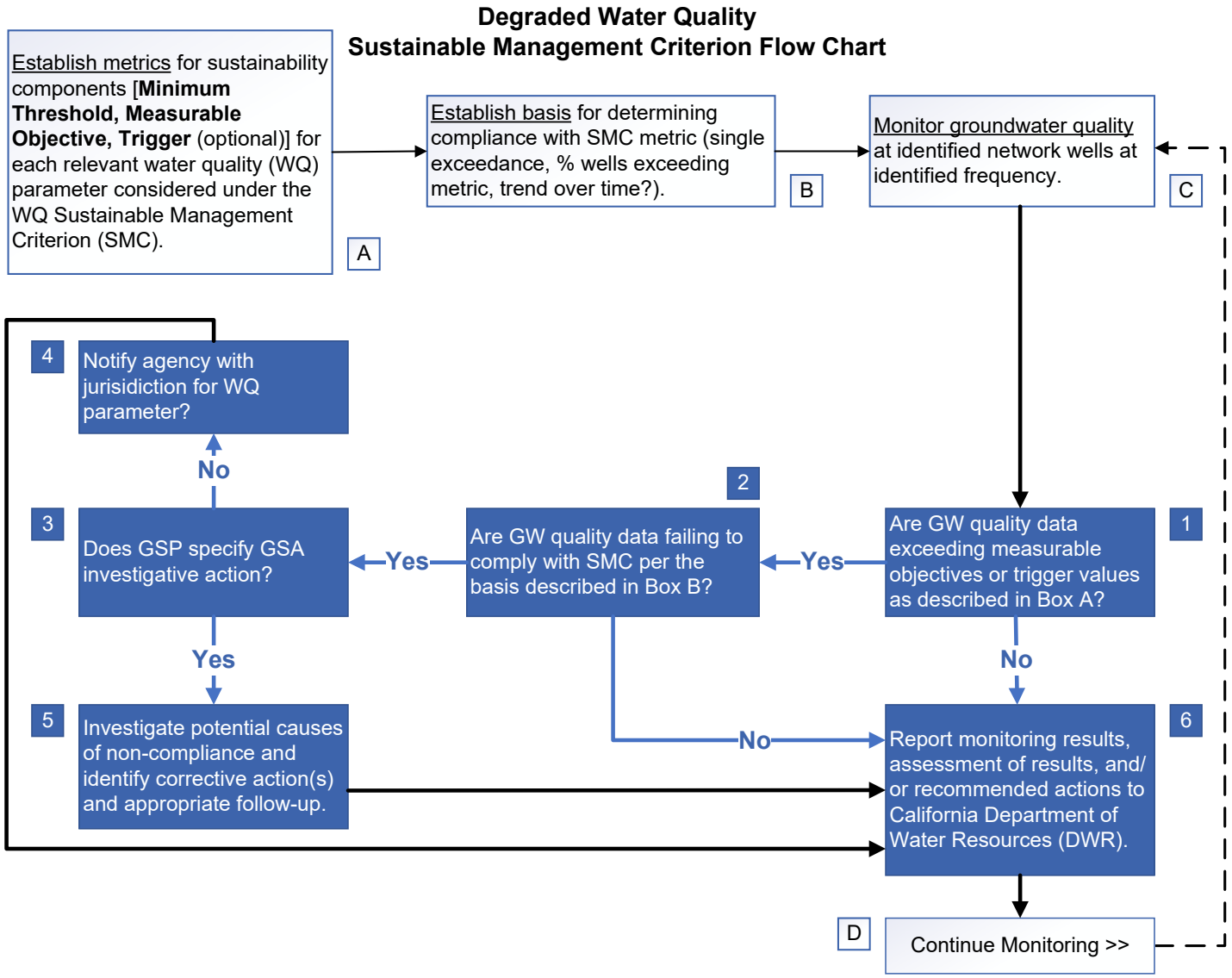

Figure 3.7: Degraded water quality sustainable management criteria flow chart.

Interim Milestones

As existing groundwater quality data indicate that groundwater in the Basin generally meets applicable state and federal water quality standards, the objective is to maintain existing groundwater quality. Interim milestones are therefore set equivalent to the measurable objectives with the goal of maintaining water quality within the historical range of values. The approach for sites that exceed existing state or federal standards will be coordinated with the relevant agency having jurisdiction over the site.

3.8 Sustainable Management Criteria - Land Subsidence

Groundwater extraction and lowering of groundwater levels can lead to subsidence of the ground surface that may occur elastically or inelastically. While inelastic land subsidence is generally irreversible and permanent, elastic land subsidence is the small, reversible lowering and rising of the ground surface.

3.8.1 Subsidence Monitoring Network

3.8.1.1 Description of Monitoring Network

DWR provides vertical displacement estimates derived from InSAR data collected by the European Space Agency (ESA) Sentinel-1A satellite and processed under contract by TRE ALTAMIRA Inc. Point data are average vertical displacements of a 328-by-328 ft (100-by-100-m) area and Geographic Information System (GIS) rasters are interpolated from the point data. As shown in **Figure 3.8**, spatial distribution of the point data covers most of the Basin and the entire Basin area is covered through interpolation of rasters. The data provide good temporal coverage and are available on multiple timescales. The annual rasters begin and end on each month of the covered year and the cumulative rasters are available for the full time period (2015 to 2019). Monthly timeseries are available for each point data location.

Representative Monitoring

DWR/TRE ALTAMIRA InSAR data will be used to monitor subsidence in the Basin. There are no explicitly identified representative subsidence sites because the satellite data are based on thousands of points. **Figure 3.8** shows the coverage of the subsidence monitoring network, which will monitor potential surface deformation trends related to subsidence. Data from the subsidence monitoring network will be reviewed annually.

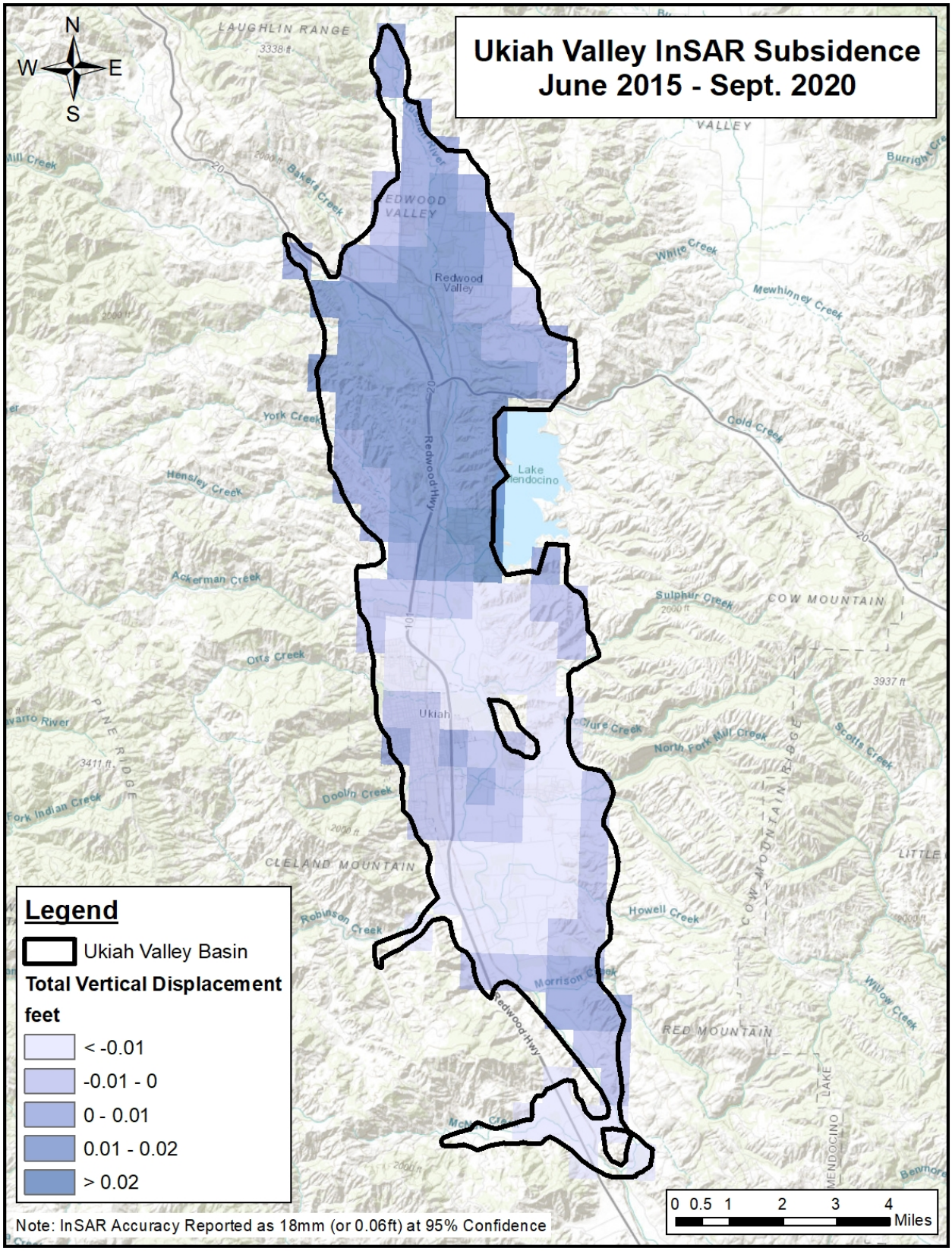

Figure 3.8: Ukiah Valley InSAR subsidence from June 2015 to September 2019

3.8.1.2 Assessment and Improvement of the Monitoring Network

There is one Continuous Global Positioning System (CGPS) station (UNAVCO Station #P190, **Figure 3.8**) and no borehole extensometer stations within the Basin boundary. Since CGPS stations offer higher accuracy and frequency than satellite-based InSAR data, observations from Station #P190 can be used to ground truth the satellite data and obtain better accuracy. As subsidence is currently not a significant concern for the Basin, and is not likely to be in the future, the InSAR-based subsidence monitoring network along with data from CGPS Station #P190 will allow sufficient monitoring both spatially and temporally to adequately assess that the measurable objective (currently in attainment) is being maintained. In addition, the data provided by DWR (TRE Altamira) are spatially and temporally adequate for understanding short-term, seasonal, and long-term trends in land subsidence and are consistent with the data and reporting standards outlined in Reg. § 352.4.

There are data gaps in the subsidence network including the lack of data prior to 2015. DWR/TRE ALTAMIRA InSAR dataset is the only currently available major subsidence dataset that covers the entire Basin, but it only extends back to 2015. Historical subsidence data prior to 2015 is currently unavailable from DWR/TRE ALTAMIRA InSAR dataset. However, data from the existing CGPS station goes back to 2005. Due to little current evidence of subsidence since 2015 (see **Section 2.2.2.5**), no future borehole extensometer or further CGPS stations are proposed for the Basin at this time. If subsidence becomes a concern in the future, then installation of CGPS stations and/or borehole extensometers can be proposed. The subsidence monitoring network will be used to determine if and where future CGPS stations would be installed or ground-based elevation surveys would be performed. In addition, if subsidence anomalies are detected in the subsidence monitoring network, ground truthing, elevation surveying, and GPS studies may need to be conducted.

3.8.1.3 Monitoring Protocols for Data Collection and Monitoring

The subsidence monitoring network currently depends on data provided by DWR through the TRE ALTAMIRA InSAR Subsidence Dataset. The following describes the data collection and monitoring completed by DWR contractors to develop the dataset. The GSA will monitor all subsidence data annually. If additional data become available, they will be evaluated and incorporated into the monitoring network, as applicable.

The statewide InSAR subsidence dataset was acquired by DWR to provide important SGMA-relevant data to GSAs for GSP development and implementation. InSAR is a satellite-based remote sensing technique that measures vertical ground surface displacements at high degrees of measurement resolution and spatial detail. TRE ALTAMIRA processed InSAR data collected by the ESA Sentinel-1A satellite. Statewide data were collected between January 1st 2015 and September 19th 2019 and calibrated to data from 232 stations in the regional network of CGPS stations. TRE ALTAMIRA compiled time series of vertical displacement values for point locations on a grid with 328 ft (100-m) spacing, with values representing averages of vertical displacement measurements within the immediate 328-by-328 ft (100 by 100 m) square areas of each point. Gaps in the spatial coverage of the point data are areas with insufficient data or data quality. TRE ALTAMIRA also created two sets of GIS rasters: annual vertical displacement and total vertical displacement relative to the common start date of June 13, 2015, both in monthly time steps. An inverse distance weighted (IDW) method with a maximum search radius of 1,640 ft (500 m) was used to interpolate the rasters from the point data.

Under contract with DWR, Towill Inc. conducted an independent study to ground truth and verify the accuracy of the InSAR dataset. In the study, variation in vertical displacement of California's ground surface over time, as measured from InSAR satellites, was statistically compared to available ground-based CGPS data. The study compared the InSAR-based vertical displacement point time series data to data from 160 CGPS stations that were not used for calibrating the InSAR data, as well as 21 CGPS stations that were used for calibrating InSAR data in Northern California.

For the statewide dataset, the study provides statistical evidence that InSAR data accurately measured vertical displacement in California's ground surface to within approximately 0.6 in (16 mm) for the period January 1st 2015 through September 19th 2019. The statement of accuracy may vary for regional or localized area subsets.[6]

3.8.2 Undesirable Results – Land Subsidence

An undesirable result occurs when subsidence substantially interferes with beneficial uses of groundwater and land uses. Subsidence occurs as a result of compaction of (typically) fine-grained aquifer materials (e.g., clay) due to the overdraft of groundwater. As there has not been any historically documented subsidence in the Basin, and the aquifer materials are unlikely to present such a risk, it is reasonable to conclude that any land subsidence caused by the chronic lowering of groundwater levels occurring in the Basin would be considered significant and unreasonable. This is quantified as pumping induced subsidence greater than the minimum threshold of 0.1 ft (3 cm) in any single year; essentially zero subsidence accounting for measurement error.

3.8.2.1 Effects of Undesirable Results on Beneficial Uses and Users

Subsidence can result in substantial interference with land use including significant damage to critical infrastructure such as canals, pipes, or other water conveyance facilities. Flooding of land, including residential and commercial properties, can lead to financial losses.

3.8.3 Minimum Thresholds – Land Subsidence

The minimum threshold for land subsidence in the Basin is set at no more than 0.1 ft (3 cm) in any single year, resulting in no long-term permanent subsidence. This is set at the same magnitude as the estimated error in the InSAR data (+/- 0.1 ft [3 cm]), which is currently the only tool available for measuring Basin-wide land subsidence consistently each year in the Basin.

The minimum thresholds for land subsidence in the Basin were selected as a preventative measure to ensure maintenance of current ground surface elevations and as an added safety measure for potential future impacts not currently present in the Basin and nearby basins. This avoids significant and unreasonable rates of land subsidence in the Basin, which are those that would lead to a permanent subsidence of land surface elevations that would impact infrastructure and agricultural production in Ukiah Valley and neighboring groundwater basins. There are currently no other state, federal, or local standards that relate to this sustainability indicator in the Basin.

[6] California Department of Water Resources, March 24, 2020, TRE Altamira Subsidence Data. California Natural Resources Agency. Available: https://data.cnra.ca.gov/dataset/tre-altamira-insar-subsidence.

3.8.4 Information and Methodology Used to Establish Minimum Thresholds and Measurable Objectives

Recent InSAR data provided by DWR (TRE Altamira) as well as information regarding the specific geology of the aquifer materials comprising the Basin were used to establish minimum thresholds and measurable objectives.

3.8.4.1 Relationship to Other Sustainability Indicators

By managing groundwater pumping to avoid the undesirable result of chronic lowering of groundwater levels, the possibility of land subsidence, already unlikely due to aquifer geology, will be mitigated. Avoiding or limiting land subsidence through sustainably managed groundwater levels in the Basin will also lessen impacts due to declines in groundwater storage and/or impacts to the sensitive, and relatively shallow, interconnected surface water/groundwater system that defines much of the Basin.

3.8.5 Measurable Objectives - Land Subsidence

Land subsidence is not known to be significant in Ukiah Valley. There is no historical record of inelastic subsidence in the Basin resulting in permanent land subsidence. Recent InSAR data provided by DWR (TRE Altamira) show no significant subsidence occurring during the period of mid-June 2015 to mid-September 2019. Small fluctuations observed in these datasets are likely due to seasonal variations in the local hydrologic cycle and agricultural practices and are not significant or unreasonable. Additionally, the specific geology of the aquifer materials comprising the Basin is not known to contain the thicker clay confining units that typically exhibit inelastic subsidence due to excessive groundwater pumping (i.e., overdraft conditions).

The guiding measurable objective of this GSP for land subsidence in the Basin is the maintenance of current ground surface elevations. This measurable objective avoids significant and unreasonable rates of land subsidence in the Basin, which are those that would lead to a permanent subsidence of land surface elevations that impact infrastructure and agricultural production. As this subsidence measurable objective is essentially already met, the specific goal is to maintain this level of land subsidence (i.e., essentially zero) throughout the GSP implementation period. Land subsidence in the Basin is expected to be maintained throughout the implementation period via the sustainable management of groundwater pumping through the groundwater level measurable objectives, minimum thresholds, and interim milestones, as well as the fact that the aquifer geology is not very likely to be susceptible to significant and unreasonable subsidence, even under groundwater overdraft conditions.

The margin of safety for the subsidence measurable objective was established by setting a measurable objective to maintain current surface elevations and opting to monitor subsidence throughout the implementation period, even though there is no historical record of subsidence and the aquifer is not deemed likely to succumb to inelastic subsidence. This is a reasonable margin of safety based on the past and current aquifer conditions and more conservative than the alternative of simply setting the subsidence indicator as ‘not applicable’ in the Basin due to current and documented historical evidence. As the current measurable objective is set to maintain the present land surface elevations of the Basin, the interim milestones are set as check-in opportunities to

review year-to-year subsidence rates from the previous 5 year period to assess whether there are longer-period subsidence trends than may be observed in the annual reviews.

3.8.6 Path to Achieve Measurable Objectives - Land Subsidence

Land subsidence in the Basin will be quantitatively measured by use of InSAR data (DWR-funded TRE Altamira or other similar data products). If there are areas of concern for inelastic subsidence in the Basin (i.e., exceedance of minimal thresholds) observed using the InSAR data, then ground-truthing studies could be conducted to determine if the signal is potentially related to changes in land use or agricultural practices or from groundwater extraction. If the subsidence is determined to result from groundwater extraction and is significant and unreasonable, then ground-based elevation surveys might be needed to monitor the situation more closely.

3.9 Sustainable Management Criteria - Depletion of Interconnected Surface Waters

Interconnected surface waters in the Basin are identified in **Chapter 2**. To acknowledge uncertainties and data gaps in the GSA's assessments, the entirety of the mainstem Russian River is assumed as interconnected with the Basin. This assessment will be re-assessed upon additional data and information collection. The interconnection between surface and groundwater along the tributaries was determined to seasonal and strongly impacted by the current incision on the mainstem Russian River. Most of the tributaries are ephemeral and more data are needed to fully demonstrate their connection or disconnection to the principal aquifer system.

Additionally, as described in **Chapter 2**, the Russian River stream network can sometimes become ecologically stressed due to insufficient baseflow conditions during the summer baseflow period in dry years. Ecosystem stresses in the Russian River stream network also include geomorphic conditions unrelated to flow, such as channel straightening and incision, and sediment deposition.

3.9.1 Depletion of Interconnected Surface Waters Monitoring Network

The depletion of ISW monitoring network measures groundwater elevations at shallower representative wells close to the surface water bodies identified to be interconnected with groundwater, and monitors groundwater elevations at deeper wells farther away from the water bodies to form an almost linear transect. These transects are intended to provide the ability to effectively characterize the gradient, direction, and amount of groundwater flow towards or away from interconnected surface water bodies. They are formed along the sections of the streams and aquifers that are close to streamflow gages so that the relationship between streamflow and groundwater elevations and the corresponding gradients can be investigated. These measurements along with surface water diversion data to help analytically evaluate surface water depletion and groundwater baseflow and also improve model estimates of exchanges of water between the aquifers and interconnected streams.

Groundwater elevation measurements are taken with high temporal frequency. The corresponding wells are selected at three transects distributed from north to south in the Basin, as shown in **Figure 3.9**. Selected wells to be included in the ISW monitoring network follow SGMA requirements and provide an appropriate spatial coverage. They include existing CASGEM wells instrumented with continuous groundwater level and temperature measurement sensors and telemetry, as well as newly drilled and instrumented wells funded through the TSS grant (shown in **Table 3.9**). Each transect also includes an appropriately located streamflow gage to couple streamflow measurements with groundwater level and temperature measurements (shown in **Table 3.10**). In the northern transect located in Redwood Valley, the newly installed streamflow gage installed and maintained by the GSA will be used. The central basin transect, located just south of Lake Mendocino, will use data from a combination of the USGS streamflow gage at Russian River West Fork (USGS 11461000) and CDEC Russian River East Fork gage (RRU). USGS 11461000 represents the natural flow from the West Fork Russian River and the RRU gage represents the releases from Lake Mendocino. The third and most southern transect, located along the UWWTP, will include the USGS streamflow gage at Talmage (USGS 11462080).

It is worth noting that this monitoring network was set up with the understanding that individual measurements of groundwater levels or streamflow do not sufficiently represent surface water

depletion due to groundwater pumping. Groundwater levels are affected by factors other than groundwater use. The typical variability induced by seasonal climate and pumping changes is greater than the changes in head that would correspond to a significant change in outflow to the stream system. In other words, the frequency of available head data is not adequate and may pose considerable uncertainty in assessing streamflow depletion due to groundwater pumping. Similarly, streamflow is also affected by several factors other than groundwater use. At the USGS station 11462080 and CDEC station RRU, streamflow is a measure of the total groundwater contribution to the stream, as well as releases from Lake Mendocino during the summer baseflow season. The groundwater contribution to streamflow is a function of groundwater use, winter and spring recharge from precipitation, irrigation on the Valley floor, winter and spring recharge from tributaries on the upper alluvial fans, mountain front recharge, and surface water diversions. It is a function of both their total amounts and the temporal dynamics of these amounts (pumping, recharge, diversions, etc.).

The proposed network is intended to address and improve the temporal and spatial distribution of data with regard to groundwater level measurements and streamflow measurements. As discussed in **Chapter 2** and **Appendix 2-E**, existing data provide insufficient high-frequency groundwater elevation measurements. The short history of groundwater level measurements and spatial gaps in streamflow measurements and suitable wells along surface water bodies including tributaries, are also data gaps that are intended to be addressed through implementation and enhancement of the GSP monitoring network. Once a better historical record for these wells and stream gages is established they will be candidates for inclusion as future RMPs. Furthermore, the designed monitoring network is intended to help improve the adaptive SMC set for depletion of ISW at the next GSP review milestones.

This network will also help record data that will be used to improve the UVIHM estimates of groundwater and surface water interaction. As mentioned below, the UVIHM will ultimately be used to quantify potential ISW depletions from groundwater pumping and to assess the Basin's compliance with its respective SMC. Therefore, the UVIHM will be considered as a component of the monitoring network in this GSP, which will be maintained and updated as needed during the GSP implementation period. The GSA believes that this network in combination with the UVIHM can sufficiently address SGMA requirements and provide accurate accounts of surface water depletion in the basin and its respective SMC.

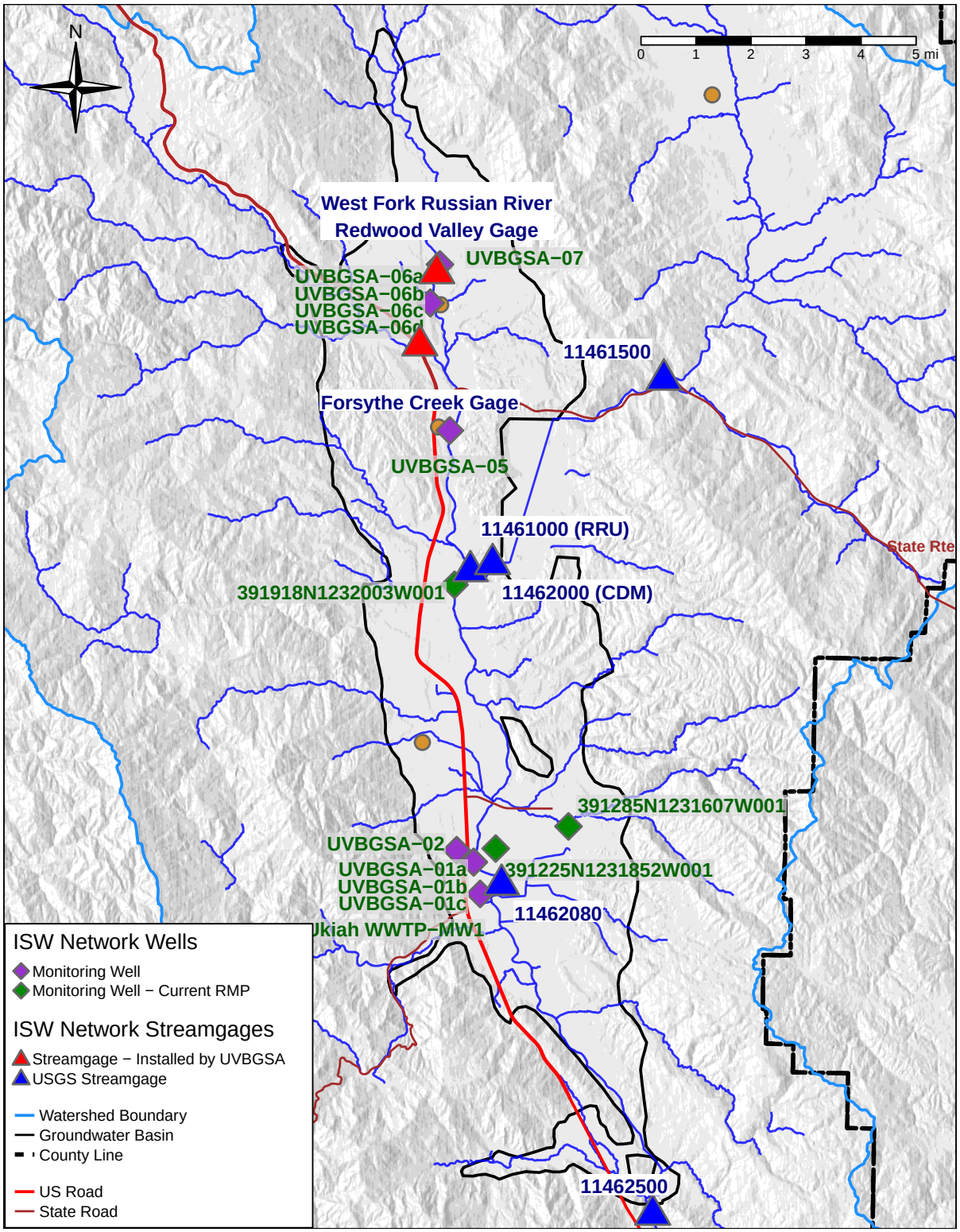

Figure 3.9: Depletion of interconnected surface waters monitoring network.

Table 3.9: Depletion of interconnected surface waters monitoring well locations. Minimum thresholds, triggers, and measurable objectives are proposed based on groundwater elevations at the start of the implementation period.

Site Code	Aquifer	RMP?	Monitoring Frequency	MT (ft-bgs)	Triggers (ft-bgs)	MO (ft-bgs)
391225N1231852W001	1	Yes	Monthly	25	15	25
391918N1232003W001	1	Yes	Monthly	48	32	47
391285N1231607W001	2	Yes	Monthly	26	10	25
UVBGSA-01a	1	No	Continuous	-	-	-
UVBGSA-01b	2	No	Continuous	-	-	-
UVBGSA-01c	2	No	Continuous	-	-	-
UVBGSA-06a	1	No	Continuous	-	-	-
UVBGSA-06b	1	No	Continuous	-	-	-
UVBGSA-06c	2	No	Continuous	-	-	-
UVBGSA-06d	2	No	Continuous	-	-	-
UVBGSA-05	1	No	Continuous	-	-	-
UVBGSA-07	1	No	Continuous	-	-	-
UVBGSA-02	1	No	Continuous	-	-	-
Ukiah WWTP-MW1	1	No	Monthly	-	-	-

Table 3.10: Depletion of interconnected surface waters monitoring streamflow gages. Minimum thresholds, triggers, and measurable objectives for the streamflow gage RMPs will be proposed based on depletion volume/rate upon revision and adaptation of SMC.

Gage	Stream	Future RMP?	Monitoring Frequency	MT (ft-bgs)	Triggers (ft-bgs)	MO (ft-bgs)
CDEC RRU	West Fork Russian River	RMP	Daily	TBD	TBD	TBD
USGS 11461500	West Fork Russian River	RMP	Daily	TBD	TBD	TBD
USGS 11462080	West Fork Russian River	RMP	Daily	TBD	TBD	TBD
USGS 11462500	West Fork Russian River	RMP	Daily	TBD	TBD	TBD
CDEC CDM	East Fork Russian River	-	Daily	-	-	-
GSA Redwood Valley Gage	West Fork Russian River	RMP	Daily	TBD	TBD	TBD
GSA Forsythe Creek Gage	Forsythe Creek	RMP	Daily	TBD	TBD	TBD

Note:

TBD: To be determined upon gathering sufficient data for revision and adaptation of SMC during the first (or second) GSP review period

Regulatory Requirements for Quantifying Streamflow Depletion due to Groundwater Pumping

Per Section 254.28(c) of DWR regulations, minimum thresholds for depletions of ISW shall be a rate or volume of surface water depletions caused by groundwater use that has adverse impacts on beneficial uses of the surface water and may lead to undesirable results. The regulatory requirements for the minimum threshold allow for the use of a numerical groundwater and surface water model to quantify the amount of surface water depletion due to groundwater pumping and to set the minimum threshold using the model.

Quantifying Streamflow Depletion due to Groundwater Pumping with the UVIHM

The UVIHM, described in **Chapter 2** and **Appendix 2-D**, is the best available tool to evaluate surface water depletion conditions in the Basin and to quantify the amount of depletion attributable to groundwater use. However, to use the model to set SMC for depletion of ISW, the GSA needs to fill critical data gaps such as continuous groundwater level measurements along the monitoring transects and streamflow measurements. Installation of transects mentioned above is expected to finish in early 2022 and make this information available for incorporation into subsequent 5 year review periods.

Depletion of ISW will be calculated using a combination of measured and modeled information at each monitoring transect. Measured information includes high-frequency groundwater level measurements at monitoring network wells, streamflow measurement at assigned gages, and available surface water diversion data. The UVIHM will be updated based on the measured data and recalibrated to sufficiently match the streamflow and groundwater elevation measurements for the current period, which is defined as the recently completed water year at the time that new simulations are implemented. For example, if this modeling exercise is implemented in 2029, the current period would refer to the water year 2027 or 2028. The calibrated model will quantify surface water depletion due to pumping by subtracting simulated streamflow of the “business-as-usual” scenario from that of the no-pumping scenario. The business-as-usual scenario is the simulation of the current conditions using best available data and methods and includes existing and implemented PMAs. The no-pumping scenario is a replicate of the business-as-usual scenario with two primary differences: 1) all pumping from the Basin is removed from the simulation, and, 2) no PMAs are included in the simulation.

This is designed to be an adaptive management process that evolves as new knowledge is gained. A detailed description of the relationship between the numerous data collection efforts and the process of updating the UVIHM is provided in the following subsections.

Adaptive Sustainable Management Criteria Approach for Depletion of Interconnected Surface Waters due to Existing Data Gaps

As explained in the previous section, the lack of historical and high-frequency groundwater elevation data in the Basin, spatial gaps in streamflow measurements, and lack of historical and current data regarding surface water diversions and groundwater pumping impose considerable uncertainties to the calculation of surface water depletions. Moreover, managed releases from the Coyote Valley Dam and Lake Mendocino to the central and southern regions of the Basin increase the complexity of such calculation and limit the use of simplified analytical methods. Acknowledging these uncertainties and existing data gaps, the GSA finds it inappropriate to define the interconnected surface water SMC based on calculated depletion rate or volume at this stage. Instead, the GSA proposes an adaptive approach that would help improve the SMC setting in the future using newly collected data while addressing SGMA requirements and avoiding undesirable results throughout

the implementation period. This adaptive approach uses the 5 year assessment periods as an opportunity to adapt the SMC. The implementable SMC will be set ideally at the first, or ultimately the second 5 year assessment period and must be followed for the rest of the implementation period.

The adaptive approach can be summarized as follows:

$$SMC(MT, MO, and PT) = \begin{cases} \text{if sufficient data is gathered: } f(\text{calculated depletion}) \\ \text{otherwise: } f(\text{groundwater levels at RMPs}) \end{cases} \tag{3.2}$$

The GSA will use groundwater levels as a proxy in the first 5 to 10 years of the implementation. The GSA will gather data and information during this period to improve its understanding of the surface water and groundwater interaction, cover existing data gaps, and re-calibrate and improve the UVIHM. Upon gathering sufficient data and information, the GSA will revise SMC for the depletion of ISWs to be based on the volume or rate of depletion of surface water due to groundwater pumping at monitoring transect locations using measured data and model estimation.

3.9.1.1 Assessment and Improvement of the Monitoring Network

Assessing and Improving Related Monitoring Network

As discussed above, the identified data gaps include high-frequency groundwater level measurements, streamflow measurements, surface water diversion and groundwater pumping information. The first two will be addressed by the proposed monitoring network including newly instrumented existing and drilled wells and newly installed stream gages. If the need is identified, the monitoring network will be expanded by adding new wells and stream gages.

Assessing and Improving the UVIHM

The UVIHM, as a monitoring instrument for surface water depletion due to groundwater pumping, will be assessed and updated every 5 years, utilizing the data and knowledge used for the original/previous model development update plus any additional monitoring data collected since the last model update. New data to be considered in the assessment and update of the model can be grouped into three general categories:

- *Validation and re-calibration data (target data).* These include independently-collected field data, typically collected on a daily, monthly, or seasonal basis. These data are also produced by the model as outputs, which include groundwater levels and streamflows within the Basin and the upper Russian River watershed. They are commonly used as calibration targets during model (re-)calibration. In other words, model simulation results will be compared to measured data to adjust model parameters (within the limits of the conceptual model) to increase the precision of simulated results including groundwater levels, and streamflow rates, etc.
- *Conceptual model data – hydrologic and hydrogeologic conditions (concept and input data).* These are the model input data used to parameterize or conceptually design the model. Examples of these data include precipitation data, hydrogeologic data obtained from well logs and pump tests, and research insights obtained from projects to further understand the hydrogeology of the Basin.

- *Data about implementation of projects and management actions (PMA data).* These are monitoring data collected specifically to characterize the implementation of PMAs to inform the GSA, stakeholders, and the design of future model scenario updates. The specific data to be collected depend on each PMA and are described in **Chapter 4**.

These newly collected data will be used by the model in three ways:

1. Precipitation and streamflow data measured at weather stations, continuous groundwater data, and streamgage data will be used to update the input climate data and observation data without any adjustments to parameters, boundary conditions, or scenarios. This is a relatively inexpensive model application that allows for updated comparison of simulated water level and streamflow predictions against measured data under baseline and existing scenario conditions through the most current time period for which data are available. This type of model application is anticipated to occur at least once every five years concurrently with the 5 year assessments, or possibly annually.
2. In addition to (1), data about PMA implementation will be used to update the model to include new, actual PMA implementation data on the correct timeline. This provides a model update that appropriately represents recent changes in PMA implementation and a more consistent evaluation of simulated versus measured water level and streamflow data. This type of model application is anticipated to occur at least once every five years concurrently with the 5-year assessments.
3. In addition to (1) and (2), conceptual model data are used to update model parameters and model boundary conditions unrelated to PMAs to improve the conceptual model underlying the UVIHM based on newly measured data and information. This will typically, but not automatically, require a re-calibration of the model against measured target data. After the re-calibration, all scenarios of interest will be updated using the re-calibrated model to allow for consistent comparison of streamflow. This type of model application is anticipated to occur at least every ten years.

The above protocol ensures tight integration between monitoring programs, PMAs implementation, and the UVIHM. It provides the most accurate estimation not only of streamflow depletion, but also of associated information about water level dynamics, streamflow dynamics and their spatial, seasonal, interannual, and water-year-type-dependent behavior. Examples of future field monitoring data used to assess and improve the model are listed below:

- ***Validation and re-calibration data ("target" data):***
  - Groundwater levels from the groundwater elevation monitoring network.
  - Daily streamflows measured at the existing and newly installed stream gages.
  - Data documenting dates and locations of dry sections in the stream network.
- ***Hydrologic and hydrogeologic conditions (concept and "input" data):***
  - Precipitation data from existing climate stations.
  - Potential ET data computed from existing climate stations.
  - Daily streamflows measured at locations near tributary streamflows to Ukiah Valley.
  - Pump test data that contain information about hydrogeologic properties in the vicinity of a well.

  - Geologic information obtained from the new well drilling logs.
  - Data collected in conjunction with research and pilot projects characterizing hydrologic and hydrogeologic conditions in the Basin.

- ***Data about projects and management actions ("PMA" data); see Chapter 4***:
  - Location of PMA implementation:
    * The location of all fields participating in managed aquifer recharge (MAR) activities during a given water year.
    * The location of conservation easements with altered diversion or pumping patterns during a given water year.
  - Changes in timing and volumes of water budget components associated with PMA implementation:
    * The total volume of water recharged in MAR activities during a specific month of a given water year.
    * The amount of streamflow diversion dedicated to instream flow in a specific month of a given water year.
    * The amount of pumping reduction implemented in a given month of a given water year.
    * The reduction in ET over the total growing season in a conservation easement.
    * First installation date of improved irrigation systems with higher irrigation efficiencies and estimated improvements in irrigation efficiency.

3.9.2 Undesirable Results – Interconnected Surface Waters

The undesirable result that is relevant to SGMA is the stream depletion that can be attributed to groundwater pumping to the degree it leads to significant and unreasonable impacts on beneficial uses and users of surface water. SGMA also requires that the design of the SMC is consistent with existing water rights and regulations. The depletion of surface water due to groundwater extraction is considered significant and unreasonable when such depletion exceeds historical depletion or adversely impacts the long-term viability of domestic, agricultural, municipal, or environmental groundwater users, including GDEs or other beneficial users of surface water.

Depletion of surface water in the Basin has the potential to limit surface water diversions under appropriative or riparian rights for different water use sectors and can negatively impact the fish and riparian habitat. It may also reduce the ability to meet instream flow requirements in the watershed.

Operationally, an adaptive approach will be used to identify and avoid undesirable results due to depletion of ISW, as discussed in **Section 3.9.1**. The adaptive approach is selected because it was deemed the most reasonable path to deal with existing data gaps and their imposed uncertainty while providing applicable measures to avoid undesirable results. Accordingly, during the first review period (first five years, or first ten years if data gathered during the first five years are not yet sufficient to justify a better alternative), similar undesirable results as the chronic lowering of groundwater elevations are proposed. This equates to groundwater levels at more than a third of the RMPs falling below their defined minimum thresholds in two consecutive years. Comparison of measured groundwater elevations at RMPs and monitoring wells is conducted based on the measurement frequency as explained in **Section 3.4.2**.

The Basin has not experienced significant and unreasonable depletion of interconnected surface water bodies due to groundwater extraction in the recent historical period. Therefore, this measure is expected to protect against such undesirable results for the proposed implementation period. Upon revision of the SMC, including Minimum Thresholds, the volume of calculated depletion will be used at each transect location (stream gages in the monitoring network) as the metric to define minimum thresholds, measurable objectives, and consequently, the undesirable results.

3.9.2.1 Potential Causes of Undesirable Results

Potential causes of water depletion in the mainstem Russian River include consumptive use of surface water and groundwater (some of which can be modified through PMAs) and extreme climate variability (which must be accounted for in the GSP). Some consumptive uses of groundwater may have a more immediate impact on streamflow than others. For example, a well that begins pumping groundwater in the proximity of the riverbank may cause streamflow depletion hours or days later, while a well that begins pumping further away from the riverbank may not influence streamflow for a few weeks or months (detailed analysis is expected to be performed as part of the implementation phase). Watershed management decisions such as changes to the Potter Valley Project and Coyote Valley Dam operations and releases may indirectly cause changes to consumptive uses in the basin and impact the interaction of groundwater aquifers and surface waters. This may result in groundwater use and reduced streambed recharge scenarios that would contribute to causing undesirable results. Possible causes of undesirable results include increasing frequency or duration of drought conditions, increased groundwater extraction, continued surface water diversions, and significant changes in operation rules for Coyote Valley Dam and the Potter Valley Project.

3.9.2.2 Effects of Undesirable Results on Beneficial Uses and Users

Agricultural Land Uses and Users – depletions of interconnected surface water due to groundwater pumping can reduce the surface flow available to downstream diverters. Some of the PMAs considered in the GSP development process, which are designed to reduce streamflow depletion during the critical summer months or when releases from Lake Mendocino are expected to decrease due to lack of precipitation, can make less water available for consumptive use, which would negatively impact some agricultural operations.

Domestic and Municipal Water Uses and Users – depletions of interconnected surface water can negatively affect municipalities that are reliant on surface water as a drinking water source. None of the PMAs considered in the GSP development process would change operations for domestic water users pumping less than 2 AFY (approximately 2,467 m^3/year), as these are de minimis groundwater users who are not regulated under SGMA. A few of the PMAs discussed in the GSP development process would affect municipal water users due to re-distributing supply and demand to reduce impact on interconnected streams during low flow and high demand months.

Recreation – depletions of interconnected surface water can affect the ability of users to partake in recreational activities on surface water bodies in the Basin.

Environmental Land Uses and Land Users – depletions of interconnected surface water may negatively affect the following: near-stream habitats for plant and animal species; instream ecosystems, including habitat necessary for reproduction, development, and migration of fish and other aquatic organisms; terrestrial ecosystems reliant on surface water; and wildlife that rely on surface

waters as a food or water source. Additionally, low flow conditions can result in increased stream temperature that can be inhospitable to aquatic organisms, including anadromous fish.

As mentioned in **Section 2.1.1.1**, DACs and SDACs cover most of the Basin. Therefore, impacts on other beneficial users indicated above represent impacts on DACs and SDACs.

3.9.2.3 Undesirable Results to Define a Minimum Threshold for ISWs versus the "Watershed Goal"

According to SGMA guidance, undesirable results occur when significant and unreasonable effects for any of the sustainability indicators are caused by groundwater conditions occurring throughout the basin" (23 CCR § 354.26). For the interconnected surface water sustainability indicator, undesirable results commonly arise from habitat conditions that are affected by the amount of streamflow, as described above. However, streamflow, even during periods of baseflow, is not identical to streamflow depletion due to groundwater pumping, and subject to several contributing factors as described above and in **Section 3.9.1**.

For improving streamflow conditions, various agencies and non-governmental organizations (NGOs) managing a watershed typically develop one or several "watershed goals." The SGMA undesirable result, which is the portion of the streamflow degradation that can be attributed to surface water depletion due to groundwater pumping is therefore only partially responsible for impairing such watershed goals. While its enforcement responsibilities are more narrowly focused on groundwater extraction, the GSA's management goals are broader than its enforcement responsibilities and include supporting watershed goals and collaboration with the many partners engaged in watershed management. The GSP seeks to reflect these efforts in the design of the measurable objective for ISW. Consequently, for the ISW sustainability indicator, this GSP makes a distinction between undesirable result (which must be attributable to groundwater use) and overall challenges related to insufficient environmental flows in ISW. This distinction reflects the fact that SGMA can address only a portion of the water supply challenges of the Ukiah Valley Basin, as it does not regulate surface water diversions.

The objective of securing sufficient environmental flows has been referred to as a "watershed goal," indicating that the action of all water users in the watershed may be necessary to achieve it. The watershed goal should be considered as an aspirational goal and can be obtained by a set of PMAs which, developed by the GSAs and all the other entities with interest in the Basin, will help the entire Basin to ensure sustainability, and also to create the needed resiliency to deal with the frequent extreme drought conditions that have occurred in recent years. Using this watershed goal as the MO rather than a quantitative value for the desired maximum stream depletion (consistent with the quantification/measurement of streamflow depletion that is used to establish the minimum threshold) is a deviation from DWR regulation (23 CCR § 354.30): "(b) measurable objectives shall be established for each sustainability indicator, based on quantitative values using the same metrics and monitoring sites as are used to define the minimum thresholds." However, the GSA seeks to elevate its priority for being an active partner in an integrated watershed management process involving many collaborations and partnerships by choosing this broader, integrated watershed management goal as the more comprehensive measurable objective for guiding its sustainable groundwater management. The GSA considers this measurable objective for the interconnected surface water sustainability indicator also more appropriate as it reflects that the driver behind the ISW SMC is the Clean Water Act, the Public Trust Doctrine obligations, the Endangered Species Act, and SGMA.

To summarize, the ISW undesirable result is more contained in scope than the overall low flow challenges in the Russian River stream network and is defined as “significant and unreasonable streamflow depletion due to groundwater extraction from wells subject to SGMA.” It is protected by the MT. However, the efforts are part of a broader, integrated effort across multiple partners to address overall low flow challenges in the Basin, which is reflected in the MO.

3.9.3 Minimum Thresholds – Interconnected Surface Waters

During the first five years of Plan implementation (or ten years if the newly acquired data are not sufficient after five years to justify a better alternative), groundwater elevations will be used as a proxy, and the MT defined for chronic lowering of groundwater elevation in Aquifer I will be used as the MT for the depletion of ISW (**Table 3.9**). For each RMP in the monitoring network, MT is defined according to the following framework:

- Wherever possible, the MT is set as the average of the three lowest (Fall season) historical measurements on record for depth to groundwater taken during drought periods. A well-specific margin, not exceeding the minimum of 10 percent or 10 ft, is further added to the MT to account for uncertainty in measuring annual low groundwater levels. This criterion applies to RMPs with historical groundwater level measurements that at least cover the 2012 to 2016 drought period.
- For RMPs with insufficient historical groundwater elevation data, the lowest historical groundwater depth to water plus 10 percent of its value or 10 ft (3 m), whichever is less.

Existing data for the Basin have been gathered biannually during the Fall and Spring of each year. These data do not necessarily capture the lowest and highest elevations at each well. Therefore, the subtraction of 10 percent of historical low or 10 ft (3 m), whichever is less, intends to account for possible errors in measurement of the lowest groundwater elevations and serves as a buffer to avoid unexpected non-compliance that is not due to changes in groundwater extraction, but rather rooted in data gaps and uncertainty in defining the MT. During the development process, none of the depletion of ISW RMPs had a sufficient historical record to use the first criterion, the average of the three lowest measurements plus a margin, to set their respective MTs. However, the GSA has included this criterion to provide the platform to revise these MTs if a sufficient measurement baseline is established during the implementation.

Comparison of MTs to measured groundwater elevation is conducted based on the well’s measurement frequency as explained in **Section 3.4.2**. Since no long-term decline in groundwater levels has been identified, the Basin is not in overdraft, and no historical undesirable results have been experienced with respect to depletion of ISW. To this end, the MT defined above is expected to be protective against future potential undesirable results during the first five to ten years of the implementation period. Upon receiving better information and data, minimum thresholds will be revised to be defined based on the volume of depletion at stream gages in the monitoring network at the identified transects (**Table 3.10**).

3.9.4 Information and Methodology Used to Establish Minimum Thresholds and Measurable Objectives

The minimum threshold is defined initially based on groundwater elevations as a proxy and is proposed to be adaptively revised and defined in terms of modeled stream depletions once more data and information become available. A detailed discussion about ISW and groundwater dependent ecosystems in the Basin is described in **Sections 2.2.2.6 and 2.2.2.7**, respectively. In establishing minimum thresholds for depletions of interconnected surface water, the following information was considered:

- Feedback on concerns about depletions of ISW and feasibility of PMAs from stakeholders.
- An assessment of interconnected surface water in the Basin.
- Results of the UVIHM, which was provide a preliminary estimate of surface water depletion under a variety of scenarios.
- Input from stakeholders resulting from the consideration of the above information in the form of recommendations regarding minimum thresholds and associated management actions.

The initial minimum thresholds, set using groundwater levels, were selected based on available historical data and conditions and the scenarios that were run using the UVIHM. Feedback from stakeholders, including members of the technical advisory committee and subject matter working groups, was incorporated so that the selected minimum thresholds for the chronic lowering of groundwater elevations and depletion of ISW are protective of beneficial uses and users in the Basin.

The adaptive minimum thresholds will be selected using the updated and re-calibrated the UVIHM and based on different scenarios, which will be used to identify a realistic and reasonable amount of surface water depletion that can be managed and maintained through existing, planned, and proposed PMAs. Outputs from the UVIHM will also be used to compute other relevant project outcome metrics, including:

- The ratio of depletion reversal and total depletion, which is the “Relative Depletion Reversal,” measured in percent. The computation of this value is shown in **Figure 3.10**. This graphic also shows the computation of the total depletion and the depletion reversal as defined above. The Relative Depletion Reversal is a unitless fraction. Multiplied by 100, it has units of percent [%]. PMAs may lead to less than 100 percent Relative Depletion Reversal, or even more than 100% Relative Depletion Reversal. Just like Total Depletion and project or management action-specific Depletion Reversal, the Relative Depletion Reversal varies from day to day.
- For each group of projects and management actions that are implemented, the Depletion Reversal is a measure of the amount of surface water depletion that is reversed relative to the BAU conditions. PMAs are therefore – through the UVIHM – inextricably, deterministically, and directly linked to specific “measured” outcomes: streamflow, streamflow gains, Depletion Reversal, Relative Depletion Reversal, number of days gained in stream connectivity, etc.
- Streamflow on any given day and location, a metric relevant to the measurement of environmental outcomes.
- The number of days gained in stream connectivity in dry and some average years, both in the summer after the end of the Spring flow recession, and in the Fall when streamflow increases for the first flush.

- Other relevant metrics including the timeseries of relative streamflow increase and simulated streamflow.
- Evaluation under future climate conditions: The Total Depletion under future climate conditions, as well as the Depletion Reversal under future climate conditions, can be modeled in the same way as for the 1991 to 2018 models, using future climate data and DWR's protocol for simulating climate change conditions.
- Uncertainty Analysis: The UVIHM also allows for uncertainty analysis in predicting Total Depletion, as well as Depletion Reversal for specific projects and management actions under current or future climate conditions.

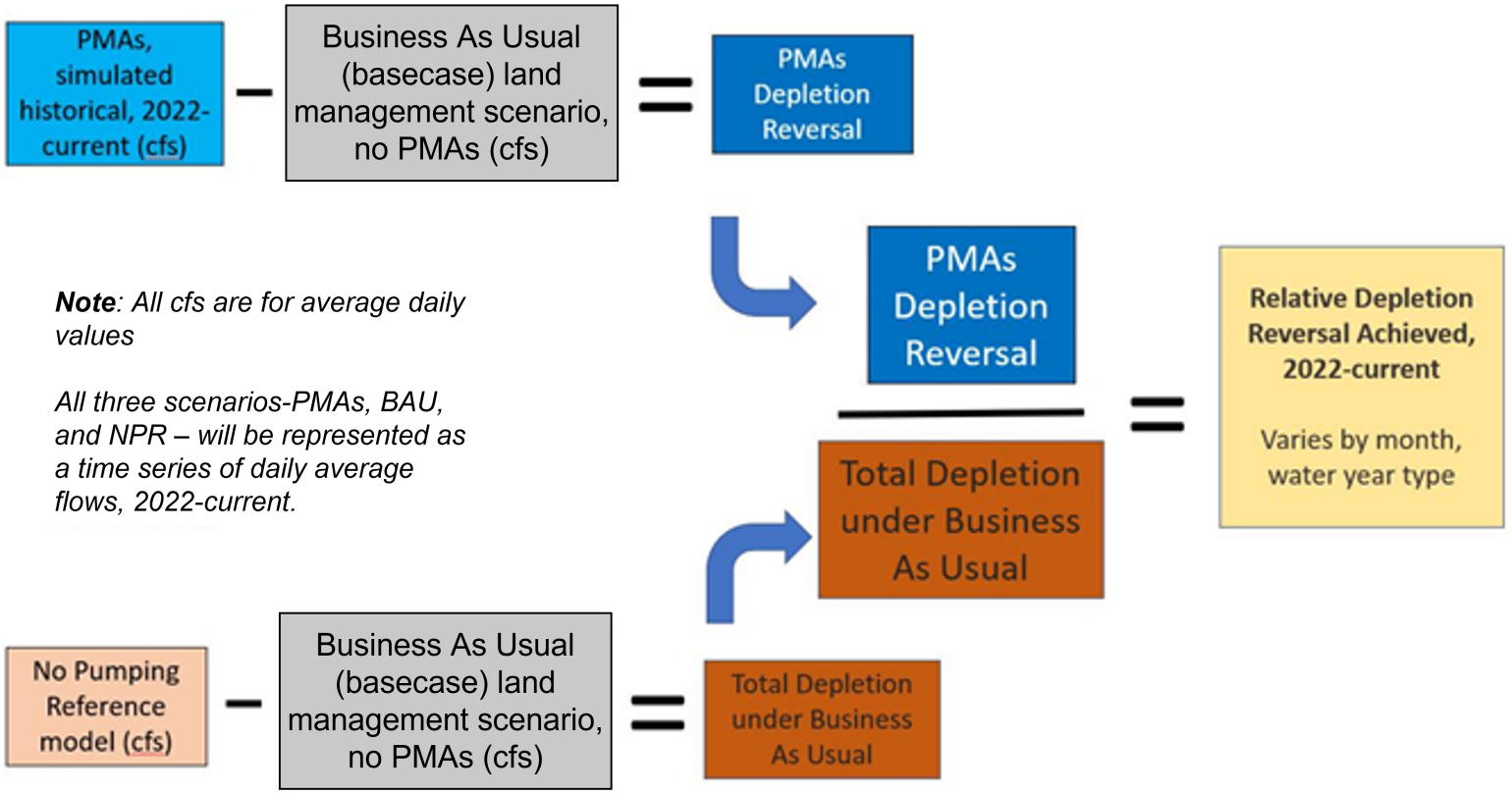

Figure 3.10: Computation of the relative depletion reversal as the ratio of depletion reversal (due to PMAs) and total depletion.

3.9.4.1 Relationship to Other Sustainability Indicators

Minimum thresholds are selected to avoid undesirable results for other sustainability indicators. Depletion of ISW is a complex function of groundwater storage and groundwater level dynamics that are in turn the result of groundwater pumping patterns. The relationship between depletion of ISW minimum thresholds and minimum thresholds for other sustainability indicators are discussed below.

- **Groundwater Level –** depletions of ISW occur in conjunction with decreases in groundwater levels measured in shallow groundwater wells, relative to the (unmeasured) conditions under no-pumping or less-pumping. Minimum thresholds for groundwater levels may serve to avoid significant additional streamflow depletion due to groundwater pumping, but are insufficient as a tool to manage the ISW sustainability indicator.

- **Groundwater Storage –** depletions of ISW are related to groundwater storage similar as to how they are related to water level changes.

- **Seawater Intrusion –** This sustainability indicator is not applicable in this Basin.

- **Groundwater Quality –** groundwater quality is not directly related to depletions of ISW.

- **Subsidence –** subsidence is not directly related to depletions of ISW except that widespread onset of subsidence would indicate significant but unquantified increases in streamflow depletion due to groundwater pumping depending on the location of subsidence.

3.9.5 Measurable Objectives - Interconnected Surface Waters

More than any other sustainable management criteria besides water quality, the interconnected surface water SMC are tightly linked to water management efforts which do not fall exclusively under groundwater management. Managing to comply with the interconnected surface water SMC is part of a broader watershed portfolio of PMAs that engages multiple federal, state, and local agencies, NGOs, and volunteer groups. To be successful, it must be closely integrated with these broader, collaborative water management efforts. To articulate the integrated water management characteristic of this SMC, the MO is set to be part of the overall, aspirational “watershed goal,” which constitutes a management objective covering all consumptive water uses, as well as land management in the Basin and its surrounding watershed. Because the GSA has no regulatory authority over some of these uses, collaboration with surface water users in the Basin, land managers, local organizations, and state and federal agencies will be necessary to work towards this aspirational watershed goal.

Consistent with the metrics for the minimum threshold, the measurable objective is defined adaptively and upon gathering better data and information. Accordingly, an initial MO is set that mirrors the MO set for the chronic lowering of groundwater elevations. That is the 75th percentile of the Fall season groundwater levels measured in each well with insufficient groundwater elevation historical data (not covering the most recent drought period of 2012-2016); or, the average historical Fall season groundwater elevation measured in wells with sufficient historical groundwater level data (groundwater level data that at least covers the recent drought period of 2012-2016). However,

the MO will be revised and adapted as better data and information become available to be based on the volume or rate of surface water depletion at streamgages in the monitoring network for each monitoring transect.

The final MO will be part of a broader, albeit aspirational, integrated water management goal to establish appropriate, healthy stream and streamflow conditions. The implementation of the plan contributes, in collaboration with other agencies and groups, to achieving compliance with the Public Trust Doctrine and resolves watershed-wide water management issues. This explicit linkage between the measurable objective with the aspirational watershed goal also provides flexibility for compliance with potential future regulations or actions in an integrated water management approach.

An integrated approach to setting the measurable objective is consistent with existing regulations, which allow the GSA to "establish measurable objectives that exceed the reasonable margin of operational flexibility for the purpose of improving overall conditions in the Basin, but failure to achieve those objectives shall not be grounds for a finding of inadequacy of the Plan." (23 CCR Section 354.30(g)). The aspirational watershed goal is not a specific quantitative metric at this time due to the reasons outline above for the selection of an adaptive approach.

3.9.6 Path to Achieve Measurable Objectives - Interconnected Surface Waters

The GSA will support achievement of the measurable objective by conducting monitoring related to ISW, including streamflow monitoring and groundwater elevation monitoring applicable to the beneficial uses and users of interconnected surface water in the Basin. PMAs to reverse surface water depletion and ensure compliance with the minimum threshold will be undertaken by the GSA, as needed, either as the lead agency, or as a project partner. The GSA will review and analyze data and update the model to evaluate any changes in depletion of surface water due to groundwater pumping or PMAs implemented in the Basin. Using monitoring data collected as part of GSP implementation, the GSA will develop information to adapt and revise the SMC and to further demonstrate that PMAs are operating to maintain or improve conditions related to the depletion of ISW in the Basin and to avoid undesirable results. Should the minimum threshold be exceeded, the GSA will implement measures to address this occurrence.

To manage depletions of ISW, the GSA will partner with local agencies and stakeholders to implement PMAs. PMAs are presented in further detail in **Chapter 4**. Implementation timelines and approximate costs are discussed in **Chapter 5**. The GSA may choose to conduct additional or more frequent monitoring. The need for additional studies on depletion of ISW will be assessed throughout GSP implementation. The GSA may identify knowledge requirements, seek funding, and help to implement additional studies.

Chapter 4

Projects and Management Actions

4.1 Introduction and Overview

To achieve the Groundwater Sustainability Plan's (GSP or Plan) sustainability goal by 2042 and avoid undesirable results as required by SGMA regulations, multiple projects and management actions (PMAs) have been designed for evaluation and possible implementation by the GSA, in partnership with other entities and agencies active in the Basin. The Basin has not historically experienced conditions of overdraft or undesirable results. Therefore, PMAs are proposed to promote long-term resiliency and adaptive management strategies and help maintain the Basin's conditions in the future. PMAs are described in accordance with §354.42 and §354.44 of the SGMA regulations. Projects generally refer to infrastructure features and other capital investments, their planning, and their implementation, whereas management actions are typically programs or policies that do not require capital investments but are geared toward engagement, education, outreach, changing groundwater use behavior, adoption of land use practices, monitoring, etc.

PMAs discussed in this section will help achieve and maintain the sustainability goals and measurable objectives and avoid the undesirable results identified for the Basin in **Chapter 3**. These efforts will be periodically assessed during the GSP implementation period. As planning is at varying early stages of development, complete information regarding construction requirements, operations, costs, permitting requirements, and other details are not uniformly available. A conceptual description of the operation of PMAs as part of the overall GSP is provided in this chapter and in **Chapter 5**. In developing PMAs, priorities for consideration include minimizing impacts to the Basin's economy, maximizing external funding, and prioritizing voluntary and incentive-based programs over mandatory programs. Upon consideration of their implementation, a careful review of PMAs will be performed to assess their economic impacts and means to reimburse those adversely impacted by PMAs will be considered.

In the Ukiah Valley, the PMAs are designed to achieve the following objectives related to the sustainable management criteria (SMC): to achieve the thresholds and objectives for the interconnected surface water sustainability indicator (**Section 3.9**), to provide sufficient capacity for conjunctive use of groundwater and surface water to prevent water shortages during periods of low surface water availability, and to prevent the lowering of groundwater levels to protect wells from outages, preserve groundwater dependent ecosystems, and avoid additional stresses on interconnected surface waters and their habitat.

PMAs included in this GSP will not only be important for the above SMC related objectives, but can represent a critical tool to develop water resiliency in the Basin. The current critical drought conditions are demonstrating the need to develop a new, integrated framework that can support the County and all the water agencies in responding to future drought conditions.

The PMAs identified reflect a range of options to achieve the goals of the GSP and will be completed through an integrative and collaborative approach with other agencies, organizations, landowners, and beneficial users. The GSA considers itself to be one of multiple parties collaborating to achieve overlapping, complementary, and multi-benefit goals across the integrated water and land use management nexus in the Basin. Furthermore, PMAs related to water quality, interconnected surface waters, and groundwater-dependent ecosystems will be most successful if implemented to meet the multiple objectives of collaborating partners. For many of the PMAs, the GSA will enter into informal or formal partnerships with other agencies, NGOs, or individuals. These partnerships may take various forms. These forms may include GSA participation in informal technical or information exchange meetings, collaboration on third-party proposals, projects, and management actions, or being the lead agency on proposals and the subsequent implementation of PMAs.

The GSA and individual GSA partners will have varying but clearly identified responsibilities with respect to permitting and other specific implementation oversight. These responsibilities may vary across PMAs or even within individual phases of a PMA. Inclusion of a PMA in this GSP does not forego any obligations under local, state, or federal regulatory programs. Inclusion in this GSP also does not assume any specific project governance or role for the GSA. While the GSA does have an obligation to oversee progress towards groundwater sustainability, it is not the primary regulator of land use, water quality, or environmental project compliance. It is the responsibility of the respective implementing, lead agency to collaborate with appropriate regulatory agencies to ensure that the PMAs for which the lead agency is responsible are in compliance with all applicable laws. The GSA may choose to collaborate with regulatory agencies on specific overlapping interests such as water quality monitoring and oversight of projects developed within the Basin.

PMAs are classified under four main categories: 1) supply augmentation, 2) managed aquifer recharge and injection wells, 3) demand management and water conservation, and 4) other management actions. Furthermore, PMAs are organized into two tiers, explained in **Section 4.2** and **Section 4.3**, that are reflective of their timeline for implementation:

1. TIER I: Existing PMAs that are currently being implemented and are anticipated to continue to be implemented.
2. TIER II: PMAs planned for near-term initiation and implementation (2022 to 2027) by individual member agencies, as well as additional PMAs that may be implemented in the future, as necessary (initiation and/or implementation 2027 to 2042).

The process of identifying, screening, and finalizing PMAs is illustrated in **Figure 4.1**. Existing and planned projects were first identified through a review of different reports, documents, and websites. Planned and new projects also received stakeholder input in their identification. These projects were then categorized into four categories: supply augmentation, conjunctive use, water conservation, and water quality enhancement. In the next step, all projects were evaluated to identify those with the highest potential to be included in the GSP. Using the Ukiah Valley Integrated Hydrological Model (UVIHM), the effectiveness of each project, or a combination of projects, can be assessed to identify those projects that, if implemented, will most likely bring the Basin into a sustainable condition or will likely help maintain its conditions. Monitoring will be a critical component in evaluating PMA benefits and measuring potential impacts from PMAs.

The ability to secure funding is an important component in the viability of implementing a particular PMA. Funding sources may include grants or other fee structures (**Chapter 5**). Under the Sustainable Groundwater Management Implementation Grant Program Proposition 68, grants can be awarded for planning activities, monitoring, implementation, and for projects with a capital improvement component. In late-2022, the SGMA implementation grant round 2 solicitation will open, which is scheduled to provide over 204 million dollars to high and medium priority basins for planning and implementation projects.

In 2020, the California Land Stewardship Institute (CLSI) received one of only five watershed coordinator grants in California to work with the Ukiah Valley GSA. CLSI has worked in the Ukiah Valley for over 25 years primarily completing numerous Fish Friendly Farming and Ranching plans and projects, running the Russian River Frost program, and implementing many water storage, conservation, and recycled water projects with landowners and cities. The grant work plan addresses the need for a community-based watershed plan that identifies specific actions needed to implement SGMA and address federal, state, and local planning goals.

The watershed coordinator will support the identification of projects to increase groundwater levels, restore fish and wildlife habitat, and reduce fire fuels in the watershed. The watershed coordinator will work with the GSA, Technical Advisory Committee, Mendocino County (County), and other partners to define project locations for groundwater recharge and conjunctive use, evaporation reduction, stream revegetation, and fire/fuel reduction and work with landowners to assure such projects can be implemented in a collaborative manner. Project identification started in May 2021 and will produce a first round of easy-to-implement projects. CLSI will work with local partners and the GSA to implement projects, and can also rapidly implement projects directly.

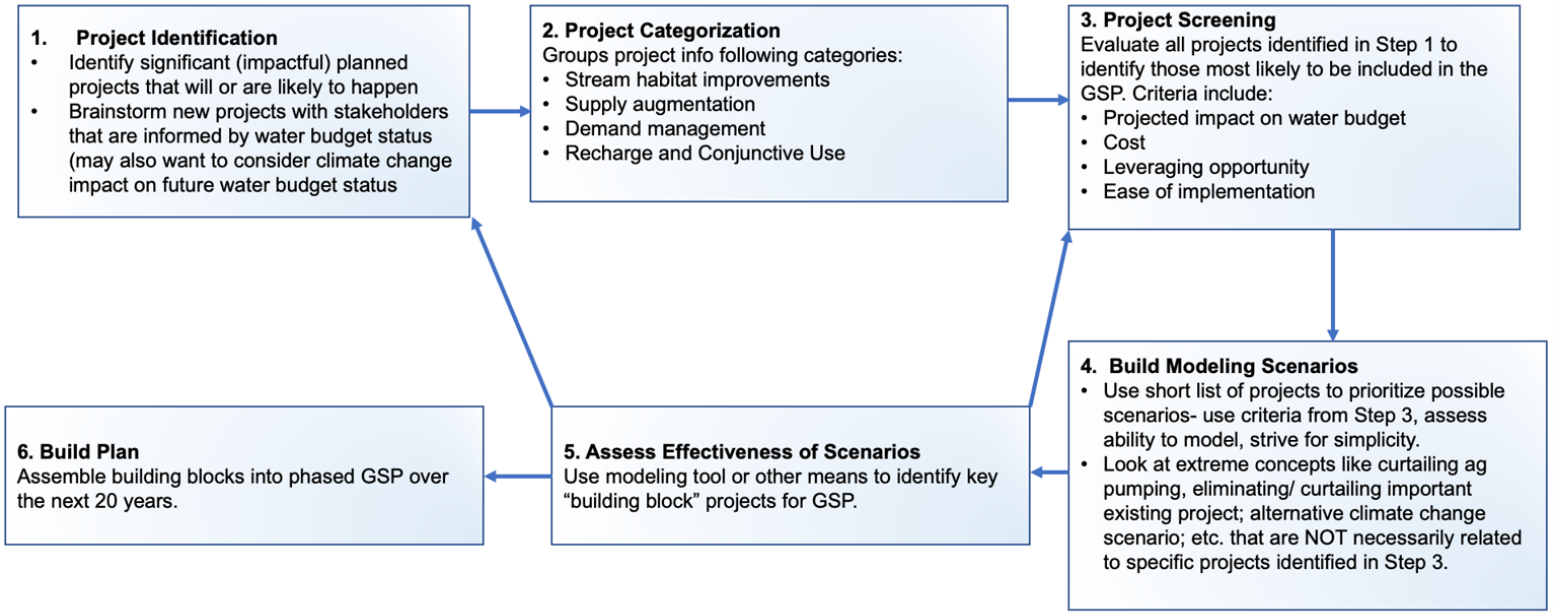

Figure 4.1: Process for identification and prioritization of PMAs.

4.2 Tier I: Existing or Ongoing Projects and Management Actions

Tier I PMAs presented in **Table 4.1** have been extracted from the following documents:

- The County of Mendocino General Plan, August 2009;
- Conceptual Model of Watershed Hydrology, Surface Water and Groundwater Interactions and Stream Ecology for the Russian River Watershed, September 2016.
- Ukiah Valley Area Plan, August 2011;
- Fish Habitat Flows and Water Rights Project, Draft Environmental Impact Report, August 2016;
- The North Coast Resource Partnership projects (website) ;
- Draft Lake Mendocino Master Plan, 2019 Revision;
- Lake Mendocino Water Supply Reliability Evaluation Report, May 2013;
- City of Ukiah Storm Water Management Plan, February 2006;
- City of Ukiah 2015 Urban Water Management Plan;
- Southern Sonoma County Storm Water Resources Plan, May 2019;
- Sonoma Water 2020-2025 Capital Improvement Plan; and,
- North Coast Integrated Regional Water Management Plan Phase III, August 2014.

Table 4.1: Tier I PMAs Summary Table.

Project Title	Project Summary	Lead Agency	Project Type	Status of Project	Anticipated Time-frame	Targeted Sustainability Indicator and Beneficiaries
City of Ukiah Recycled Water Project (Phase I through III)	The Purple Pipe Project is a recycled water project that includes nearly eight miles of pipeline, a 66-million-gallon water storage reservoir, upgraded treatment facilities and improved water and wastewater infrastructure on Oak Manor Drive to serve agricultural and urban irrigation and frost protection demands of about 1,320 AFY. This allows the City to serve approximately 325 million gallons of water to farmers, parks, and schools. Total project cost was $32.085 Million.	City of Ukiah's Water Resources Depart-ment	Supply Augmentation and Conjunctive Use	Completed	2020	Chronic lowering of groundwater elevations, depletion of interconnected surface water

Table 4.1: Tier I PMAs Summary Table. *(continued)*

Project Title	Project Summary	Lead Agency	Project Type	Status of Project	Anticipated Time-frame	Targeted Sustainability Indicator and Beneficiaries
Water Meter Replacement	The Redwood Valley Tribe will replace all 35-year old, malfunctioning residential water meters. The new radio read meters will allow accurate measuring of water usage, identification of possible leaks, and inform the district of residents using excess water. The Redwood Valley Tribe receives water from the Redwood Valley County Water District which is quite limited, and this project will reduce water needs from the District. Total project cost is $18,000.	Redwood Valley Little River Band of Pomo Indians	Water Conservation	60% Complete	Summer 2021	Chronic lowering of groundwater elevations, depletion of interconnected surface water
Rainwater Catchment & Usage	Pinoleville Pomo Nation will install a 60,000 gallon rainwater catchment tank at their administrative offices to support the food garden and ornamental landscape. This water will reduce the amount of water used from Millview Water District, whose source of water is from the Russian River. Total project cost $125,000.	Pinoleville Pomo Nation	Water Conservation	50% Complete	Fall 2022	Depletion of interconnected surface water

Table 4.1: Tier I PMAs Summary Table. *(continued)*

Project Title	Project Summary	Lead Agency	Project Type	Status of Project	Anticipated Time-frame	Targeted Sustainability Indicator and Beneficiaries
Redwood Empire Fairgrounds Water System Upgrade	The aged (ca. 1950) and leaking plumbing system at the fairgrounds has been a problem for many years, but funds to secure a phased upgrade/replacement have not been secured. This site represents the third largest water customer for the City of Ukiah, and leaks may represent 15-20% of total water delivered. Purchasing a ”leak detection wand” is important to monitor the segments where upgrade/replacement will not occur during Phase 1. Total project cost is $20 Million.	12th District Agriculture Association	Water Conservation	50% Complete	Fall 2022	Chronic lowering of groundwater elevations, water supply reliability and conservation

Table 4.1: Tier I PMAs Summary Table. *(continued)*

Project Title	Project Summary	Lead Agency	Project Type	Status of Project	Anticipated Time-frame	Targeted Sustainability Indicator and Beneficiaries
Irrigation upgrades and turf to xeric landscape conversion	The Mendocino College Ukiah campus will replace irrigation components on ornamental landscapes to increase efficiency, and will convert two turf lawns to xeric landscapes to save water. The purchase of turf aerator ($4,500) will promote deeper root growth on sports fields, thus requiring less frequent irrigation. Total project cost $73,000.	Mendocino College	Water Conservation	75% complete	Fall 2021	Chronic lowering of groundwater elevations, water supply reliability and conservation
Sports field conversion to non-irrigated surface	The soccer field at Ukiah High School will be converted from an irrigated turf surface to an artificial year-round playing surface. Staff have calculated the annual water saving to be at least 2,240,000 gallons. The entire soccer facility upgrade cost estimate is $6.7 Million.	Ukiah Unified School District	Water Conservation	Division of the State Architect is in review and approval process of 100% design.	Fall 2022	Chronic lowering of groundwater elevations, water supply reliability and conservation

Table 4.1: Tier I PMAs Summary Table. *(continued)*

Project Title	Project Summary	Lead Agency	Project Type	Status of Project	Anticipated Time-frame	Targeted Sustainability Indicator and Beneficiaries
Forsythe Floodplain Restoration Project	The removal of a levee on Forsythe Creek will allow expansion of floodwaters, reducing erosion, and increasing infiltration. Armoring the opposite bank will protect private residences from further property damage. Restoring the riparian community will promote natural species recovery. Total project cost is $2.7 Million.	Mendocino County RCD	Water Quality Enhancement	60% design complete. CEQA MND complete	Fall 2025	Chronic lowering of groundwater elevations, water supply reliability and conservation

4.3 Tier II: Planned and Potential Future Projects and Management Actions

Tier II PMAs are planned for near-term feasibility evaluation, initiation, and implementation (2022 to 2027) by individual agencies and private landowners or will be considered in the future for implementation on an as-needed basis. Projects are described through the following categories: 1) supply augmentation, 2) managed aquifer recharge and injection wells, 3) demand management and water conservation, and 4) other management actions. A summary of the Tier II PMAs is provided in **Table 4.2** and further descriptions are provided in **Sections 4.3.1** through **4.3.4**.

Many of the projects considered in this tier and in the first two categories can be regarded as elements of conjunctive use. Conjunctive use commonly refers to the coordinated use of water resources to increase water supply reliability and promote sustainability. According to the Water Education Foundation, conjunctive use can be categorized into passive and active actions. Passive conjunctive use or in-lieu conjunctive use utilizes other sources of water (ex. surface water or recycled water) in place of groundwater to provide pumping relief and improve the conditions of the Basin. Active conjunctive use utilizes other water resources to purposefully recharge the underlying groundwater aquifers for later use. The supply augmentation projects outline below primarily fall into the passive conjunctive use category. Managed aquifer recharge and injection well projects are considered active conjunctive use practices. Conjunctive use practices enable water managers to utilize groundwater basins for storage to accumulate and preserve water for use at a later date. They also provide a strategy for adjusting supplies to meet demands under highly variable hydrological conditions. Various strategies rely on these practices, including groundwater banking and groundwater transfers.

There is the opportunity to utilize conjunctive use practices to the benefit of water users in the Basin. This is due to the Basin's proximity to significant surface water storage in Lake Mendocino and the Russian River, the existence of surface water rights, the presence of numerous surface water diversions and conveyance facilities, and recycled water production. To take advantage of the opportunities made available by the presence of these facilities, any proposed action that will rely on facilities managed by DWR or Bureau of Reclamation will have to comply with requirements imposed by those agencies as articulated in the Water Transfer White Paper (DWR & Reclamation, 2019).

Tier II PMAs are currently at varying stages of development. Project descriptions are provided below for each of the identified Tier II PMAs. The level of detail provided for PMAs described below depends on the status of the PMA. Where possible, information relevant to §354.42 and §354.44 of the SGMA regulations is included for projects. In most cases, due to the preliminary stages of the PMA, information including conditions of implementation, expected benefits and measurable objectives, permitting and regulatory requirements, and legal authority and public noticing are provided for the four PMA categories rather than their specific projects. If a project is at a later stage of development, further project-specific details are provided in the project description for relevant topics.

Evaluation and implementation of many of these PMAs are subject to funding availability. Funding opportunities will be pursued to implement proposed PMAs deemed needed by the GSA, starting in 2022. The GSA will conduct additional cost-benefit analyses to further prioritize and define the scope of projects and identify funding opportunities. Selected projects are expected to help meet the GSA's sustainability goals by improving groundwater levels, sustaining interconnected

surface waters, improving instream habit, and preserving water quality in the Basin. Some Tier II PMAs will start as small-scale or pilot projects and feasibility studies. The GSA may pursue the full-scale design and implementation based on the pilot project or the feasibility study results. Public input and feedback were sought to develop these conceptual-level PMAs as part of the GSP development process. Further opportunities for public comment regarding PMA selection and implementation will be established and publicized throughout the implementation period.

The lead agency for each project will be finalized as funding opportunities become available, if not already specified. The lead agency may be the GSA, water purveyors, private landowners, non-profit agencies, or NGOs. The designated lead agency will be responsible for securing funding, project management, obtaining the necessary permits, and ultimately, the success of each project. If the GSA is not the lead agency, it will provide needed support and coordinate with the lead agency to ensure the project benefits the implementation of the GSP and conditions of the Basin.

Table 4.2: Tier II PMAs Summary Table.

PMA	PMA Category	Lead Agency	Status	...5
Rehabilitation of Existing Reservoirs	Supply Augmentation	TBD	Planning Phase	
Construction of Additional Off-Stream Reservoirs	Supply Augmentation	TBD	Planning Phase	,
Construction of Additional Off-Stream Tanks for Storage	Supply Augmentation	TBD	Planning Phase	
Well Analysis, Rehabilitation, and Impact Mitigation	Supply Augmentation	GSA	Planning Phase	
City of Ukiah Recycled Water Project - Phase IV	Supply Augmentation	City of Ukiah	Planned	
Pump(s) for Potable Water Intertie	Supply Augmentation	City of Ukiah	Planned	
City of Ukiah Groundwater Recharge	Managed Aquifer Recharge and Injection Wells	City of Ukiah	Planning Phase	
Rogina Mutual Water Company and Millview County Water District MAR and/or Injection Wells	Managed Aquifer Recharge and Injection Wells	Water Agencies	Planning Phase	
Mendocino County Water Agency Groundwater Recharge Projects	Managed Aquifer Recharge and Injection Wells	Mendocino County	Planning Phase	
City of Ukiah Western Hills Source Water Protection	Managed Aquifer Recharge and Injection Wells	City of Ukiah	Planning Phase	
RRFC On-Farm Groundwater Recharge Multi-Benefit Demonstration Project	Managed Aquifer Recharge and Injection Wells	RRFC	Planning Phase	
Stream Enhancement Projects	Managed Aquifer Recharge and Injection Wells	TBD	Planning Phase	

Table 4.2: Tier II PMAs Summary Table. *(continued)*

PMA	PMA Category	Lead Agency	Status	...5
Distributed Storm Water Collection and Managed Aquifer Recharge (DSC-MAR)	Managed Aquifer Recharge and Injection Wells	TBD	Planning Phase	
RRFC On-Farm Groundwater Recharge Multi-Benefit Demonstration Project	Managed Aquifer Recharge and Injection Wells	RRFC	Planning Phase	
Aquifer Storage and Recovery (ASR) and Flood-MAR Feasibility & Implementation	Managed Aquifer Recharge and Injection Wells	TBD	Planning Phase	
Reduce Evaporative Losses from Existing Surface Water Storage	Demand Management & Water Conservation	TBD	Planning Phase	
Conservation Programs and Green Infrastructure	Demand Management & Water Conservation	TBD	Existing/Ongoing	
Irrigation Efficiency Improvements	Demand Management & Water Conservation	TBD	Planning Phase	
Voluntary Land Repurposing	Demand Management & Water Conservation	TBD	Planning Phase	
Alternative Lower ET crops	Demand Management & Water Conservation	TBD	Planning Phase	
Municipal Supply and Use Efficiency Improvements	Demand Management & Water Conservation	City of Ukiah	Planning Phase	
Develop Emergency and Drought Mitigation Strategies Through Demand Management and Groundwater Conservation	Demand Management & Water Conservation	GSA	Planning Phase	
Monitoring Activities	Other Management Actions	GSA	Planning Phase	

Table 4.2: Tier II PMAs Summary Table. *(continued)*

PMA	PMA Category	Lead Agency	Status	...5
Groundwater Well Inventory Program	Other Management Actions	GSA	Planning Phase	
Drought Mitigation Measures	Other Management Actions	TBD	Planning Phase	
Forbearance	Other Management Actions	TBD	Planning Phase	
Voluntary Well Metering Program	Other Management Actions	GSA	Planning Phase	
Outreach and education	Other Management Actions	GSA in Coordination with Relevant Entities	Existing/Ongoing	
Rate fee study	Other Management Actions	GSA	Planning Phase	
Climate Change Impact Assessment	Other Management Actions	GSA	Planned	
PMA Economic Impact Analysis	Other Management Actions	GSA	Planned	

4.3.1 Supply Augmentation

Supply augmentation PMAs are infrastructural projects or management strategies that improve water supply reliability and water use efficiency or provide additional supply resources in the Basin. Except for the City of Ukiah's (City) Recycled Water Project, all other projects in this category are in the preliminary design stages and will be further developed on an as-needed basis and upon the decision of the GSA. General specifications that apply to all of these projects are summarized below. The City's Recycled Water Project and well analysis, rehabilitation, and impact mitigation PMAs include project-specific descriptions that supersede the general information provided here.

Condition for Implementation

The GSA supports supply augmentation projects since they provide additional flexibility and resiliency in the water supply. While currently there is no indication of chronically declining groundwater levels or conditions of overdraft in the Basin, these projects serve as proactive measures for the GSA to prevent such conditions in the future due to possible impacts of climate change, land use and population changes, and water supply system uncertainties. The timetable of implementation for these projects is contingent upon the availability of funding resources. The GSA will also need to cooperate and coordinate with appropriate agencies, entities, and private landowners to implement these projects successfully. Therefore, proper public education and outreach would precede the implementation of these projects. The GSA will pursue grant funding for and help the lead agency (if not the GSA) in analyzing PMA impacts on the Basin. This coordination will improve PMA design and implementation to maximize the benefits to the Basin and its beneficial users.

Measurable Objectives Expected to Benefit

Supply augmentation projects have the potential to:

- Improve the timing of pumping and surface water diversions and help maintain appropriate streamflows and reduce surface water depletions to groundwater pumping;
- Reduce instantaneous demand and consequently the risk of impacts to fishery resources and GDEs and improve instream habitat; and,
- Reduce pumping and improve groundwater levels.

Permitting and Regulatory Requirements

The permitting and regulatory process for supply augmentation projects depends on many factors, such as funding agency requirements (local, state, federal), potential impacts to environmental and cultural resources, availability of supply and water rights permits, and project logistics. Because several PMAs are not yet fully designed, defining what permitting and regulatory process will be required would be premature. However, environmental and cultural resources investigations may be required per the California Environmental Quality Act (CEQA) or National Environmental Policy Act (NEPA). Temporary or permanent water rights permits may be required from the California State Water Resources Control Board (SWRCB). Additional engineering work may need to be conducted per the Division of Dam Safety requirements and other agencies.

Legal Authority and Public Noticing

The GSA has the authority to manage groundwater in the Basin and has no land use authority or legal jurisdiction to impact water rights. The GSA will collaborate with the appropriate agencies and entities with jurisdiction over the different facets of the PMAs to facilitate their implementation. This includes private landowners and water users in the Basin.

The GSA engaged the public during GSP development, and a sufficient commenting period was included to review all proposed PMAs. The public will be notified and provided avenues for submitting additional comments as required by regulations and obligations from funding agencies.

Estimated Costs and Funding Plan

This information will be developed upon further design of the PMAs by the lead agencies.

4.3.1.1 Rehabilitation of Existing Reservoirs and Irrigation Ponds

There are two primary practices that could help rehabilitate existing reservoirs. These include:

- *Pond Liners:* Older agricultural ponds could benefit from the installation of either synthetic liners or clay-based liners to reduce water loss due to percolation. Initial surveys show that at least five existing ponds could be considered for liner installation if funding is available. The estimated cost would be approximately $1 per square foot.
- *Pond Clean Out:* Existing, unlined ponds could benefit from reconditioning; including, but not limited to, removal of soil/debris to return pond capacity to original levels during low water years if storage conditions allow. Such reconditioning practices would also prepare existing ponds for pond liner installation as applicable. The estimated cost would be approximately 20 dollars per cubic yard.

4.3.1.2 Construction of Additional Off-stream Reservoirs

Existing surface water storage ponds within the Ukiah Valley are essential for reducing instantaneous demand on water sources, especially for reducing surface water diversions, and for providing additional water supply security in drier water years. The reduction in instantaneous demand is also beneficial for reducing the risk of impacts to fishery resources. Between 2009-2013, there were 12 off-stream agricultural ponds built with cost share funding as part of a $5 million grant from the USDA Agricultural Water Enhancement Program (AWEP) administered by the CLSI. While several other off-stream agricultural ponds were built without funding assistance, initial surveys show that at least eight new agricultural ponds could possibly be added if funding is available. The GSA will conduct an initial study to inquire about logistical opportunities to construct new reservoirs and determine their impacts on Basin conditions and sustainable groundwater management.

4.3.1.3 Construction of Additional of Off-stream Tank for Storage

Off-stream tanks and storage can be built to store water during high-flow and wet seasons to be used during the demand season. Such storage can be built at a small-scale for domestic and small agricultural uses and/or at a larger scale for municipal and major agricultural uses. A feasibility study needs to be considered at first. The project can increase supply reliability and provide additional supply to offset pumping and surface water diversions that may cause seasonal depletions. The GSA will conduct an initial study to determine the feasibility and assess the benefits of the project. The feasibility study will also determine the best locations and appropriate volumes of storage. The feasibility study findings will guide the GSA in its decision to fully implement the project and its process.

4.3.1.4 Well Analysis, Rehabilitation, and Impact Mitigation

Using the California Well Completion Report (WCR) database, the GSA conducted an analysis to evaluate the impacts of returning to Fall 2016 groundwater levels. The analysis showed that if the groundwater levels decline 10 ft (3 m) below Fall 2016 conditions about 5% of domestic users with shallow or ill-designed wells may also be impacted. Most of these wells are shallow and located around surface water bodies, which would increase the likelihood of short-term impacts on those surface water bodies, especially when pumping is at its peak. These shallow wells are primarily for domestic use, mixed domestic/agricultural use, or small agricultural wells. There are also several riparian users and surface water rights holders along the Russian River that use such rights to divert water as their primary source of supply, including a few public water purveyors. A portion of the rights holders do not have reliable wells to use in low-flow years and/or the number and condition of their wells cannot satisfy their existing demand.

These findings emphasize the importance of reconditioning wells, specifically for the shallow and/or old wells, to improve supply reliability for domestic users by making it possible to alternate between sources of supply and to increase conjunctive use of water in the Basin. This would also help adaptively manage undesirable results through different pumping patterns and diversions.

Additionally, the GSA has been using the UVIHM to simulate the Basin and Upper Russian River Watershed (upstream of Hopland) and evaluate different future scenarios so that effective and adaptive management can be implemented to achieve and maintain the Basin sustainability. This model can also be used to plan for locating new wells and reconditioning existing wells. The model can help define and optimize the following projects and management actions, especially during droughts:

- Locate additional supply wells to be drilled and identify effective pumping patterns that would maximize the supply while causing no significant and unreasonable impacts;
- Evaluate appropriate recharge locations to store and improve Basin conditions; and,
- Demonstrate that new or reconditioned wells can be developed in locations where no impact will be noticed to the sustainability indicators applicable to the UVB.

The above list is not all inclusive and the model can simulate further scenarios as needed.

Similarly, a better accounting of agricultural production wells can be developed to assess possible impacts on them. Feasibility studies need to be conducted to possibly implement well drilling for major agricultural producers with limited groundwater withdrawal capacity to increase flexibility in changing seasonal surface water diversions and pumping patterns with negligible impact on overall demands. This effort will be focused on the rehabilitation of old and/or faulty wells to increase efficiency and reduce losses.

Condition for Implementation

The GSA has conducted an initial study to evaluate the impacts to shallow and domestic wells in **Appendix 3A**. This PMA, in conjunction with the well inventory PMA, will facilitate updating and improving the domestic well assessment through a special study. The special study will act as the first phase of the PMA and will assess groundwater wells in the Basin, existing vulnerabilities, potential high-risk areas and groundwater users, and define appropriate criteria and pathways for rehabilitation and impact mitigation.

Upon completion of the first phase, the GSA will be able to mitigate possible impacts on drinking water and domestic groundwater uses in case of groundwater declines due to droughts or emergencies by implementing the designed impact mitigation measures. These measures may include, but are not limited to, constructing new wells, deepening and rehabilitating existing wells, passing ordinances to enhance well drilling permitting procedures, and offering financial services to well owners.

The GSA will continue to pursue funding to assess well infrastructure and potential impacts due to groundwater levels. Implementation of this PMA is contingent upon securing the funding through available grants.

Measurable Objectives Expected to Benefit

This PMA can provide relief to drinking water and domestic water users to increase water supply reliability and resiliency in the Basin.

Legal Authority and Public Noticing

Well construction permits, environmental forms, and possible CEQA/NEPA requirements need to be addressed for well construction and rehabilitation. The GSA can modify the well permitting process through coordination with the County of Mendocino Environmental Health Department. The GSA engaged the public during GSP development, and a sufficient commenting period was provided to review all proposed PMAs. The public will be notified and provided avenues to submit additional comments as required by regulations and funding agencies' obligations.

4.3.1.5 City of Ukiah Recycled Water Project – Phase IV

The City's Water Resources Department plans to implement Phase IV of the Recycled Water Project, which will add six miles of pipeline, a one-million gallon storage tank, ponds, and a booster station to provide an additional 400 AFY of recycled water to serve schools, parks, the cemetery, and golf course. This phase of the project is expected to cost approximately 18 million dollars.

Condition for Implementation

Recycled Water Project – Phase IV received CEQA approval on June 5th 2018. The City plans to continue to evaluate their long-term projected water balance to identify the appropriate implementation timeline for this project.

Measurable Objective

Additional recycled water supply will provide conjunctive use opportunities and increase supply reliability in the Basin. Depending on the location and amount of use, it can replace groundwater pumping and surface water diversion, resulting in reduced depletion of surface water bodies and increased groundwater levels in the Basin.

Legal Authority and Public Noticing

With the appropriate permitting, the City of Ukiah is authorized to construct new recycled water infrastructure to provide an alternative water to its customers. The public is frequently informed of the Phase IV Recycled Water Project through City of Ukiah's webpage and news publications. The GSA engaged the public during GSP development, and a sufficient commenting period was provided to review all proposed PMAs. Additional public notification is planned with significant project changes or additional project elements.

4.3.1.6 Pump(s) For Potable Water Intertie

The City is proposing to install two pumps within an intertie system to provide potable drinking water to the adjoining county water districts, Millview County Water District to the north and Willow County Water District to the south. The cost for each pump would be about $140,000. These projects are expected to increase supply reliability for the two water districts and the region, and consequently, reduce stress on the groundwater Basin and diversions from the surface water bodies.

4.3.2 Managed Aquifer Recharge and Injection Wells

Geophysical analysis conducted during GSP development indicated the presence of conductive soils in the Basin that could contribute toward groundwater recharge from surface water sources. However, existing data gaps prevents the GSA from fully analyzing the geology below these soils using the UVIHM to determine operational locations for groundwater recharge projects. If funding becomes available, additional geological analyses can be performed to specify pilot groundwater recharge projects within the Basin.

Both active and passive conjunctive uses can be considered in the Basin and Upper Russian River Watershed to provide water supplies. As explained above, active conjunctive use, or direct recharge, includes any practice that delivers water to the aquifer and increases groundwater storage. Passive conjunctive use, or indirect recharge, includes conjunctive use practices (i.e., coordinated uses of surface water and groundwater) that reduce the amount of groundwater withdrawals which leads to increased aquifer storage. Direct recharge can be achieved by the following approaches:

- ***Spreading basins:*** Spreading basins facilitate the movement of water from the ground surface to the underlying hydraulically connected unconfined aquifer. A large volume of infiltrating water is concentrated on the ground surface which provides opportunities for recharge over larger areas and for longer time periods than what would otherwise occur.
- ***Flooding agricultural fields (Flood-MAR):*** This practice involves use of flood water or stormwater for managed aquifer recharge (MAR) on agricultural lands and appropriate landscapes. Flood-MAR projects provide multiple benefits to the water supply system, ecosystem, and wildlife habitat by increasing water supply reliability, flood risk mitigation, drought preparedness, aquifer replenishment, ecosystem enhancement, subsidence mitigation, water quality improvement, working landscape preservation and stewardship, climate change adaptation, recreation, and aesthetics.
- ***Injection wells and/or dry wells:*** Using injection or dry wells involves the installation and operation of equipment to inject water into specific aquifers. Aquifer storage and recovery (ASR) wells are the most common injection method used in California. Groundwater injection projects are typically most effective when utilizing a consistent, designated water supply (such as recycled water). ASR wells do not have seasonal constraints and do not depend on surficial soil characteristics, but require controlled operation and regular maintenance to sustain adequate recharge rates.
- ***Streams and canals:*** These features can be used to infiltrate water and increase groundwater recharge. For example, diverting water during non-irrigation seasons into unlined canals can supplement groundwater recharge if canal seepage reaches the underlying aquifers.

Indirect recharge can be conducted by supplying a water demand with an alternative water source that would otherwise be met by groundwater extraction or surface water diversion.

All above methods are applicable in the Basin and Upper Russian River Watershed. For direct recharge practices, the initial process to identify possible locations would include:

1. Identifying potential sites through stakeholder coordination, infrastructure feasibility, and long-term planning efforts.
2. Performing site-specific analyses based on the ongoing efforts of the GSA to assess the following:
    a. Local groundwater levels and aquifer characteristics and capacity;
    b. Local infiltration capacity of soils using SSURGO and/or UC Davis SAGBI databases;
    c. Local water quality and possible water quality implications of recharge; and,
    d. Potential environmental impacts.
3. Perform groundwater flow analysis using the integrated hydrological model to assess:
    a. Residence time of recharged groundwater prior to the closest withdrawal location;
    b. Estimate recharge rate; and,
    c. Whether the recharged groundwater would be directed to streams or can offset demands in the Basin.
4. Perform site-specific geophysical field work and studies to assess hydrogeological characteristics and help conceptual design.
5. Develop cost estimate and prioritize feasible sites for pilot projects or larger-scale implementation.

List items (1) to (3) can be accomplished by using the existing data analysis and identifying new model scenarios. However, findings from these three steps need to be verified by conducting geophysical studies mentioned in step (4) before proposed recharge sites are considered for design and pilot studies.

The use of surface-based geophysical surveying methods to investigate groundwater aquifer systems and recharge pathways is well documented and is a potentially fast and cost-effective way to identify subsurface targets of interest. Two dominant surface geophysical methods used in groundwater exploration studies are electrical resistivity and electromagnetic conductivity surveying, both of which are occasionally referred to as geoelectric techniques. Using a combination of these two techniques at specific sites of interest across the valley floor is proposed for this GSP. Each is based on the principle of how resistive or conductive the combination of rock, sediment, and/or water and other fluids in the subsurface are to a passing electrical current. Various combinations of saturated and unsaturated subsurface material create a wide spectrum of electrical responses that can be roughly correlated to a geologic material. Both methods produce cross-sectional images of varying resistivity with depth along the surveyed lines.

These methods are ideal for using differences in conductivity to identify the elevation of the water table (the saturated zone is more conductive than the unsaturated zone within the same geologic unit), the contact between porous rock or sediment and impermeable bedrock (resistive), and to determine the location of freshwater-saturated coarse sediment (more resistive) and clay layers (less resistive). To explore the feasibility of managed aquifer recharge and conjunctive use projects, electrical resistivity surveying is utilized, which requires lines of connected, grounded electrodes,

to estimate surface properties and structure. DWR is conducting Airborne Electromagnetic (AEM) Surveys for all groundwater basins subjected to SGMA. This Basin was surveyed in November 2021. The results of this survey can provide a good starting point for recharge practices in the Basin.

The feasibility of MAR and injection wells largely depends on the availability of excess surface water. This availability is constrained by several factors, including drinking water treatment capacity, water rights and place of use restrictions, required minimum instream flows, and availability of adequate surface water supplies to serve other existing demands prior to being used for recharge. Climate change impacts could also constrain water supply availability for such projects.

MAR and ASR projects outlined in this category are in the preliminary design stages and will be further developed on an as-needed basis and upon the decision of the GSA and their respective lead agencies. General specifications that apply to all these projects are summarized below. Project-specific descriptions are provided for each project that supersedes the overlapping general information provided here.

Condition for Implementation

The GSA supports MAR and injection well PMAs to improve groundwater conditions in the Basin. It will coordinate with potential partners such as the County, the City, the RRFC, water purveyors in the Basin, MCRCD, and CLSI to implement MAR and ASR project. Implementation of projects is contingent upon receiving sufficient funding resources. The GSA will cooperate with partners and lead agencies to pursue grant funding opportunities. Upon the decision of the lead agency and the GSA to implement a project, a feasibility study will be conducted that includes small-scale or pilot recharge practice. The feasibility study will determine design elements and provide an outlook for the large-scale implementation. Following the feasibility study and depending on the availability of financial resources, the GSA and the lead agencies will proceed to site selection, purchasing, design, and implementing the full-scale recharge practices.

Measurable Objectives Expected to Benefit

MAR and ASR projects would recharge aquifers and have the potential to increase groundwater storage, improve baseflow conditions, and raise groundwater levels. Therefore, they can improve sustainability of the Basin and increase water supply reliability. Impacts of recharge on groundwater quality should be an integral part of feasibility and pilot projects. Recharge projects are not intended to degrade groundwater quality locally or Basin-wide.

Permitting and Regulatory Requirements

The permitting and regulatory process for MAR and ASR projects depends on many factors, such as funding agency requirements (local, state, federal), potential impacts to environmental and cultural resources, availability of supply and water right permits, and project logistics. Because several PMAs are not yet fully designed, defining what permitting and regulatory process will be required would be premature. However, for MAR projects, a temporary Water Rights Permit (e.g., SWRCB Application for Temporary Permit filed pursuant to Water Code 1425 to Divert to Underground Storage During High Flow Events) is needed. As permits can be issued for up to 180 days, this permit will be needed for every application year. California Department of Fish and Wildlife (CDFW) also requires a Lake and Streambed Alteration Agreement when a project may affect fish and wildlife resources. ASR projects may need similar water rights and CDFW permits. In addition, ASR wells need to follow SWRCB Water Quality Order 2012-0010[1] and possibly an environmental impact

[1] https://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2012/wqo2012_0010_with%

report. The lead agency sponsoring the projects will be obligated to obtain the necessary funding and permits and meet regulatory requirements to the extent applicable.

Legal Authority and Public Noticing

The GSA has the authority to manage groundwater in the Basin and has no land use authority or legal jurisdiction to impact water rights. The GSA will collaborate with the appropriate agencies and entities having jurisdiction over the different facets of the PMAs to facilitate their implementation. This includes private landowners and water users in the Basin. California state law gives water districts the authority to take actions necessary to supply sufficient water for present or future beneficial use. Land use jurisdictions have regulatory authority to develop similar programs. The City and the County have similar authority over their respective jurisdictions.

The GSA engaged the public during GSP development, and a sufficient commenting period was provided to review all proposed PMAs. The public will be notified and provided avenues for comments as required by regulations and funding agencies' obligations.

Estimated Costs and Funding Plan

This information will be developed upon further design of the PMAs by the lead agencies.

4.3.2.1 City of Ukiah Groundwater Recharge

The City has proposed a groundwater recharge project through the construction of a recharge basin at Riverside Park that would facilitate aquifer recharge and create seasonal wetlands. Estimated costs for the design and construction of this recharge basin, which could potentially recharge the aquifer by 1,000 AFY is approximately $1,750,000. Construction of this recharge basin would improve groundwater supply and reliability while also creating riparian and wetland habitat in a natural park setting. The GSA will cooperate with the City and assist in pursuing grant funding for this project, analyze impacts and benefits to the Basin, and provide letters of support. The project implementation will generally follow the steps outlined in **Section 4.3.2**. It may start as a pilot project, including geophysical studies, monitoring, and small-scale implementation. Based on the pilot project's success and availability of excess water resources, full-scale implementation may be pursued.

4.3.2.2 Rogina Mutual Water Company and Millview County Water District MAR and/or Injection Wells

This concept project includes conducting a feasibility study, and possible implementation of ASR wells in Rogina Mutual Water Company (customer of RRFCD) and Millview County Water District well fields. Both Rogina Water Company and Millview County Water District currently divert surface water from the Russian River into percolation ponds and pump groundwater through supply wells.

This ASR would inject excess surface water, treated to drinking water standards, into the natural structure of Basin aquifers for use as an underground storage reservoir. This concept project needs to be further developed to allow for an informed decision regarding conditions of implementation. ASR projects commonly need feasibility studies and pilot projects as a first phase to assess hydrogeologic conditions, groundwater flow and injected water movement and local response to

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injection and extraction. The feasibility study also determines sustainable injection rates and possible groundwater quality impacts on the Basin.

4.3.2.3 Mendocino County Water Agency Groundwater Recharge Projects

There are several areas across the Basin, such as reclaimed mines and gravel pits, that would require minimal infrastructural improvements to recharge the underlying aquifer. A geophysical study must be conducted on these areas to identify geologically suitable locations for recharging the aquifer by stormwater and river diversions. Followed by geophysical studies, the GSA can begin working on contracting or purchasing these tracts of land to implement pilot recharge projects and conduct additional studies with the ultimate goal of implementing effective recharge basins. Some examples of these reclaimed mines include:

- Ford Gravel - Talmage: This is a sand and gravel dredged site owned by NORCAL Recycled Rock in the Talmage area. it includes 95 acres of permitted and 26.5 acres of disturbed land (reclamation in progress).
- Redwood Valley Gravel Products Mine: Located in the Redwood Valley area, this is a streambed/gravel bar pitting site that includes 56 acres of permitted and 2 acres of disturbed land (none reclaimed).
- Nor-Cal Investment Co., Inc. Mine : Located west of the town of Calpella, this site includes 3 acres of disturbed land with no listed excavation or completed reclamation.
- Kunzler Terrace Mine Project: Located just north of the City of Ukiah, this site was intended to be developed as a sand and gravel quarry by the Granite Construction Company. A CEQA EIR was completed in 2010 for this site, but the project was never excavated.

Upon the decision of the County and the GSA to implement this project, a feasibility study will be conducted that includes small-scale projects in different locations. The feasibility study will determine water availability and prioritize recharge locations and methods. Following the feasibility study and depending on the availability of financial resources, the GSA and the County will proceed to site selection, purchasing, and design, and implementing the full-scale recharge practice.

4.3.2.4 City of Ukiah Western Hills Source Water Protection

The current hydrology of the western hills of the Ukiah Valley is a major driver for recharging the underlying aquifer. Preserving these properties will protect these important resources. This project proposes to purchase the undeveloped headwater properties in the western hills. The estimated capital cost for this project is $3.5 million. Preservation of headwater properties in the western hills of the Ukiah Valley will help ensure that natural runoff and groundwater recharge patterns will continue in perpetuity.

4.3.2.5 Stream Enhancements

Feasibility studies need to be conducted to increase water supply reliability and reduce impacts on groundwater table through:

- Storing flows in the tributaries and creating recharge basins in river channels to allow for direct recharge. Feasibility studies need to be conducted and pilot projects need to be performed to select appropriate sites.
- Stream restoration projects in the Russian River and tributaries to reduce the impacts of historical incision and gravel mining done in the Basin and Upper Russian River Watershed. Stream restoration projects can be form-based or process-based. Feasibility studies need to be designed and conducted to measure the possible benefits of such projects and help with the design of the pilot and final projects.

4.3.2.6 Distributed Stormwater Collection and Managed Aquifer Recharge (DSC-MAR)

Distributed Stormwater Collection and Managed Aquifer Recharge (DSC-MAR) is a landscape management strategy that can help to reduce aquifer overdraft and maintain long-term water supply reliability. DSC-MAR targets relatively small drainage areas from which stormwater runoff can be collected for infiltration. Infiltration can be accomplished in surface basins, typically having relatively small surface areas, or potentially through flooding of agricultural fields or flood plains, use of dry wells, or other strategies.

Feasibility studies and pilot projects need to be designed to take advantage of DSC-MAR in the Basin. These projects can be combined with the County and the City's stormwater management programs and plans and utilize their respective low impact development manuals.[2] This PMA can be designed and implemented along or in conjunction with similar and ongoing projects in the Basin executed by the MCRCD and local water districts.

4.3.2.7 RRFC On-Farm Groundwater Recharge Multi-Benefit Demonstration Project

This project will demonstrate the potential benefits of diverting wet-season surplus flows from the Russian River for on-farm groundwater recharge. RRFC can utilize customers' existing agricultural surface water diversion and irrigation infrastructure and divert up to 500 AFY from the main-stem Russian River under its water right. It can also obtain a temporary groundwater recharge permit for recharge on up to 500 acres of agricultural land owned by RRFC contractors.

The project will also install up to 50 shallow (<50 feet) monitoring wells to be outfitted with continuous water level data-loggers, which will record changes in water level before, during, and throughout the summer irrigation season. The data can be correlated with stream gage data to evaluate the benefit of winter on-farm recharge on spring flows and the impact of groundwater pumping during the summer on the main stem Russian River in the Basin.

The goal of the project is to increase underground storage of water which has the potential to:

- Increase spring-time baseflow to the Russian River, which will reduce supplemental releases from Lake Mendocino to meet minimum in-stream flow requirements;
- Reduced supplemental reservoir releases will retain higher levels of storage of water in Lake Mendocino to serve summer-time demand and maintain in-stream flows for aquatic resources;

[2] For more information on Mendocino County stormwater management program visit: https://www.mendocinocounty.org/government/planning-building-services/stormwater

- Increase stored groundwater to reduce potential depletion of surface waters from groundwater pumping; and,
- Collect data to evaluate impacts of groundwater pumping on surface water flows.

4.3.2.8 Aquifer Storage and Recovery (ASR) and Flood-MAR Feasibility & Implementation

This project includes identifying suitable locations for ASR and Flood-MAR projects to increase groundwater storage in the shallow aquifer layers. Surplus seasonal flows (flood water available during winter and spring months) can be spread onto agricultural or other suitable lands to percolate into the aquifer and provide recharge benefits for the Basin. Agricultural lands close to the Russian River and tributaries can be used for this purpose and several agricultural users have shown interest during public meetings and outreach opportunities to cooperate for pilot projects and feasibility studies. Incentive structures can also be set up to encourage landowners to participate in this program.

4.3.3 Demand Management and Water Conservation

The GSA's member agencies have a full range of water conservation programs in place. They have actively and successfully implemented policies and programs promoting and incentivizing water conservation and efficient water use in the past. PMAs included here are additional strategies that the GSA may decide to implement in coordination with local and regional partners to maintain sustainability in the Basin and improve groundwater conditions. As these projects evolve in the Basin and are identified to be implemented, further details will be provided through appropriate public notices and outreach avenues. Demand management and conservation PMAs generally intend to prevent additional stresses on water supply resources, including groundwater basins. Therefore, they would help maintain the Basin in sustainable conditions and avoid undesirable results. The GSA does not have the legal authority to solely implement the PMAs mentioned below and will coordinate and cooperate with appropriate agencies to accomplish them. The GSA may use its legal authority under SGMA to incentivize conservation and implementation of PMAs mentioned in this category.

4.3.3.1 Reduce Evaporative Losses from Existing Surface Water Storage

While the area of most agricultural off-stream ponds within Ukiah Valley is between 1 to 5 acres, these ponds vary in volume from 0.5 AF to over 50 AF. There are also municipal storage ponds within the Basin. Although these ponds provide storage benefits, they are subject to significant evaporative losses in this area. The purpose of this project is to reduce evaporative demand potentially reducing surface water diversions allowing more flow to stay in the river to meet minimum instream flows and increase groundwater recharge allowing more water to percolate through the ground. Some short-term solutions that can limit the evaporative loss include:

- *Shade Balls:* Shade balls are made from various materials in different sizes. These shade balls float on the surface of water storage ponds to reduce evaporative loss and water quality impacts (algal blooms). Depending on the manufacturer producing the shade balls, they can reduce evaporative loss by as much as 90%.

- *WaterSavr:* WaterSavr is a patented hydrated lime powder containing hydroxy-alkanes (food grade and potable approved) that is applied to the surface of the water. Ionic repulsion causes the hydroxy-alkanes to self-spread, resulting in a mono-molecular film on the surface of the water. This is an inexpensive method suitable for most water bodies, such as reservoirs, canals, irrigation ponds, and rice paddies. A local application of WaterSavr on an off-stream agricultural pond verified an over 30% reduction in evaporative loss. The cost would be approximately $27.50 per acre per month, while the dispensing unit would cost between $3,000 to $5,000.

4.3.3.2 Conservation Programs and Green Infrastructure

The objective of these types of projects is to increase water yield from the watershed through green infrastructure. Green infrastructure may include actions that reduce flows to surface waters. Anticipated benefits from these types of projects include increased water storage in the watershed during the wet season, improved flows from the watershed during the dry season, and the support of desired instream flow conditions. Changes in streamflow entering the Basin will be monitored and evaluated through existing and proposed new streamflow gauges and through statistical analyses of acquired data.

4.3.3.3 Irrigation Efficiency Improvements

Achieving increases in irrigation efficiency through equipment improvements are anticipated to reduce irrigation pumping and diversions during the growing season, and lessening the chance of river disconnection during critical dry periods. This is expected to support desired instream flows, fish migration, and aquatic habitat. This project involves an exploration of options to improve irrigation efficiency, assessment of irrigator willingness, outreach and extension activities, and development of funding options, primarily by cooperators, possibly in cooperation with the Natural Resources Conservation Service (NRCS). This PMA is likely to be accomplished through a voluntary, incentive-based program. Cost estimates have not yet been completed for this PMA.

An example of this type of project that has been partially implemented in the Basin by the CLSI is the supply and installation of soil moisture sensors at agricultural fields to improve the timing and amount of irrigation and applied water. An expansion of this project may be incorporated as part of this broader irrigation efficiency improvement project.

In addition, increasing the flexibility of irrigation systems in the Basin can lead to improvements in surface water depletion and reduction in aquifer stress. This type of irrigation efficiency improvement can involve infrastructural improvements to the pumps and lifting facilities through the installation of variable frequency drive (VFD) pumps, and/or other equipment, that allow farmers to change the intensity and volume of supply based on the need and acreage of their respective irrigated land and reduce evaporative loss and wastes due to leaks and over-irrigation.

Monitoring data to be collected in this irrigation efficiency improvement program include, but are not limited to:

- Total acreage with improved irrigation efficiency equipment;
- Location of fields under improved irrigation efficiency equipment;

- Assessment of the increase in irrigation efficiency, with particular emphasis on assessing the reduction or changes in consumptive water use (evaporation, evapotranspiration) based on equipment specification, scientific literature, or field experiments; and,
- Cropping systems in fields with improved irrigation efficiency equipment.

4.3.3.4 Voluntary Land Repurposing

Voluntary managed land repurposing programs include a wide range of voluntary activities that make dedicated, managed changes to land use (including crop type) on specific parcels in an effort to reduce consumptive water use in the Basin to improve and increase groundwater levels and instream flow during the critical late spring recess, summer baseflow, and early fall flush flow period. These activities may include any of the following:

Term Contracts: In some circumstances, programs like the Conservation Reserve Program (CRP) could provide a means of limiting irrigation on a given area for a term of years. Because of low rates, the CRP has not been utilized much in California, but this could change in the future. In addition, other term agreements may be developed at the state or local level.

Crop Rotation: Landowners may agree to include a limited portion of their irrigated acreage in crops that require only early season irrigation. For example, a farmer may agree to include a portion of their land in grain crops that will not be irrigated after June 30.

Irrigated Margin Reduction: Farmers could be encouraged to reduce irrigated acreage by ceasing irrigation of field margins where the incentives are sufficient to offset production losses. For corners, irregular margins, and pivot end guns, this could include ceasing irrigation after a certain date or even ceasing irrigation entirely in some instances.

Crop Support: To support crop rotation, particularly for grain crops, access to crop support programs may be important to ensure that this option is economically viable. Some type of crop insurance and prevented planting payment programs could provide financial assurances to farmers interested in planting grain crops.

Other Uses: In some circumstances, portions of a farm that are currently irrigated may be well suited for other uses that do not consume water. For example, a corner of a field may be well suited for wildlife habitat, solar panels, managed aquifer recharge infiltration areas, or water storage, subject to appropriate zoning requirements to avoid undesirable outcomes. Other voluntary managed land repurposing projects include conservation easements that reduce or eliminate surface water diversion for irrigation (streamflow augmentation). This would offset depletions of interconnected surface water. These actions may also involve a reduction in groundwater irrigation for part or all of the irrigation season, in some or all years, on currently irrigated acreage. Conservation easements may also include floodplain reconnection/expansion projects. Depending on the circumstances of an individual project, conservation easements may include habitat conservation easements, wetland reserve easements, or other easements that limit irrigation on a certain area of land. It may be established that certain portions of a property may be suitable for an easement, while the rest of the property remains in irrigated agriculture.

Implementation of this project type includes consideration of the following elements:

- Exploration of program structure;
- Contracting options;

- Exploration and securing of funding source(s); and,
- Identification of areas and options for conservation easements.

Anticipated benefits from this type of project include improvement in instream flow conditions on the Russian River and its tributaries during critical summer and fall low-flow periods.

Monitoring data to be collected in this conservation easements program include, but are not limited to:

- Location, acreage, and current and future anticipated cropping system/land use on enrolled acreage.
- Quantification and timeline of surface water dedications to instream flow specified in the easement.
- Quantification and timeline of groundwater pumping curtailments, including water year type or similar rule to be applied and specified in the easement.

Monitoring data to be collected in this voluntary land repurposing program include, but are not limited to:

- Total acreage of land repurposing;
- Location of parcels with land repurposing;
- Assessment of the effective decrease in evapotranspiration and water use; and,
- Description of the alternative management on repurposed land.

4.3.3.5 Alternative, Lower ET Crops

The “alternative, lower ET crop” PMA defines and introduces alternative crops with lower ET, but adding sufficient economic value to the Basin’s agricultural landscape. The objective of this PMA is to facilitate crop conversion in some of the agricultural landscape that will reduce total crop consumptive use (evapotranspiration) of water in the Basin, as needed. The management action is to create a program to develop and implement pilot studies with alternative crops that have a lower net water consumption for ET, and to provide extension assistance and outreach to growers to facilitate and potentially incentivize the crop conversion process. In the conceptual phase, this project involves:

- Scoping of potential crops;
- Pilot research and demonstrations;
- Defining project plan;
- Exploration of funding options;
- Securing funding;
- Development of an incentives program; and,
- Implementation.

Anticipated benefits from this project include lower consumptive water use and either an increase in recharge (on surface water irrigated crops) or a reduction in the amount of irrigation or both. As

a result, water levels in the aquifer system will rise. This will also lead to an increase in instream flows.

Monitoring data to be collected in this alternative, lower evapotranspiration program include, but are not limited to:

- Total acreage with alternative, lower ET crops;
- Location of fields with alternative, lower ET crops;
- Assessment of the effective decrease in ET; and.
- Cropping systems used as alternative, lower ET crops.

4.3.3.6 Municipal Supply and Use Efficiency Improvements

This PMA involves future infrastructural improvements, outreach and education efforts, and operational adjustments that would reduce municipal demand, increase supply reliability and water use efficiency for municipal beneficial users. It may include educational workshops and training to increase water conservation, provide incentives and rebates on appliances' and utilities' improvements, leak detection and distribution network rehabilitation, and improved metering

As part of this PMA, the Mendocino County Russian River Flood Control and Water Conservation Improvement District intends to conduct a feasibility study to replace old meters and calibrate existing meters to improve tracking of surface water diversions and assess the possibility of telemetry instrumentation. This project would provide data regarding surface water diversion volumes and locations, and help improve water budget calculations and re-calibrate the UVIHM.

4.3.3.7 Develop Emergency and Drought Mitigation Strategies Through Demand Management and Groundwater Conservation

The urgency for resiliency and contingency planning has never been greater. The ongoing drought in California and the uncertainty surrounding the operation of the Potter Valley Project, combined with the impacts of climate change, has made it evident to the GSA that a comprehensive strategy is required to mitigate short-term impacts on the Basin during emergencies. Further studies and a deeper understanding of the Basin are needed to develop a groundwater demand management and conservation strategy that would produce efficient short-term relief from impacts without generating unnecessary ecological and economic burden on the beneficial users of the Basin. This PMA intends to enumerate the steps that the GSA will take and the special studies that need to be conducted to attain such understanding and develop the strategic plan.

As outlined in other PMAs in this Chapter, a number of conservation programs have already been put in place by the GSA's member agencies. They have actively and successfully implemented policies and programs promoting and incentivizing water conservation and efficient water use. In recent years, management actions to reduce water demand have also been implemented in the Basin to mitigate the impacts on beneficial users of surface water during frost and heat protection events. The GSA plans to build on the success of these efforts and develop additional measures with respect to groundwater management that can address specific and local needs of the Basin during emergency and drought years. The GSA is considering the following strategies for this purpose:

- Planning and redistribution of municipal and agricultural groundwater pumping to mitigate local impacts on groundwater levels and streamflow depletion and;
- Management of groundwater extractions and recharge.

These strategies have the potential to supplement groundwater storage, increase groundwater levels, and decrease surface water depletions in the Basin. They are within the jurisdiction of the GSA to implement but may need to satisfy additional regulatory requirements and permits based on their implementation pathway and details. It is worth noting that this PMA intends to develop these strategies for possible future implementation. Therefore, implementation costs, funding sources, and the circumstances of implementation will be detailed in the development. The GSA will initiate this PMA during the first five years of the implementation contingent upon the availability of funding through implementation grants or from the GSA's annual implementation budget. As these strategies for groundwater conservation and demand management evolve, the GSA will provide sufficient outreach and public process to educate the public on its findings and the details of each strategy.

Planning and redistribution of municipal, non-municipal domestic, and agricultural groundwater pumping to mitigate local impacts on groundwater levels and streamflow depletion

As outlined in **Chapter 2** and **Appendix 2-D**, major groundwater users in the Basin are municipal, non-municipal domestic, and agricultural users. The Basin experiences different dynamics of water supply depending on the geographical location of the demands. Surface water is available through the Russian River and its tributaries to the users that have riparian access or purchase water from water purveyors. South of Lake Mendocino, this source of key water supply has been available historically, even during dry and irrigation seasons, due to the managed releases from the Coyote Valley Dam and baseflow contributions of the groundwater aquifers. On the other hand, north of Lake Mendocino, dry season supply is more diversified and typically comprised of groundwater, stored water, and limited surface water supply. Water users farther from surface water bodies that do not purchase water from water purveyors are primarily reliant on groundwater. In recent years, recycled water has been added to the water supply portfolio of the Basin and was used for irrigation along the Russian River mainstem.

Due to these different supply and demand dynamics and the land use and population distribution in the Basin, GSA expects localized impacts within the Basin to become evident during emergency and drought years. This may include impacts such as groundwater level declines, localized significant depletion of interconnected surface water bodies, and impacts to groundwater-dependent ecosystems. Redistribution of groundwater pumping in the case of such localized impacts may provide supply relief and help mitigate such impacts. For example, the depletion of interconnected surface water bodies may be mitigated by redistributing the pumping from shallow domestic wells near the rivers to deeper wells further from the surface water bodies. This would help improve the groundwater flow gradients towards the river to decrease depletion while not reducing the supply to the water users.

Pumping redistribution may include horizontal and vertical changes in withdrawal patterns, meaning changing the pumping location and the depth and the aquifer that is being withdrawn. In addition, redistribution may include changing the timing and amount of pumping by optimizing the conjunctive use of available water supply sources to meet demands in a timely manner while providing the needed localized pumping relief to the Basin.

To develop such a strategy and implement it efficiently, the GSA will conduct special studies to assess the ecological, hydrogeological, and economic impacts of different redistribution scenarios

and understand their mitigation efficiencies. In addition, the GSA will assess existing groundwater production redundancies within the Basin to implement such redistribution and prepare funding and relief programs to facilitate the redistribution and mitigate unexpected impacts on beneficial users.

Groundwater conservation and optimization of conjunctive use of groundwater and surface water

The GSA believes that absent drastic changes to the water supply dynamics in the Basin, implementation of effective PMAs outlined in this Chapter such as urban and agricultural conversations, improving water supply and infrastructure efficiencies, and water supply augmentation will be sufficient to manage and maintain the Basin sustainably. However, it is evident that critical changes in the water availability for the entire watershed due to possible alterations in Potter Valley Project operation together with unforeseen conditions of emergency, will require a better evaluation of conservation measures. This evaluation of conservation measures and available mechanisms to address water supply in critical conditions may include temporary and effective pumping restrictions in specific areas and at specific times to guarantee that water is available for all water users in the Basin and sustainable conditions are preserved.

For the purpose of the GSP, pumping restrictions are defined as reductions or limitations in the amount of water a current or future groundwater user can pump from the Basin. This would be applied in the case of a situation where the planned PMAs are insufficient to reach and maintain the sustainability of the Basin, and additional measures need to be implemented. Under such conditions, the GSA would identify the areas and volumes to reduce through forecast scenarios that efficiently bring the Basin back to its sustainability pathway. Restrictions may include putting limitations on new wells, embedding restrictions into well-permitting programs, and augmenting the groundwater fee structure to incentivize allocation maintenance. Restrictions are expected to be managed in conjunction with a different timeline for surface water use. They should mostly be considered as a tool to optimize conjunctive water use.

More work and further studies will need to be done to identify various scenarios to optimize conjunctive use and determine the ecological, hydrogeological, and economic impacts on beneficial users and implement the strategy efficiently.

4.3.4 Other Management Actions

Other management actions include PMAs that do not fit within the first three categories. These PMAs are outlined below.

4.3.4.1 Monitoring Activities

Chapter 3 and the explanation of data gaps presented in **Appendix 2-E** clearly describe the importance for establishing an extensive monitoring network which will be used to support the future GSP updates.

A summary of the monitoring activities to be considered under this management action include, but are not limited to:

- Development of new RMPs upon collecting sufficient temporal record in newly drilled monitoring wells to support water level SMC and ISW SMC;

- Instrument additional wells with high-frequency data loggers to monitor groundwater elevation at locations important to the assessment of depletion of ISWs;
- Conduct video logging and GPS surveys of monitoring wells with missing construction information;
- Conduct pumping tests to estimate aquifer properties;
- Conduct additional groundwater elevation monitoring and geophysical studies to assess the impacts of Maacama fault;
- Install new streamgages on both the mainstem of the Russian River and along key tributaries;
- Development of an isotope study to fully evaluate the movement of water throughout the Basin, inflow to the Basin, and to better represent and characterize underflow wells;
- Conduct stream profile and bathymetric surveys to map stream channels;
- Use of satellite images and vegetation indices to fully evaluate the status of GDEs; and,
- Conduct one or more seepage runs in the summer/fall months during the drought to evaluate local reach losses along the main Russian River. A seepage run is conducted by measuring stream discharge at multiple locations along the river during a short period in time (< 1 day) to obtain a snapshot of local reach losses between measurement locations. Reach loss estimates from a seepage run provide valuable groundwater/surface-water exchange measurements along each local reach to inform model development and depletion of ISW decision-making.

Monitoring activities will be prioritized during the implementation of the GSP considering the availability of funding, addressing data gaps, and feasibility of the monitoring activities.

4.3.4.2 Groundwater Well Inventory Program

A detailed well inventory will improve the understanding of the Basin's conditions, will enhance the UVIHM, and impact model results. It will also help solve ongoing issues with the evaluation of de-minimis users and their proper inclusion in the Basin's management and modeling. The GSA will conduct outreach and surveys to assess the willingness of water users to participate in this program and investigate different approaches to facilitate the development of such an inventory. This feasibility phase will involve coordination with the SWRCB and NCRWQCB, DWR, the County's environmental health department, the City, and other local water management, regulatory entities, and NGOs and will focus on obtaining and assessing existing data, ground-truthing the datasets used in GSP development, and evaluating data gaps. Subsequent phases of the inventory will be developed and implemented based upon this evaluation.

This PMA may be combined with the well analysis, rehabilitation, and impact mitigation PMA to better assess and continually monitor the impacts of GSP implementation, including other PMAs on drinking water users, tribes, disadvantaged and severely disadvantaged communities, and agricultural and municipal users.

4.3.4.3 Drought Mitigation Measures

Drought mitigation plans or similar contingency plans have been developed by the water districts, tribes, and other suppliers in the Basin. The PMA involves obtaining such documents and evaluating them to find common conservation and supply reliability actions that require coordination within

the Basin or the watershed to serve a larger beneficial user group. Results of this investigation will be compared with the GSP metrics (**Chapter 3**) and the next phases will be developed in conjunction with GSP's proposed PMAs. If deemed needed and/or helpful, the GSA will coordinate with other partners to develop a drought resiliency plan for the Basin, as well.

4.3.4.4 Forbearance

This PMA entails cost analysis and studies to support a change petition on RRFC license to allow landowners to purchase surplus water supply when available and use in-lieu of groundwater pumping, or for recharge (basins or Flood-MAR), depending on conditions at the time water is available. Benefits are expected to include reduced groundwater pumping and potentially preventing or reducing the loss of surface water to groundwater table in the critical summer months.

4.3.4.5 Future of the Basin Assessment

This PMA would entail developing a study of the economic impacts of the projects and management actions included in the GSP. It would include an evaluation of how implementation of the project could affect the economic health of the region and on local agricultural industry. It would also consider the projected changes to the region's land uses and population and whether implementation of these projects would support projected and planned growth.

4.3.4.6 Voluntary wells Metering Program

The GSA has concluded that metering groundwater pumpage in the Basin is not feasible at least in the near term considering the difficulties in its implementation, the significant cost that it may impose, and the lack of desire conveyed by the majority of users during outreach programs and meetings. However, groundwater use is a major data gap in the Basin, and filling this data gap, even partially, would benefit the management of the grondwater resources and future assessments. Therefore, through this PMA, the GSA will encourage through incentivize voluntary well metering throughout the Basin. Data collected can be successfully used to validate the estimates developed with the UVIHM and will be used for future assessments of the Basin conditions and effectiveness of PMAs.

A voluntary well metering program will improve the understanding of the Basin's conditions and will enhance the UVIHM, and domestic well impact modeling results. It will also potentially help solve ongoing issues with the evaluation of de-minimis users and their proper inclusion in the Basin's management and modeling.

4.3.4.7 Outreach and Education

Outreach and education will be a critical component of the future implementation of the GSP. Outreach and education can also contribute to the development of a coordinated response during periods of drought and support the implementation of drought measures that can help with a drought resiliency plan. Through this PMA, the GSA will coordinate with agencies such as NRCS, MCRCD, and others to solicit their support and guarantee the successful implementation of the GSP by 2042.

4.3.4.8 Rate Fee Study

The GSA is planning to conduct a rate fee study, preferably during 2022-2023 fiscal year, to help fund GSP implementation. The study will determine how the GSA will design and implement its fee structure within its authority under the law. Upon completion and approval of the rate fee study by the GSA, as outlined in **Chapter 5**, collected fees will partially replace member contributions to fund the implementation of the GSP. The rate fee study may include an optional initial feasibility study to assess the feasibility and applicability of expanding the well inventory in the Basin to aid the GSA's financial support and fee implementation effort. Such a study is contingent upon the approval of the GSA Board and will be proposed only if determined that its needed to provide a path for funding and fee structure.

4.3.4.9 Climate Change Impact Assessment

The GSA acknowledges the importance of assessing the impacts of climate change in all aspects of the GSP and providing adaptability to effectively mitigate such effects. The significance of these changes has been made even clearer during the recent drought in Mendocino County. The GSA adequately assessed climate change impacts using DWR methodology and central tendency scenarios during GSP development and considered those impacts in its decision-making process. However, further assessments would benefit the management and sustainability of the Basin.

As a result, the GSA has coordinated with Sonoma Water to develop a framework to ensure watershed-wide consistency with respect to climate change simulations for the Basin. This will help the GSA include changes to reservoir operation and surface water availability in the Basin through the Potter Valley Project and Coyote Valley Dam. Surface water availability can have significant impacts on the Basin and need to be incorporated into future scenarios. Sonoma Water has evaluated climate change scenarios based on downscaled general circulation models (GCMs) data for the groundwater basins that it manages. Following its approach will help the GSA address climate change impacts as a watershed-wide and regional effort.

The framework leads to an extensive study that needs significant financial resources for the GSA and Sonoma Water. This framework is further discussed in **Appendix 2-D**. The GSA will pursue funding resources for this PMA through grant programs and proposes accomplishing this PMA in phases. These phases can be generally defined as:

1) Data collection, followed by improvement and re-calibration of the UVIHM;
2) Conduct additional climate change impact assessments using DWR's two extreme scenarios;
3) Compare UVIHM inputs and outputs with hydrological models used by Sonoma Water to simulate reservoir operations;
4) Assess the feasibility of dynamic coupling of UVIHM with reservoir operation models;
5) If step 4 is determined infeasible, harmonize the reservoir operation models' inputs with the UVIHM to obtain consistent hydrological conditions for reservoir operations; and,
6) Use the model from step 4 to simulate regionally and watershed-wide consistent climate change scenarios for the Basin and assess its impacts.

Upon completion of phases 2 and 6, policies set in the GSA will be re-evaluated to ensure that impacts of climate change are sufficiently considered and addressed.

Chapter 5

Plan Implementation

List of Appendices

- Appendix 5-A Annual Reporting Template
- Appendix 5-B GSA Funding Technical Memorandum

The GSA is coordinating with other agencies, organizations, and landowners in the region to effectively manage the groundwater basin. As described in prior sections, a variety of PMAs are currently, or have previously been, implemented, that support groundwater levels, groundwater storage and ISWs. Existing and planned PMAs will contribute to the attainment of the groundwater sustainability goal in the Basin over the planning horizon of this GSP. These PMAs, as described in **Chapter 4**, enable the continued use of groundwater and protection of all groundwater uses and users into the future. In this section, the GSP implementation plan for the Basin is defined. Elements of this plan include:

1. Management and Administration
    - GSA management, administration, legal and day-to-day operations.
    - Reporting, including preparation of annual reports and 5-year evaluations and updates.
2. Implementation
    - Implementation of the GSP monitoring program activities described in **Chapter 3**.
    - Technical support, including model updates, data collection and other technical analysis.
    - Projects and Management Actions (PMAs) as described in **Chapter 4**.
3. Outreach and Education
    - Coordination activities with stakeholders and entities in the Basin.
    - Ongoing education and outreach activities to stakeholders

Cost estimates and funding methods for GSP implementation are also presented in this section.

5.1 Description of GSP Implementation Elements

The following tasks and functions in this section will be required for implementation of this GSP.

5.1.1 Management and Administration

5.1.1.1 GSA management, administration, legal and day-to-day operations

GSA functions associated with the management and administration of the GSP implementation activities are covered under this category, which includes the administrative, technical and finance staff support and related expenses, office supplies and materials, insurance, and grant writing to support funding for specific projects and/or management actions. GSA staff will provide work products, administrative support, staff leadership, and management for the GSA.

As the GSP implementation begins in February 2022, staffing support and ongoing administrative and management needs will be further evaluated so that the budget can be refined, as necessary. Staffing needs will be reevaluated annually during the early years of GSP implementation to gain a better understanding of the support required and associated costs.

GSA administration activities include coordination of meetings with other organizations on projects or studies, email communications for updating GSA stakeholders about ongoing activities within

the Basin, administration of projects implemented by the GSA, and general oversight, budgeting and coordination. Other oversight and administrative activities will occur on an as-needed basis. The GSA is responsible for, and authorized to take, appropriate action to achieve sustainable management of groundwater within the Basin based on the authority granted under Division 6 of the California Water Code. On an as-needed basis, the GSA may seek legal services to assist in the interpretation of legal requirements and provide legal advice during GSP implementation.

GSP implementation costs include GSA administration, management actions, monitoring protocols, data management, sustaining a sufficient fiscal reserve, and other potential costs for the twenty-year implementation horizon. The estimated annual cost of ongoing activities as well as the estimated cost of activities anticipated to be conducted within the next five years are classified by major categories. For each category, an estimated 5-year total cost and an associated annualized cost is provided.

5.1.1.2 Reporting, including preparation of annual reports and 5 year evaluations and updates

As part of GSP implementation starting in 2022, the GSA must prepare and submit to DWR annual reports and 5-year assessments. Annual reports will be submitted to DWR by April 1st of each year and an initial 5 year GSP assessment and update will be due to DWR by April 2027. Requirements for each of these reports are explained below.

Annual Reporting

Per Water Code Sections 10727.2, 10728, and 10733.2, SGMA regulations require the GSAs to submit an annual report on the implementation of the GSP to the Department of Water Resources (DWR). Development of the annual report will begin at the beginning of each water year, October 1st, to assess the previous water year. The report will be submitted to DWR on April 1st of the following calendar year. A template for annual reporting is provided as **Appendix 5-A**. The annual reports will be completed in a format consistent with Section 356.2 of the SGMA regulations and will include three key sections:

General Information

General information will include a map of the Basin and an executive summary that includes a description of the sustainability goal, ongoing PMAs in the Basin, jointly funded PMAs and their progress, as well as an updated implementation schedule.

Basin Conditions

This section will describe the current groundwater conditions and monitoring results, used to evaluate how groundwater conditions have changed in the Basin during the previous year. SGMA regulations require the following key components to be included in this section:

- Groundwater elevation data from monitoring wells, including (1) groundwater elevation contour maps for the principal aquifers in the Basin depicting seasonal high and low groundwater conditions, and (2) hydrographs of historical-to-current-reporting-year data showing groundwater elevations and water year type.
- Groundwater extractions during the preceding water year summarized by water use sector, including a map showing the general location and volume of groundwater extractions, as well as the method of measurement (direct or estimate) and accuracy of measurements. Metering

of groundwater extraction is only included as a voluntary action and this information will be collected as the PMA is implemented, also based on availability of funding
- Surface water supply for managed groundwater recharge or in-lieu use, including the annual volume and sources for the preceding water year.
- Total water uses by water use sector and water source type, including the method of measurement (direct or estimate) and accuracy of measurements.
- Maps of changes in groundwater storage for the principal aquifer and a graph depicting historical-to-current-reporting-year water year type, groundwater use, annual change in groundwater in storage, and the cumulative change in groundwater storage for the Basin.

This information may change over time to incorporate potentially revised GSA priorities and to reflect new Basin conditions and applicable SGMA requirements.

Plan Implementation Progress

The progress made toward achieving interim milestones, as well as implementation of PMAs, will be explained in this section, along with a summary of plan implementation progress and sustainability progress.

Periodic Evaluations Every Five Years

Per Water Code Sections 10727.2, 10728, 10728.2, 10733.2, and 10733.8, SGMA regulations require the GSA to provide a written assessment of GSP implementation and progress towards meeting the sustainability goal at least every five years. A similar evaluation must also be submitted whenever the GSP is amended. The five-year assessment reports will be completed in a format consistent with Section 356.4 of the SGMA regulations and include the following elements:

Sustainability Evaluation

The overall Basin sustainability and current groundwater conditions for each applicable sustainability indicator will be described, including progress toward achieving interim milestones and measurable objectives, and an evaluation of groundwater elevations at each of the representative monitoring points (RMPs) in relation to minimum thresholds.

Plan Implementation Progress

This section will describe the current implementation status of PMAs, along with the effect on groundwater conditions resulting from their implementation, if applicable.

Reconsideration of GSP Elements

Elements of the GSP may require revision due to one or more of the following: collection of additional monitoring data during GSP implementation; implementation of PMAs; significant changes in groundwater uses or supplies and/or land uses. Such new information may require revision to the following GSP elements: Basin setting, water budgets, monitoring network, SMC, or PMAs.

Monitoring Network Description

This section will provide an assessment of the monitoring network's function, an analysis of data collected to date, a discussion of data gaps and the needs to address them, and identification of areas within the Basin that are not monitored in a manner commensurate with the requirements of Sections 352.4 and 354.34(c) of the SGMA regulations.

Consideration of New Information for Basin Setting and SMC

New information made available after GSP adoption will be described and evaluated. If new information would warrant a change to the GSP, including a re-evaluation of the Basin setting and SMC, then corresponding revised descriptions will be included in the five-year GSP update.

Regulations or Ordinances

If DWR adopts new regulations that impacts GSP implementation, the update will also identify and address those requirements that may require updates to the GSP.

Legal or Enforcement Actions

Any enforcement or legal actions taken by the GSA or their member agencies to contribute to attainment of the sustainability goal for the Basin will be summarized.

Plan Amendments

Each 5 year assessment report will include a description of amendments to the GSP, including adopted amendments, amendments that are underway during development of the report, and recommended amendments for future adoption.

Coordination

A summary of coordination that has occurred between Basins, with different agencies in the Basin, or with agencies with jurisdiction over land use and well construction will be incorporated in the 5 year assessment report. The 5 year assessments will also include any other information deemed appropriate by the GSA to support DWR in its periodic review of GSP implementation, as required by Water Code Section 10733.

5.1.2 Implementation

5.1.2.1 Implementation of the monitoring program activities described in Chapter 3

This category covers the functions associated with monitoring activities, including logistics and coordination with third party entities performing monitoring in the GSP monitoring network and any related monitoring data management. The GSP monitoring network for groundwater level, interconnected surface waters and groundwater quality, including the agencies performing that monitoring, are detailed in **Chapter 3**.

To address data gaps (extended data gap section is presented in **Appendix 2-E**) that are identified during GSP implementation, improvements to or expansion of the GSP Monitoring Network may be necessary. In that event, additional monitoring wells, monitoring well instrumentation; sampling and in-situ measurements; sample analysis; and associated data management and analysis may be required in the future. Costs for those facilities and activities are not addressed in this section. Monitoring and data-related activities include:

- Groundwater Elevation Monitoring;
- Groundwater Quality Monitoring;
- Streamflow Monitoring;
- Subsidence Monitoring, primarily conducted based on data provided by DWR;
- Monitoring data management (including data management system (DMS) maintenance), data validation (QA/QC), data entry and security, and data sharing; and
- As needed GDE monitoring.

The GSA has started implementing additional data collection during GSP development and is committed to pursue funding to supplement its monitoring networks and data collection efforts. A summary of the GSA's new monitoring isntallations and proposed additions to the network is provided in **Table 5.1**.

Table 5.1: Summary of Existing and Proposed New Monitoring for Assessment of SMCs.

SMC	Existing Monitoring Points	Newly Installed Monitoring Points	Measurement and Monitoring	Proposed Actions Based on Funding Availability
Groundwater Levels	4 DWR Wells, 18 CASGEM Wells	5 TSS-funded Wells	DWR wells and 14 CASGEM wells monitored at least 2x per year (spring/fall), 3 CASGEM wells and TSS wells (Two multi-completion wells) to be monitored continuously. [abc]	Instrumentation of additional wells with continuous monitoring
Storage	Groundwater Levels as Proxy	-	-	-
Water Quality	13 Wells	4 TSS-funded Wells[e]	Sampling Constituents of Interest (Five Constituents) every one to three years depending on the constituent[f]	Sample additional wells in Aquifer I and data gap areas.[d]
ISW	5 Streamflow Gages	5 TSS-funded Wells, 2 Stream Gages[g]	Measured at transects using continuous measurement of groundwater elevations at wells and streamflow measurement at gages.	2 additional stream gages on tributaries.

Subsidence	-	-	InSAR Data[h]	-

[a] Access agreements have not been secured for all wells in the monitoring network (as of December 15, 2021). Prior to the first semi-annual monitoring event, access agreements will be confirmed with all relevant well owners.

[b] TSS-funded wells were drilled between September and November 2021. Their instrumentations with continuous measurement devices are ongoing by the GSA, as of December 15, 2021

[c] Four existing wells and two TSS-funded wells (including three nested wells) will be monitored continuously with water elevations recorded every 15 minutes using pressure transducers and preprogrammed data loggers. This high-frequency monitoring can be used to supplement manual water level measurements but not all of these wells are currently incorporated into the RMP network. Adjustments to the RMP network will be undertaken during the implementation, as needed.

[d] No additional new wells are planned at this time. New wells may be added for monitoring due to PMA implementation, changes in land use or activities, or as necessary during implementation.

[e] A minimum of four TSS-funded wells will be added to the water quality monitoring network in the first five years of implementation. Additional wells may be added to the monitoring network as available or as deemed necessary to achieve adequate spatial coverage and monitoring for PMAs or to cover identified data gaps.

[f] Measurement may be more frequent if necessary to achieve monitoring objectives, or if the well is sampled at a greater measurement frequency as part of another monitoring program.

[g] In addition to new near-stream wells drilled for the purpose of monitoring ISWs, the installation of continuous monitoring equipment in existing shallow wells may be considered in the future as implementation funding become available and based on the adequacy of the current data. Shallow wells will be paired with streamflow gages, pending funding availability over the first five years of the implementation period. Feasibility studies are required to assess potential locations. Gages may benefit by using telemetry to provide continuous data.

[h] InSAR data analyzed as it becomes available from DWR, but no more frequently than annually.

5.1.2.2 Technical support, including Ukiah Valley Basin Integrated Hydrological Model (UVIHM) model updates, SMC tracking, other data analysis and technical support

UVIHM updates

Management activities and ongoing performance evaluation of the SMC are informed by UVIHM model output, which will require periodic updates and refinements as more data become available. Model updates and refinements help maintain, and potentially improve, the model functionality and its capabilities in providing more representative simulation results. These activities include incorporation of new model tools and features, data input and model parameter updates, calibration updates as additional data from the monitoring network and stream gauges is obtained, use of UVIHM to update water budgets, assess water usage, and assess the status of Basin-wide storage volumes, and related work to support ongoing simulations of PMAs, including recharge projects.

SMC tracking

Synthesis of data to analyze and track the status of compliance with SMC at the RMP wells in the Monitoring Network. This information will comprise an essential element of the annual reports and 5-year updates. A template for SMC tracking based on the annual report requirements from DWR is available in **Appendix 5-A**.

Data analysis

Additional data analysis and associated technical support, outside of the GSA's resource capabilities, will be needed for annual reporting and 5-year GSP update and outreach activities. The GSA will also have an ongoing need for technical support for the Basin management, such as vulnerability assessments for climate change, hydrologic technical support, assessment of managed aquifer recharge opportunities, economic and funding mechanisms assessments, and studies to address data gaps. It is anticipated that the GSA may also require various planning and programmatic support assistance for ongoing GSP- and SGMA-related requirements.

Results of the monitoring program activities inform GSA actions and next steps. The flowchart shown in **Figure 5.1** illustrates the process and decision points for the first five years of GSP implementation. This process will be refined, as necessary, throughout the first five years of GSP implementation and will be updated in parallel with the five-year evaluations. The initial GSP is a starting point towards achievement of the sustainability goal for the Basin. Although available information and monitoring data have been evaluated throughout the GSP to set sustainable management criteria (SMC) and define projects and management actions, there are gaps in knowledge and additional monitoring requirements. Information gained in the first five years of plan implementation, and through the planned monitoring network expansions, will be used to further refine the strategy outlined in this draft of the GSP. The GSA will work towards implementation of the GSP to meet all provisions of SGMA and will utilize available local resources, and resources from state and federal agencies to achieve this. It is anticipated that coordination with other agencies that conduct monitoring and/or management activities will occur throughout GSP implementation to fund and conduct this important work. Additional funding required may be achieved through fees, or other means, to support progress towards compliance with SGMA. The GSA will use this preliminary flowchart to develop a more defined roadmap at the beginning of the implementation period in February 2022. Further detail on the prioritization and implementation timeline of PMAs can be found in the discussion of PMAs below.

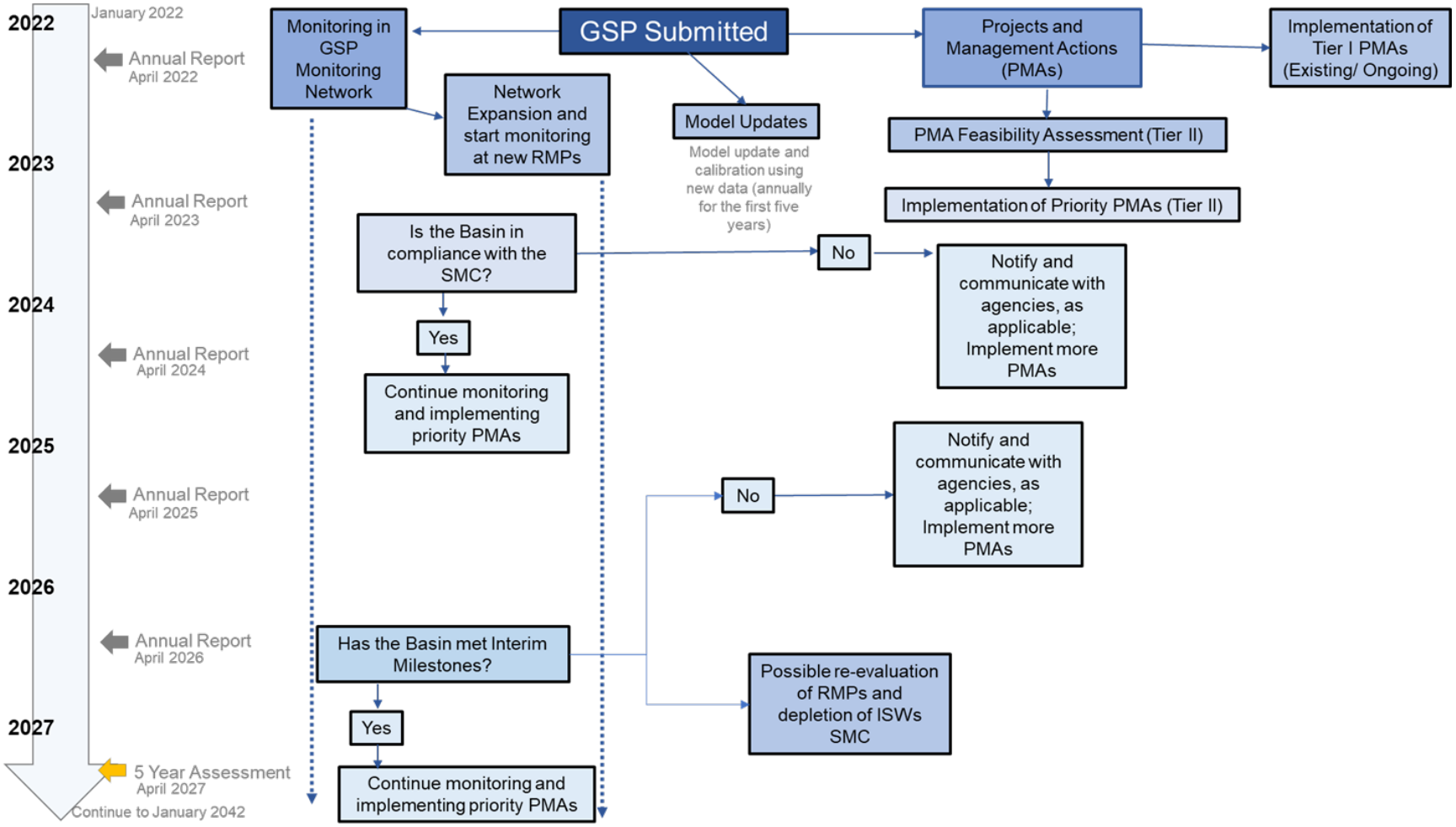

Figure 5.1: GSP implementation process for the first 5 year implementation. The road map is expected to be similar for the following 5 year cycles.

5.1.2.3 Re-evaluation of depletion of ISWs sustainable management criteria

As discussed in **Chapter 3**, SMC set for ISWs are based on groundwater levels due to existing data gaps and uncertainties in UVIHM projection results. However, a framework is proposed to re-assess available data and model results upon collection of additional data and information during GSP implementation to update depletion of ISWs SMC and set them based on the rate and/or volume of depletion at streamgage locations along monitoring transects. This action is planned to be preferably conducted during the first 5-year evaluation of the plan, or if available data is not sufficient, at the second 5 year evaluation of the GSP. The cost of this re-evaluation includes subtasks such as data analysis, UVIHM updates, and calibration, and additional monitoring will be included in the respective round of periodic evaluation of GSP.

5.1.2.4 Re-evaluation of RMPs for different sustainability indicators

Similar to the re-evaluation of depletion of ISWs SMC, **Chapter 3** discusses the possible re-evaluation of RMPs for chronic lowering of groundwater elevations, depletion of ISWs, and degradation of groundwater quality monitoring networks and SMC. The GSP is primarily utilizing the existing wells with the longest historical records for its RMPs currently. However, efforts are ongoing to supplement the monitoring networks with new wells at suitable locations. Upon collection of a sufficiently long record of measurements at such wells, it may be beneficial to the management of the Basin if those dedicated monitoring wells are considered as RMPs. Needed analysis to assess if those wells satisfy the requirements of an RMP will be done before updating the plan. The cost of this re-evaluation will be included in the respective round of periodic evaluation of GSP.

5.1.2.5 Projects and Management Actions described in Chapter 4

Chapter 4 of this GSP identifies two different tiers of projects and management actions (PMAs) in the Basin, as follows:

1. Tier I: Existing PMAs that are currently being implemented and are anticipated to continue to be implemented.
2. Tier II: PMAs planned for near-term initiation and implementation (2022 to 2027) by individual member agencies or PMAs that may be implemented in the future, as necessary (initiation and/or implementation 2027 to 2042).

The PMAs listed in **Chapter 4** reflect a collection of potential options that may be employed to support the sustainability goals outlined in this plan. Tier I PMAs are anticipated to continue to be implemented throughout the GSP implementation period. A preliminary strategy for PMA prioritization and associated criteria, have been developed for PMAs. As a first step in Plan implementation, PMAs identified in the Tier II category will be ranked using criteria including the effectiveness, completeness, complexity, cost, uncertainty, and level of support for the project or management action. This preliminary prioritization step will be initiated immediately after submission of the GSP to provide the GSA with enough time to evaluate projects feasibility and include the selected projects into future funding requests. The GSA is expected to continue to refine this prioritization as additional data is collected and more information on the feasibility, costs and anticipated benefits becomes available for these PMAs.

5.1.3 Outreach

5.1.3.1 Coordination activities with other entities

The GSA will need to budget for ongoing coordination during GSP implementation. Coordination will be required with the following entities on the following topical areas:

- Agencies in the Basin with land use jurisdiction to identify and communicate regarding activities that may impact Basin sustainability.
- Water supply agencies, such as irrigation districts or municipal providers, to obtain updated information regarding water use efficiency programs, encourage such programs, and obtain information regarding the impacts of those programs on water demands.
- Mendocino County Environmental Health Division to implement as needed updates to environmental regulations, ordinances, and existing procedures for new and existing groundwater wells such as well permitting.
- Entities sponsoring projects, such as recharge or efficiency improvements, in the Basin that will provide benefits to attainment of sustainability goals and objectives, including support for grant funding.
- Property owners in the Basin who are affiliated with groundwater use.
- Any other entities working in the Basin to support the sustainability goal and aspirational watershed goal, as applicable.

To achieve this coordination, the GSA will need to develop governance and communication processes to support these activities efficiently and effectively.

5.1.3.2 Outreach to Stakeholders

Activities under this element of the GSP implementation plan include continuation of education, outreach, and engagement with stakeholders, building off the framework and activities established in the Communication and Engagement Plan, as described in **Appendix 1-A**. Such activities performed during GSP implementation include maintaining the Basin webpage on the County website and the online/social media presence, community meetings, workshops, and public events. These activities may also include electronic newsletters, informational surveys, coordination with entities conducting outreach to diverse communities in the Basin, and development of brochures and print materials. Decisions regarding the nature and extent of these outreach activities will be made by the GSA.

5.2 Estimate of GSP Implementation Costs

The implementation costs for the Ukiah Valley GSP will include funding for functions associated with the GSP implementation elements described above, including GSA management and administration, monitoring, technical support, data management, coordination, reporting, management actions, and outreach. GSP implementation costs will also cover the building of sufficient fiscal reserves to address other potential costs for the twenty-year implementation horizon.

Table 5.2: Summary of GSP Implementation Costs Estimated for the First Five Years.

GSP Implementation Tasks	Recurring Annual Cost
GSA Administration	$25,000-$68,000
Monitoring and Data Collection	$50,000-$68,000
Reporting (Includes Annual Reporting, and 5-Year GSP Assessments)	$20,000-$74,000
Model (UVIHM) Maintenance	$10,000-$113,000
Grant Writing and Administration	$10,000-$27,000
Outreach and Education	As needed
Legal Fees	$5,000-$6,000
Projects and Management Actions	Up to $100,000
Contingency and Reserve	Up to $20,000
Total	$220,000-$365,000

Implementation of the GSP over the 20-year planning horizon is projected to cost \140,000 - 405,000 dollars(present value) per year for operation and maintenance along with capital projects, which are expected to be funded through future available grants. **Table 5.2** summarizes the breakdown of these costs by implementation element. These costs are based on the best available estimates at the time of Plan development and may vary throughout the period of Plan implementation. Costs include 3 percent annual CPI increase and the cost of each task may vary in different years. For example, 5 year assessment cost may need to be primarily funded every 4 to 5 years. Overall, GSP implementation cost is estimated to fall within the total range provided. If the GSA develops additional projects or management actions during the GSP implementation period, the cost estimates will be refined and reported to DWR through the annual reports or 5 year periodic assessments. Similarly, grant awards may offset some of the costs estimated and shown in **Table 5.2**.

Development of this GSP was funded largely through a Proposition 1 Groundwater Grant Program and Proposition 68 Grant. The GSA will pursue additional grant funding for GSP implementation as it is available. In the following analysis, it is assumed that the GSA will identify other sources of funding to cover GSP implementation costs. Sources of funding are being considered and are presented in **Appendix 5-B**. The exact funding mechanisms will be decided by the GSA and will depend on its legal authority.

5.2.1 Financial Reserves and Contingencies

To mitigate financial risks associated with expense overruns due to unanticipated expenditures and actual expenses exceeding estimated costs, the GSAs may carry a general reserve with no restrictions on the types of expenses for which it can be used. Adoption of a financial reserves policy is authorized by SGMA Sections 10730(a) and 10730.2(a)(1). The GSA intends to start the reserve at the start of year three when its fee structure is set up and implemented.

5.2.2 Total Implementation Costs Through 2042

The implementation of this GSP is estimated to have a total annual cost in the range of \140,000 and 405,000 dollars based on the best available information at the time of Plan preparation and submittal. Actual cost of GSP implementation for each year will depend on the specific tasks that need to be conducted during that year. This estimated amount excludes major capital projects. The breakdown of this total estimated annual cost is presented by the major budget category in **Table 5.2**.

5.3 Schedule for Implementation

The final GSP will be presented to the GSA Board for adoption in November or December 2021 and will be submitted to DWR no later than January 31, 2022. The preliminary schedule for agency administration, management, and coordination activities, GSP reporting, and community outreach and education are provided in **Figure 5.2**. While most activities are continuous during GSP implementation, annual reports will be submitted to DWR by April 1st of each year and periodic five-year assessment reports will be submitted to DWR by April 1st every 5 years after the initiation of Plan implementation in 2022 (e.g., assessment report submittal in 2027, 2032, 2037, and 2042).

	Start	2022-2042																				
		2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
Data Management and Reporting																						
Milestones																						
GSP Submitted to DWR	January 2022	●																				
Groundwater Sustainability Goal Attained	January 2042																					●
Reporting																						
Annual Reporting	April 2022	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
5-Year Evaluations	April 2027						●					●					●					
Possible re-evaluation of GSP RMPs	April 2027						●					●										
Possible re-evaluation of depletion of ISWs SMC	April 2027						●					●										
Monitoring																						
Monitoring: Groundwater (all)	Quarterly or Continuous																					
Monitoring: Streamflow	Continuous																					
Monitoring: Stream transects	Continuous																					
Groundwater Quality Monitoring Network Expansion	January 2022																					
Data Management	Continuous																					
Outreach and Education																						
Stakeholder Outreach and Education	Continuous																					
Projects and Management Actions																						
Teir I PMAs: Ongoing	January 2022																					
Teir II PMAs: Feasibility study and prioritization upon funding availability	January 2022	●																				
Teir II PMAs: Implementation of highly prioritized PMAs depending of funding availability	January 2023		●																			

Figure 5.2: GSP Implementation Schedule.

5.4 Funding Sources and Mechanisms

SGMA authorizes GSAs to charge fees, such as pumping and permitting fees, to fund the costs of groundwater management and sustainability programs.

The GSAs will pursue various funding opportunities from state and federal sources for GSP implementation. As the GSP implementation proceeds, the GSAs will further evaluate funding mechanisms through its rate fee study PMA and may perform a cost-benefit analysis of fee collection to support consideration of potential refinements. **Table 5.3** presents examples of potential financing options. At the start of the GSP implementation, the GSA will be funded through member agency contributions. Member agency contribution will continue during the first 5-year implementation period until a fee structure is implemented to support and fund GSA activities. Upon such action, member agency contributions will be reduced to cover the needed costs that are not funded through the implemented fee structure. More details are presented in **Appendix 5-B**.

Table 5.3: Potential Funding Sources for GSP Implementation.

Funding Source	Viability
Member Agency Contribution	High – Member agency contribution was used to cover GSA administration costs during the GSP development phase. A similar arrangement can be used if those agencies can offer a sufficient budget to cover the costs of implementation either partially or in full.
Capital Improvement Funds (of Project Proponents)	High – Capital improvement funds are set aside by agencies to fund construction of facility improvements. Depends upon agency approval.
Regulatory Fees	High – Used to fund O&M. Rate structure and methodology determined by budgetary requirements and regulatory fee study. Requires 50% support of GSA governing board. Must be Prop 26 compliant.
Property Related Fees (within Project Proponent service area or area of project benefit)	High – Used to fund O&M and capital projects. Rate structure and methodology determined by budgetary requirements and property related fee study. Requires 50% support of property owners. Must be Prop 218 compliant.
Special taxes	Medium – Used to fund O&M and capital projects. Rate structure and methodology determined by ordinance. Requires 2/3 majority support of registered voters. Must be Prop 218 compliant.
Bonds	Low – Revenue bonds can be issued to pay for capital costs of projects allowing for repayment of debt service over 20 to 30-year timeframe. Depends on the bond market and the existing debt of project proponents. Not anticipated in the Basin.

Integrated Regional Water Management (IRWM) implementation grants administered by the California Department of Water Resources (DWR)	Medium – Proposition 1, IRWM Implementation Grants.
Proposition 68 grant programs administered by various state agencies	Medium – Grant programs funded through Proposition 68, which was passed by California voters in June 2018, administered by various state agencies are expected to be applicable to fund GSP implementation activities. These grant programs are expected to be competitive, where $74 million has been set aside for Groundwater Sustainability statewide.
Disadvantaged Community (DAC) Involvement Program	Medium – DWR's DAC Involvement Program This program is not guaranteed to be funded in the future.

Chapter 6

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Chapter 7

Acronyms

Acronym	Explanation
ACS	American Community Survey, U.S. Census Bureau
AF	Acre-feet
AFY	Acre-Feet per Year
Ag-Res	Agricultural Residentia
ALDP	Agricultural Lands Discharge Program
amsl	Above Mean Sea Level
bgs	Below Ground Surface
C&E Plan	Communication and Engagement Plan
CASGEM	California Statewide Groundwater Elevation Monitoring Program
CCD	Census County Division
CCR	California Code of Regulations
CDEC	California Data Exchange Center
CDFW	California Department of Fish and Wildlife
CDP	Census Designated Place
CDPH	California Department of Public Health
CDPR	California Department of Pesticide Regulation
cfs	Cubic Feet per Second
CGPS	Continuous Global Positioning System
CIWQS	California Integrated Water Quality System
CLSI	California Land Stewardship Institute
CNRA	California Natural Resources Agency
CommPlan	Communication and Engagement Plan
CW3E	Center for Western Weather and Water Extremes
CWC	California Water Code
DAC	Disadvantaged Community
DDW	Division of Drinking Water
DPR	California Department of Pesticide Regulation
DTW	Depth to Water
DWR	California Department of Water Resources
ELAP	California Environmental Laboratory Accreditation Program
EPA	Environmental Protection Agency (United States)
ET	Evapotranspiration
Flood-MAR	Flood Managed Aquifer Recharge
ft	Foot/feet

(continued)

Acronym	Explanation
GAMA	Groundwater Ambient Monitoring and Assessment Program
GDE	Groundwater Dependent Ecosystem
GIS	Geographic Information System
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
GW	Groundwater
HCM	Hydrogeologic Conceptual Model
Î¼g/L	Î¼g/L
iGDEs	Indicators of Groundwater Dependent Ecosystem
IHCM	Initial Hydrogeologic Conceptual Model
InSAR	Interferometric Synthetic Aperture Radar
ISW	Interconnected Surface Water
JPA	Joint Powers Authority
km	Kilometer/kilometers
LUST	Leaking Underground Storage Tank
m	Meter/meters
MCL	Maximum Contaminant Level
MCRCD	Mendocino County Resource Conservation District
MCWA	Mendocino County Water Agency
mg/L	Milligrams per Liter
MGD	Million Gallons per Day
MHI	Median Household Income
mm	Millimeter
MO	Measurable Objective
MRP	Monitoring and Reporting Plan
msl	Mean Sea Level
MT	Minimum Threshold
MT	Minimum Threshold
NCCAG	Natural Communities Commonly Associated with Groundwater
NCRWQCB	California North Coast Regional Water Quality Control Board
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NWS	National Weather Service

(continued)

Acronym	Explanation
OSWCR	Online Systems for Well Completion Reports
PG&E	Pacific Gas & Electric
PLSS	Public Land Survey System
PMA	Projects and Management Actions
PMC	Pacific Municipal Consultants
POC	Point of Contact
PVP	Potter Valley Project
PWS	Public Water Supply
QA/QC	Quality Assurance and Quality Control
R3MP	Russian River Regional Monitoring Program
RMP	Representative Monitoring Point
RP	Reference Point
RRFCD	Russian River Flood Control and Water Conservation Improvement District
SAGBI	Soil Agricultural Banking Index
SDAC	Severely Disadvantaged Community
SGMA	Sustainable Groundwater Management Act
SMC	Sustainable Management Criteria
SMCL	Secondary Maximum Contaminant Level
SMUD	Sacramento Municipal Utility District
SW	Surface Water
SW/GW	Surface Water/Groundwater
SWRCB	California State Water Resources Control Board
SWRCB	State Water Resources Control Board
TAC	Technical Advisory Committee
TMDL	Total Maximum Daily Load
TSS	Technical Support Services
U.S.	United States
URRWA	Upper Russian River Water Agency
USACE	United States Army Corps of Engineers
USBR	United States Bureau of Reclamation
USEPA	United States Environmental Protection Agency
USFS	United States Forest Service

(continued)

Acronym	Explanation
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
USGS	United States Geological Survey
UVAP	Ukiah Valley Area Plan
UVBGSA	Ukiah Valley Basin Groundwater Sustainability Agency
UWMP	Urban Water Management Plan
UWWTP	City of Ukiah Wastewater Treatment Plant
WCR	Well Completion Report
WDMP	Water Demand Management Program
WDR	Waste Discharge Requirements
WWTP	Wastewater Treatment Plant

Chapter 8

Glossary

Term	Definition
Basin Setting	The physical setting, characteristics, and conditions of the basin.
CASGEM	The California Statewide Groundwater Elevation Monitoring Program
Data Gap	A lack of information that could limit the ability to evaluate whether a basin is being sustainably managed, that significantly affects understanding of the basin setting or that limits assessment of the efficacy of implementation of the groundwater sustainability plan.
De Minimis Extractor	A person who extracts, for domestic purposes, less than or equal to 2 acre-feet of groundwater per year.
Groundwater Dependent Ecosystems	Ecological communities or species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface.
Groundwater Sustainability Agency	One or a combination of local agencies with water supply, water management or land use responsibilities may establish a Groundwater Sustainability Agency (GSA). The GSA holds the responsibility to develop and implement a groundwater sustainability plan.
Groundwater Sustainability Plan	A 20-year plan to ensure groundwater is managed sustainability within a groundwater basin.
Hydrogeological Conceptual Model	A description of the geologic and hydrologic setting that determines groundwater occurrence, movement, and general conditions in a basin or subbasin.
Interconnected surface water	Surface water that is hydraulically connected at any point by a continuous saturated zone to the underlying aquifer and the overlying surface water is not completely depleted.
Interim Milestones	periodic goals (defined every five years, at minimum), that are used to measure progress toward measurable objectives and the sustainability goal.
Measurable Objective	specific and quantifiable goals that are defined to reflect the desired groundwater conditions in the Basin and achieve the sustainability goal within 20 years. Measurable objectives are defined in relation to the six undesirable results and use the same metrics as minimum thresholds.
Minimum Threshold	a quantitative value representative of groundwater conditions at a site (or sites), that, if exceeded, may cause an undesirable result. The term “maximum threshold” (MaxT) is the equivalent value for sustainable management criteria with a defined maximum limit (e.g., groundwater quality).
Projects and Management Actions	creation or modification of a physical structure / infrastructure (project) and creation of policies, procedures, or regulations (management actions) that are implemented to achieve Basin sustainability.
Representative Monitoring Points	for each sustainability indicator, a subset of the entire monitoring network where minimum thresholds, measurable objectives, and milestones are measured and evaluated.
SGMA	Sustainable Groundwater Management Act, a three-bill package signed into California state law in 2014.
Sustainability Goal	The overarching goal for the Basin with respect to managing groundwater conditions to ensure the absence of undesirable results.

Sustainability Indicators Six indicators defined under SGMA: chronic lowering of groundwater levels, reduction of groundwater storage, seawater intrusion, degraded groundwater quality, land subsidence, and depletions of interconnected surface water. These indicators describe groundwater-related conditions in the Basin and are used to determine occurrence of undesirable results (23 CCR 354.28(b)(1)-(6).)

Sustainable Management Criteria Minimum thresholds, measurable objectives, and undesirable results, consistent with the sustainability goal, that must be defined for each sustainability indicator.

Undesirable Result Conditions, defined under SGMA as:

"… one or more of the following effects caused by groundwater conditions occurring throughout a basin:

1. Chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply if continued over the planning and implementation horizon….
2. Significant and unreasonable reduction of groundwater storage.
3. Significant and unreasonable seawater intrusion.
4. Significant and unreasonable degraded water quality, including the migration of contaminant plumes that impair water supplies.
5. Significant and unreasonable land subsidence that substantially interferes with surface land uses.
6. Depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water." (Wat. Code § 10721(x)(1)-(6).)

Water Budget An estimated accounting of all the water (surface and groundwater) that flows into and out of a basin.

Water Year The period from October 1 through and including the following September 30.

Water Year Type A classification, provided by the Department of Water Resources that reflects the amount of annual precipitation in a basin.

Appendices

Appendix 1-A Ukiah Valley Basin Communication and Engagement Plan (CommPlan)

FEBRUARY 2021

Ukiah Valley Basin Groundwater Sustainability Agency

Communication and Engagement Plan

Prepared by:
LARRY WALKER ASSOCIATES
GEI CONSULTANTS
SCI CONSULTING GROUP
UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

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GSP Communications Plan

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Introduction

This Project Communication Plan (CommPlan) is developed to promote the efficient and effective coordination of internal/external communications and stakeholder engagement in the Ukiah Valley Basin Groundwater Sustainability Agency (UVBGSA) effort to develop a Groundwater Sustainability Plan (GSP). The CommPlan will serve as the primary guideline for addressing the requirements outlined in Department of Water Resources (DWR) Groundwater Sustainability Plans (GSP) Regulations Section § 354.10:

"Each Plan shall include a summary of information relating to notification and communication by the Agency with other agencies and interested parties including the following:

(a) A description of the beneficial uses and users of groundwater in the basin, including the land uses and property interests potentially affected by the use of groundwater in the basin, the types of parties representing those interests, and the nature of consultation with those parties.

(b) A list of public meetings at which the Plan was discussed or considered by the Agency.

(c) Comments regarding the Plan received by the Agency and a summary of any responses by the Agency.

(d) A communication section of the Plan that includes the following:

> *(1) An explanation of the Agency's decision-making process.*
>
> *(2) Identification of opportunities for public engagement and a discussion of how public input and response will be used.*
>
> *(3) A description of how the Agency encourages the active involvement of diverse social, cultural, and economic elements of the population within the basin.*
>
> *(4) The method the Agency shall follow to inform the public about progress implementing the Plan, including the status of projects and actions."*

The CommPlan serves as the communication and engagement plan for the Ukiah Valley Basin (UVB) GSP and is developed in response to the following requirement of the DWR evaluation criterion in GSP Regulations Section § 355.4.b.(4):

"Whether the interests of the beneficial uses and users of groundwater in the basin, and the land uses and property interests potentially affected by the use of groundwater in the basin, have been considered."

The CommPlan will be updated as needed throughout the project term. This will ensure that up-to-date information related to project communication is contained in the CommPlan. The CommPlan will be executed by members of the UVBGSA through the lifetime of the GSP. The UVBGSA will communicate GSP updates through the UVBGSA page on the County of Mendocino website, the County of Mendocino social media channels and periodic public meetings. This CommPlan will serve as a repository for all mailing lists, outreach and engagement activities and stakeholder communications.

Project Organization

The Ukiah Valley Basin GSP is being developed for the Ukiah Valley Basin Groundwater Sustainability Agency (UVBGSA). Larry Walker Associates, Inc. in collaboration with GEI Consultants, University of California Cooperative Extension (UCCE), and SCI Consulting Group (LWA Team) are responsible for the development of the GSP at the direction of the UVBGSA. The UVBGSA Board of Directors (the Board) is shown in **Table 1**. The Board acts as the GSP's overall Project Management Team (PMT) and is scheduled to meet on the second Thursday of every month at 1:30 PM in the Mendocino County Board of Supervisors Chambers. All meetings are open to the public with notices, agendas, and minutes posted on Mendocino County's (County) website[1].

Public engagement is encouraged at the Board's meetings and an e-Notification[2] capability will be offered by the County to reinforce this purpose for interested parties. Draft deliverables, draft GSP chapters and other important development milestones are scheduled to be discussed at the scheduled Board meetings in order to promote transparency regarding the decision-making process.

Table 1. UVBGSA Board of Directors.

Member Agency	Director	Alternate Director
County of Mendocino	Glenn McGourty	Maureen Mulhern
City of Ukiah	Douglas F. Crane	
Russian River Flood Control	Alfred White	John Reardan
Upper Russian River Water Agency	James Green	Ken Todd
Tribal Seat	Vacant	
Agricultural Seat	Zachary Robinson	Levi Paulin

CONSULTANT TEAM

As mentioned above, the consultant team is led by Larry Walker Associates, Inc. in collaboration with GEI Consultants, UCCE, and SCI Consulting Group. Dr. Laura Foglia, LWA Project Manager (PM), will serve as the primary point of contact for the LWA Team, providing clear, consistent, and effective communication with the PMT and the County.

TECHNICAL ADVISORY COMMITTEE (TAC)

UVBGSA has convened a TAC to provide input and recommendations on the technical aspects of the GSP development process. TAC members and the represented agencies are shown in **Table 2**. TAC meetings are scheduled at a similar frequency to the Board's meetings, on the second Wednesday of every month, at 1:00 PM. All meetings are open to the public with notices,

[1] https://www.mendocinocounty.org/government/affiliated-agencies/ukiah-valley-basin-gsa

[2] https://www.mendocinocounty.org/community/enotification

agendas, and minutes posted on Mendocino County's (County) website[3]. Subscribers to the e-notification system will be notified automatically for the TAC meetings.

Table 2. UVB TAC members.

Member Agency	Member
County of Mendocino	James Linderman
City of Ukiah	Sean White
Upper Russian River Water Agency	Ken Todd
Russian River Flood Control	Elizabeth Salomone
Sonoma County Water Agency	Don Seymour
Mendocino County Resource Conservation District	Mike Webster
California Land Stewardship Institute	Laurel Marcus
Tribal Representative	Javier Silva
Agricultural Representative	Levi Paulin

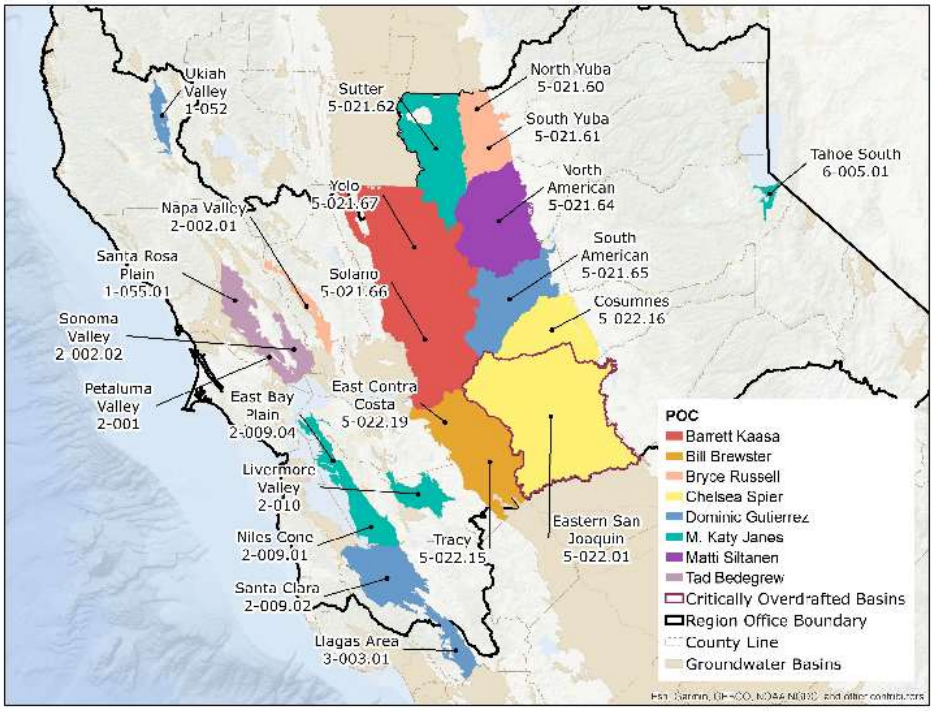
DEPARTMENT OF WATER RESOURCES (DWR) POINT OF CONTACT

All high and medium priority groundwater basins in California are assigned a Point of Contact (POC) from the DWR Region Offices. POCs assist GSAs and stakeholders in the basin to connect with the statewide Sustainable Groundwater Management Program and to locate resources for assistance. Mr. Dominic Gutierrez from the Division of Integrated Regional Water Management of the DWR North Central Region Office is the POC for this GSP and can be reached via email at: Dominic.Gutierrez@water.ca.gov. POC information for the Regional Office corresponding to the UVB GSP is shown below in Figure 1.

[3] https://www.mendocinocounty.org/government/affiliated-agencies/ukiah-valley-basin-gsa/technical-advisory-committee/tac-agenda-and-materials

North Central Region Office

SGMA Points of Contact – Subject to Change



This map illustrates the Point of Contact (POC) for each listed groundwater basin. DWR has POCs for your use when contacting DWR with questions related to SGMA. If a groundwater basin of interest is not listed on the map or table below, and you have questions, please email SGMP_RC@water.ca.gov. POCs will get back to you during regular business hours as soon as possible. This map is current as of October 2020 and subject to change.

POC	Email	Phone	Basin(s)
Barrett Kaasa	Barrett.Kaasa@water.ca.gov	916-376-9618	Sacramento Valley – [Solano (5-021.66), Yolo (5-021.67)]
Bill Brewster	Bill.Brewster@water.ca.gov	916-376-9657	San Joaquin Valley – [Tracy (5-022.15), East Contra Costa (5-022.19)]
Bryce Russell	Bryce.Russell@water.ca.gov	916-376-9620	Napa-Sonoma Valley - Napa Valley (2-002.01), Sacramento Valley – [North Yuba (5-021.60), South Yuba (5-021.61)]
Chelsea Spier	Chelsea.Spier@water.ca.gov	916-376-9656	San Joaquin Valley – [Eastern San Joaquin (5-022.01), Cosumnes (5-022.16)]
Dominic Gutierrez	Dominic.Gutierrez@water.ca.gov	916-376-9626	Ukiah Valley (1-052), Santa Clara Valley - Santa Clara (2-009.02), Gilroy-Hollister Valley - Llagas Area (3-003.01), Sacramento Valley - South American (5-021.65)
M. Katy Janes	Margaret.Janes@water.ca.gov	916-376-9607	Livermore Valley (2-010), Santa Clara Valley – [East Bay Plain (2-009.04), Niles Cone (2-009.01)], Tahoe Valley - Tahoe South (6-005.01), Sacramento Valley - Sutter (5-021.62)
Matti Siltanen	Mattipohto.Siltanen@water.ca.gov	916-376-9631	Sacramento Valley - North American (5-021.64)
Tad Bedegrew	Tad.Bedegrew@water.ca.gov	916-376-9619	Petaluma Valley (2-001), Napa-Sonoma Valley - Sonoma Valley (2-002.02), Santa Rosa Valley - Santa Rosa Plain (1-055.01)

CALIFORNIA DEPARTMENT OF WATER RESOURCES

Figure 1

Goals and Desired Outcomes

In August 2014, the California Legislature passed the Sustainable Groundwater Management Act (SGMA), which went into effect January 1, 2015. SGMA, a package of three bills (AB 1739 Dickinson, SB 1168 Pavley, and SB 1319 Pavley), requires the long-term and sustainable management of groundwater resources and places this responsibility on local authorities. Groundwater Sustainability Agencies (GSAs) were required to be formed by June 30, 2017 as the responsible authorities for developing GSPs and achieving SGMA's implementation goals and mandates.

The key objective of the Ukiah Valley Basin GSP will be to address groundwater sustainability by designing strategies that avoid and prevent undesirable results to regional groundwater resources over the next 20 years, and beyond. Because SGMA requires local stakeholders and beneficial users to be part of the GSP planning and implementation process, the UVBGSA will identify and engage stakeholders to integrate their input into the decision-making, coordination, and management processes. Specific processes are not outlined for the consideration of these interests in the legislation and it is upon the UVBGSA to define such processes. However, SGMA specifically requires public meetings to be held during the GSP development and implementation when:

- When the GSA intends to adopt or amend a GSP (CA Water Code Section § 10728.4);
- Prior the GSA imposing or increasing a fee (CA Water Code Section § 10730.(b)(1))

In order to meet these requirements, UVBGSA is implementing an adaptive management strategy as explained in detail in the sections below. This strategy contains three phases: (1) planning, (2) implementation, and (3) evaluation/response, and is intended to work fundamentally as described in the Community Water Center whitepaper[4] on this topic. For the planning phase, this CommPlan will serve as the document for communication and engagement in the GSP development and will be updated as necessary. For the implementation phase, the methods and strategies to be used are described in the **Communications Strategy Section.** Finally, for the third phase, the **Evaluation and Assessment Section** identifies questions to assess the effectiveness of the C&E plan and to deliver effective and comprehensive responses.

UVBGSA AND UVB GSP

In May 2017, UVBGSA was created to by a Joint Powers Agreement (JPA) to serve as the official GSA for the UVB to comply with SGMA. Under the agreement, the UVBGSA shall take actions deemed necessary to ensure sustainable management of the UVB, as required by SGMA[5].

The UVBGSA consists of a variety of local public agencies with water supply, water management and land use responsibilities. These include the County of Mendocino, the City of

[4] Dobbin, K., Clary, J., Firestone, L., Christian-Smit, J. (2015), "Collaborating for Success: Stakeholder Engagement for Sustainable Groundwater Management Act Implementation." Prepared by community water center.

[5] Resolution of the election of the UVBGSA can be found here:
https://sgma.water.ca.gov/portal/service/gsadocument/download/3980
JPA forming the UVBGSA can be found here:
https://sgma.water.ca.gov/portal/service/gsadocument/download/4159

Ukiah, the Upper Russian River Water Agency, and the Russian River Flood Control and Water Conservation and Improvement District. The boundaries of these agencies are shown in **Figure** . The County of Mendocino exercises land use authority on the land overlying the basin. The City of Ukiah is a local municipality that exercises water supply, water management and land use authority within the City's boundaries. The Upper Russian River Water Agency is a JPA representing Millview County Water District, Willow County Water District, Calpella County Water District, and Redwood Valley Water District. The County Water Districts have water supply and water management responsibilities within the UVB. The Russian River Flood Control and Water Conservation and Improvement District is a special district created by State statute (State of California Statute, Act 4830). The District exercises water supply and water management authority within the UVB.

The UVBGSA Board also includes a tribal representative and an agricultural representative, as noted in **Table 1**. Representation by these stakeholder groups on the Board of Directors was a decision made by the members of the JPA.

In accordance with SGMA priorities established by DWR, the UVBGSA must develop and submit its GSP by January 31, 2022; the plan must include actions to maintain or achieve sustainability within twenty years of the GSP's adoption. The information contained in the GSP will comprehensively characterize the conditions in the UVB, determine strategies for sustainably managing groundwater resources, satisfy the requirements of SGMA, be consistent with Emergency Regulations and guidance prepared by DWR, be implementable by stakeholders of the UVB, and describe monitoring and reporting to DWR. Moreover, in order to reach the best outcome for the GSA and local stakeholders, and to satisfy SGMA requirements, all beneficial uses and the interests of beneficial users of groundwater must be considered through the active involvement of local stakeholders.

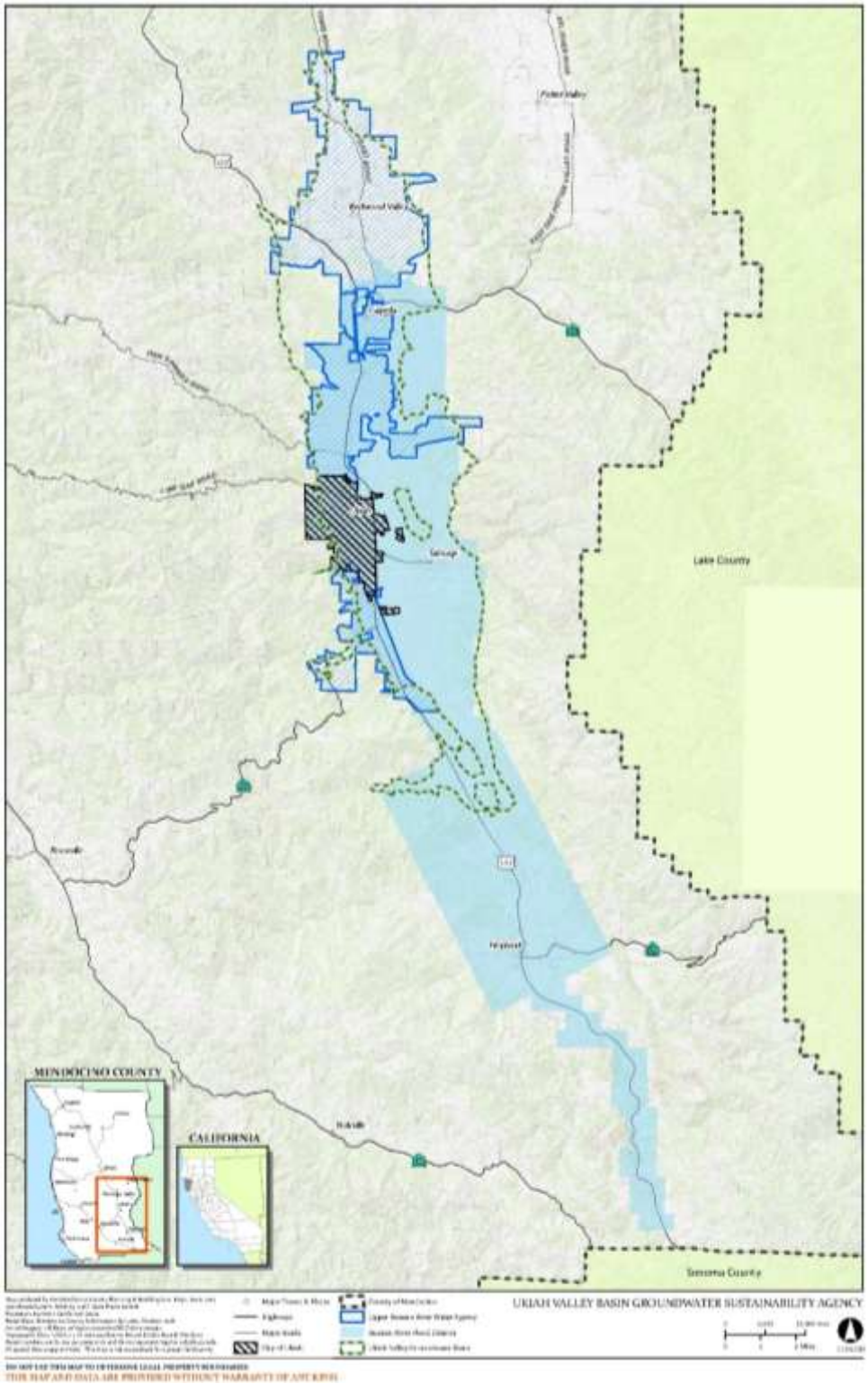


Figure 2. UVBGSA JPA members and their respective boundaries.

UVBGSA DECISION-MAKING PROCESS

The general voting procedure of the UVBGSA is outlined in the JPA. Each member of the Board has one vote. Unless otherwise specified, all affirmative decisions of the Board require the affirmative vote of a simple majority of all the Board's Directors participating in voting, provided that, if a Director is disqualified from voting on a matter before the Board because of a conflict of interest, that Director shall be excluded from the calculation of the total number of Directors that constitute a majority. The Board of Directors shall strive for consensus of all members on all items.

With respect to GSP development, the above-mentioned procedure will be used for all subjects that require Board's action. Since the beginning of this GSP development, discussions and/or presentations have been conducted in the TAC and Board public meetings to facilitate input from stakeholders and interested parties. Key documents have been made available in advance of meeting on either the County's website or via the C&E Tool, whichever was determined appropriate, as a working draft document. Comments made by the TAC, the Board, or by the public have been addressed in a reasonable timeline (if possible, by the next public meeting) and the final draft of the deliverable has been presented and an action taken by the Board in the next scheduled meeting. During all public meetings, time-limited opportunities have been offered to the public to comment on all public agenda items. In addition, an opportunity for public comment on items not on the agenda was provided.

The LWA Team, the Board, and the TAC have come up with a preferred method of communication with regards to GSP deliverables and additional matters that need the Board's approval and/or the TAC's involvement and direction. As a soft arrangement, meaning the timeline can be adjusted respective to the task in hand, the LWA Team will provide a month for the TAC to review a document or elaborate on a subject that is scheduled to be acted upon in the upcoming meeting. GSA Board will be provided with at least two weeks advance time before an official review/presentation of a document for approval at a Board meeting. As explained, all efforts will be made so that discussions and/or presentations are conducted in the TAC and Board public meetings to facilitate input from stakeholders and interested parties. In addition, key documents will be available in advance on County's website, whichever appropriate, as a working draft document. Comments made by the TAC, the Board, or by the public will be addressed in a reasonable timeline (if possible up to the next public meeting) and the final draft of the deliverable will be presented and action taken by the Board in the next scheduled meeting. This procedure is illustrated in Figure 3.

During all public meetings, time constrained opportunities will be offered for the public to comment on all public agenda items. In addition, an opportunity for public comment on items not on the agenda will be provided.

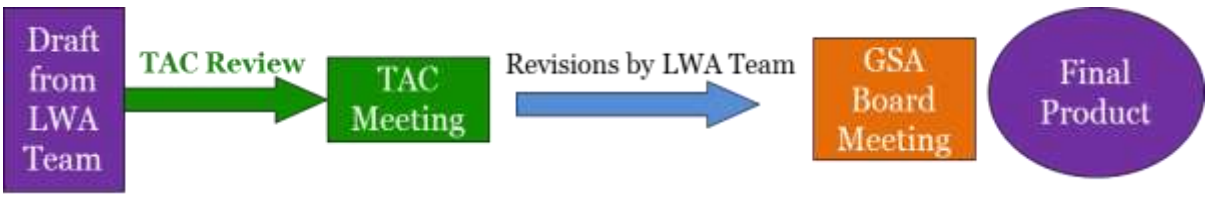


Figure 3. General review process of deliverables.

GSP Communications Plan

COMMUNICATION OBJECTIVES TO SUPPORT THE GSP

The UVBGSA will strive to build broad support for key elements of the GSP and will facilitate the effective engagement of stakeholders and beneficial users of groundwater to achieve the best outcome for its GSP. The following are the guiding principles of the GSP communication strategy:

- **Inform** the **public** with balanced information to assist them in understanding the issues to be addressed, alternative management measures, opportunities, and/or solutions.
- **Consult** with the **public** by obtaining feedback and public comments on analyses and decisions. UVBGSA will encourage the public to be involved in the decision-making process since they are affected by the GSP and can influence the outcome.
- **Involve beneficial users** and work with them throughout the process to ensure that their concerns, aspirations, and their overall input is understood and considered.
- **Collaborate** with **stakeholders** in the decision-making process including the development of management alternatives and identification of preferred solutions.
- **Empower** the members of the **GSA** by fully considering their priorities and sufficiently implementing them in the GSP.
- **Inform all engaged** on how their input affected the decision.
- Ensure process integrity and transparency.
- Utilize facilitation and outreach methods that minimize the cost and environmental impacts of travel.
- Leverage available technological platforms to increase collaboration and efficiency.
- Maintain appropriate alignment between engagement, content development, and project management.

Details of the methods and strategies used to accomplish these objectives are laid out in the following sections.

OVERRIDING CONCERNS, MAJOR CONCERNS OR CHALLENGES

A challenge in developing and implementing the GSP is the time constraint that may limit the capability to build relationships and underlying trust between all sectors of the public involved and/or affected by the GSP. UVBGSA made the necessary efforts through several public meetings, adequate outreach and notices, and involving major beneficial users in its board of directors during the formation of the GSA. The GSP development process brings about new challenges that will need broader involvement and trust to be established. Conflicting interests on the use of the shared resources may arise that can only be resolved through an effective decision-making process. It is also possible that needs and interests of particular stakeholders may change throughout the development process, complicating the dynamics of the planning process. The CommPlan and its thorough implementation will assist the UVBGSA in overcoming these types of challenges.

In addition, public outreach and stakeholder engagement takes time and resources to be done well. This can become a significant challenge since both the time and the resources available to the UVBGSA are limited. However, the Board believes that its planned strategies and venues of engagement will enable its communication and engagement efforts to be effective. The Board is confident that a balanced and effective investment in effective communication and engagement

will lead to improved outcomes, optimized resources, broad support, and reduced conflicts, which subsequently outweighs its respective cost.

Stakeholders Involved in the Project

SGMA (CA Water Code Section § 10723.2) and GSP Regulations Section § 354.10.(a) collectively require the UVBGSA to consider interests of all beneficial uses and users of groundwater basin and provide a description of those users and uses, the types of parties representing those interests, and the nature of consultation with those parties. **Table 3** summarizes the list of stakeholders identified by the UVBGSA. This list will be updated as necessary.

Table 3. Identified stakeholders and interested parties for the UVB.

Category of Interest	Stakeholder Groups	Contact Person
UVBGSA Board of Directors		
Land Use	County of Mendocino	Glenn McGourty
Land Use/Urban Use	City of Ukiah	Douglas F. Crane
Integrated Water Management	Russian River Flood Control	Alfred White
Urban Use	Upper Russian River Water Agency	James Green
California Native American tribes	Tribal Seat	Vacant
Agricultural Use/ Private Users	Agricultural Seat	Zachary Robinson
UVB TAC Members		
Land Use	County of Mendocino	James Linderman
Land Use/Urban Use	City of Ukiah	Sean White
Urban Use	Upper Russian River Water Agency	Ken Todd
Integrated Water Management	Russian River Flood Control	Elizabeth Salomone
Land Use	Sonoma County Water Agency	Don Seymour
Urban/ Agricultural Use	Mendocino County Resource Conservation District	Mike Webster
General Public/Land Use	California Land Stewardship Institute	Laurel Marcus
California Native American tribes	Tribal Representative	Javier Silva
Agricultural Use/ Private Users	Agricultural Representative	Levi Paulin
Public Water Systems		
Urban Use	Redwood Valley County Water District Millview County Water District	

GSP Communications Plan

Category of Interest	Stakeholder Groups	Contact Person
	Willow County Water District	
	Calpella County Water District	
Private Water Companies		
Urban Use	City of 10,000 Buddha's	
	Rogina Water Company	
	Yokayo Water Systems	
California Native American Tribes		
California Native American tribes	Redwood Valley Rancheria	Tribal Representative on UVBGSA and the TAC
	Coyote Valley Reservation	
	Pinoleville Pomo Nation	
	Potter Valley Rancheria	
	Guidiville Rancheria	
	Hopland Reservation	
Agriculture		
Agricultural Use	Mendocino County Farm Bureau	Devon Jones
	Mendocino County Wine Growers Association	Agricultural Representative on UVBGSA and the TAC
	Pear Growers	
	Cannabis Cultivation	
State Entities		
Environmental and Ecosystem	UC Davis Cooperative Extension	
State Lands	Department of Water Resources (DWR)	
State Lands/Environmental and Ecosystem	North Coast Regional Water Quality Control Board	
State Lands/Environmental and Ecosystem	California Department of Fish and Wildlife (CDFW)	
Federal Entities		
Federal Lands/Environmental and Ecosystem/Integrated Water Management	US Army Corps of Engineers	
Federal Lands/Environmental and Ecosystem	US Fish and Wildlife Service (USFWS)	
Environmental and Ecosystem	NOAA Fisheries	
Environmental and Ecosystem	Forest Service	
UVB Residents		
General Public	Public	

Category of Interest	Stakeholder Groups	Contact Person
	Disadvantaged Communities	
	Citizen Groups	

METHODS FOR PROMOTING ACTIVE STAKEHOLDER INVOLVEMENT

As UVBGSA moves towards developing its GSP, it will initially focus on stakeholder identification and assessment. The LWA Team will conduct stakeholder interviews at the outset of the planning effort to understand the interests, concerns, opportunities, and resources that exist in the stakeholder community. During the GSP development process, the Board will evolve its outreach efforts by identifying additional stakeholders, understanding their interests and concerns, and providing a transparent and responsive communication venue for their engagement. This will happen through the following approach:

- Develop and maintain an updated interested parties' list through UVBGSA stakeholder identification and outreach, voluntary subscription, and e-notification system.
- Conduct interviews with key stakeholders at the outset of the GSP planning effort.
- Hold regular public meetings of the UVBGSA Board and the TAC, encouraging public participation through County website. Convene a collaborative decision-making process through public meetings with the goal of building a shared understanding and reducing conflicts. This will provide an additional venue for interested parties to get involved in the more technical side of development and implementation of GSP.
- Provide alternative opportunities for stakeholders or interested parties that face more barriers to participation such as holding interviews with the LWA Team, translated materials, evening meetings, etc.
- Use the UVBGSA website to provide increased access to data and information in a user-friendly form. Provide emails/newsletters to interested parties updating them on newly developed documents or information and seeking their participation and/or comments.

Methods outlined above will help UVBGSA conduct the implementation phase of its adaptive management strategy.

USE OF PUBLIC INPUT AND RESPONSE

The Board's success in implementing their adaptive management strategy will depend, in part, on how it responds to public input. Moreover, a recognizable employment of the public input boosts engagement and increases the trust in the process and plan. The UVBGSA will respond to constructive public comments and concerns and demonstrate how they shaped the outcome at hand. Efforts will include:

- Making draft deliverables provided for the TAC or the UVBGSA review available to the public to materialize a more fruitful public discussion during the public meetings scheduled for deciding on those deliverables.
- Publishing Board-approved draft final GSP Chapters for public comment with reasonable commenting periods. If necessary, responses to comments will be published to elaborate on how they were implemented or considered in revising the documents.

- Continued implementation of the methods for promoting active engagement of the public with a focus on obtaining comments and responding to concerns.

At key C&E milestones described in the C&E Implementation Timeline Section, UVBGSA evaluated the effectiveness of its communication strategy by answering the following questions:

- Is there a shared understanding of the GSP's goals and its implementation timeline?
- Are stakeholders educated about the GSP development process and their own role?
- Has the GSA received positive press coverage?
- Do diverse stakeholders feel included?
- Has there been behavioral changes related to the program goals? Or, is improved trust/relationships in evidence among participants?
- Has the CommPlan been implemented and updated?
- Has the interested parties' list been expanded?
- Have there been well-attended and robust public hearings at all of the necessary junctures?
- Are all established venues for stakeholders open and effective?
- Are there formal mechanisms to assess outcomes and make improvements?

Reviewing these results helped identify the strengths and weaknesses of the communication strategy and how to improve it.

Communications Strategy

As explained in the previous sections, UVBGSA will use a multitude of communication methods to convey information and obtain input from stakeholders. The applicability of each method will depend on the goal of the intended communication. As a general rule of thumb, the communication strategy is divided into external and internal communications as explained below. UVBGSA will implement a comprehensive communication and engagement plan that meets SGMA requirements and will try to optimize its strategies in external and internal communications to maximize the end benefits.

INTERNAL COMMUNICATION

Internal communication is defined as any communication between and among the UVBGSA Board members, Mendocino County, the TAC or other convened committees, and the LWA Team that is necessary to keep the planning effort moving forward and to execute the scope of services articulated in the contract with the LWA Team. The Board, County, and the TAC will convey internal communications among their own members or with each other using their preferred methods such as emails, phone conversations, etc., consistent with applicable regulatory requirements. If a meeting is arranged between any combination of the three, notes will be taken and kept on record by an assigned member of the participants. The LWA Team will take and keep notes of the meetings with the Board and the TAC. These notes will be made available following the approval of the Board via the UVBGSA website. The LWA Team will provide monthly progress reports to the Board.

GSP Communications Plan

EXTERNAL COMMUNICATION

External communication is defined as any communication of the UVBGSA, the TAC, the LWA Team, or any other committee with the public (which includes DWR POC). These communications may occur through emails and newsletters, public meetings, mailed flyers/brochures/advertisement, handouts, group interviews and radio broadcasts.

For all public meetings, including but not limited to regular Board and TAC meetings, agenda for the meeting is posted online on the County website and subscribers to the e-notification system are notified. An electronic flyer for the meeting is also included in the newsletter and interested parties are notified through their preferred contact method. Meeting minutes are recorded as the normal procedure of the Board and the TAC and will be posted afterwards on County website. In addition, the LWA Team keeps record of all its communication with external parties including group interviews. Those records will be available through appropriate procedures if approved by the Board.

Online and web-based resources including the County website and County Social Media outlets are regularly updated and utilized for informing the public of the project status, posting draft GSP Chapters, publishing notices, receiving comments, demonstrating how public input is being implemented, disclosing results and data, and sharing news and updates.

Public Meetings

All UVBGSA Board and TAC meetings are open to the public and designed to encourage input, discussion, and questions from public audience members. The minutes of UVBGSA Board and TAC meetings reflect the questions and comments raised by members and the general public. Currently scheduled public meetings are shown in **Table 4**. This schedule is subject to change as the GSP development process progresses and the GSP development schedule is updated (**Appendix A**). Meetings with the UVBGSA Board and the TAC are multi-purpose venues for public engagement and outreach. The LWA Team will provide progress reports at the meetings unless directed otherwise by the Board; presentations for the Board members or the TAC may be conducted to assist in the decision-making process or to provide for information to the public; public comments regarding scheduled and non-scheduled items will be received; and, actions will be taken and decisions will be made with regards to the GSP development and implementation.

Table 4. UVBGSA important meeting dates for GSP development process.

Date	Subject of Discussion at UVBGSA Meeting (1:30 PM)	Subject of Discussion at TAC Meeting (9:30 AM)
13 September 2018	Introduction Project Schedule	
8 November 2018	Communication Plan and Data Management Plan Needs Assessment	Data Gap Analysis Monitoring Network Analysis
14 February 2019	Communication Plan Data Management Plan Data Gap Analysis Monitoring Network Analysis	
16 April 2019		Phase I Deliverables

		Data Acquisition & Confidentiality Requirements
6 June 2019	Prop. 68 Solicitation Schedule	Hydrogeologic Conceptual Model TSS Application
15 October 2019	HCM Update Prop 68 Update TSS Update	DMS Draft Deliver Draft HCM Commenting and Review Prop 68 Update, TSS Update
9 January 2020	Groundwater Model Ch.2 GSP Update	Sustainable Management Criteria Measurable Objectives, TSS Update, TAC Meetings Moved to day before Board Meets
12 March 2020	Sustainable Management Criteria Measurable Objectives	Sustainable Goal Development Water Quality SMC Survey Review
13 May 2020		Preliminary SW/GW SMC Historical GW Elevation Trends
10 September 2020	Monitoring Network Future Scenarios PVP Updates SW GW Interaction Results Water Budget WQ SMC Delivery	Future Scenarios Current and Baseline Water Budget Remote Monitoring Studies
14 October 2020		SMC Development GW Decline and SW Depletion Well Instrumentation
12 November 2020		SMC MT/MO Development Model Results
13 January 2021		Model Results ISW/GDE Discussions
11 February 2021	Draft SMC's Approved	SMC Discussion
11 March 2021	Final GSP Implementation Plan	Draft GSP Monitoring Network Finalized
8 April 2021	Final GSP Implementation Plan	Draft GSP
13 May 2021	Final GSP Draft/ GSP Submittal	Draft GSP
10 June 2021	Final GSP Draft/ GSP Submittal	Draft GSP

Table 5. UVBGSA Public Meeting Dates

Date	Subject of Discussion at Public Meeting
29 September 2020	Introduction of UVBGSA and GSP Project Schedule, Implementation Plan, Schedule for Future Public Meetings Venues for Engagement
23 February 2021	Draft GSP Public Comment SMC and Potter Valley Project Presentation

20 April 2021	Draft GSP Public Comment
25 May 2021	Draft GSP Public Comment
22 June 2021	Draft GSP Public Comment

If determined essential by the Board, additional public meetings may be scheduled to further distribute the information to the public at specified locations and times. These meetings will be appropriately advertised through the County website, emails and newsletters, interested party list subscribers, and postal mail or flyers.

Stakeholder Survey and Mapping

At the outset of the GSP development effort, the LWA Team will convene meetings with identified key stakeholders to gather important information using a survey form tailored to the UVB GSP effort.

The LWA Team will contact representatives for the key stakeholder organizations to learn more about them, describe the GSP development process, and will invite them to engage in the process. Prior to these meetings. The LWA Team will develop background information, maps, and a stakeholder survey form. Follow up communications may be made to answer questions that come up or to better understand stakeholder interests, issues, and challenges.

After the stakeholder surveys are completed, the LWA team will compile the information received in a "Lay of the Land" document. This document will summarize information received from stakeholders regarding initial concerns/issues, interests, challenges, preferred methods of communication, and desired level of engagement.

Venues for Engaging

To achieve the goals and objectives of the CommPlan, the UVBGSA will utilize multiple outreach venues as wells as broader communication tools. This will allow stakeholder engagement at different levels best suited to stakeholder needs. The Board will use these venues to provide regular feedback and updates and to receive comments. Due to the ongoing COVID-19 pandemic and in accordance with County and State health orders, these venues will be hosted virtually until new incidences of COVID-19 are reduced to a safe level within the county and we are able to return to in person meetings. These venues are discussed in previous sections and are listed below:

- Public meetings of the Board and Advisory Committees: for all interested parties. Advertised and announced through appropriate means such as email newsletters, interested parties subscription lists, e-notification system, flyers and banners, etc.
- Stakeholder interviews and/or work group meetings
- Community or regional forums: conducted on as needed basis by the UVBGSA, the LWA Team, or appropriate public agencies identified by the Board.
- Public workshops/briefings: Conducted if deemed necessary by the Board with the help of the LWA Team, DWR, and/or other appropriate public agencies for information sharing and receipt of input.

- Digital venues: County website and Zoom Meetings will be used as the main online resources for conducting and tracking engagement and outreach activities. Emails and newsletters will be delivered to the interested parties' list and subscribers. Available social media outlets will be used as needed.
- Mailing services: provided on as needed basis and may include one or a combination of informational brochures, advertisement, flyers, handouts, etc.

After the COVID-19 pandemic started, in accordance with County and State health orders, the venues were hosted virtually until new incidences of COVID-19 were reduced to a safe level within the county and people could return to in person meetings.

C&E IMPLEMENTATION TIMELINE

Implementation of the C&E Plan (CommPlan) will follow the timeline shown in **Figure** . The implementation timeline is subject to periodic update and change dependent on the status of the project and the GSP development schedule (**Appendix A**).

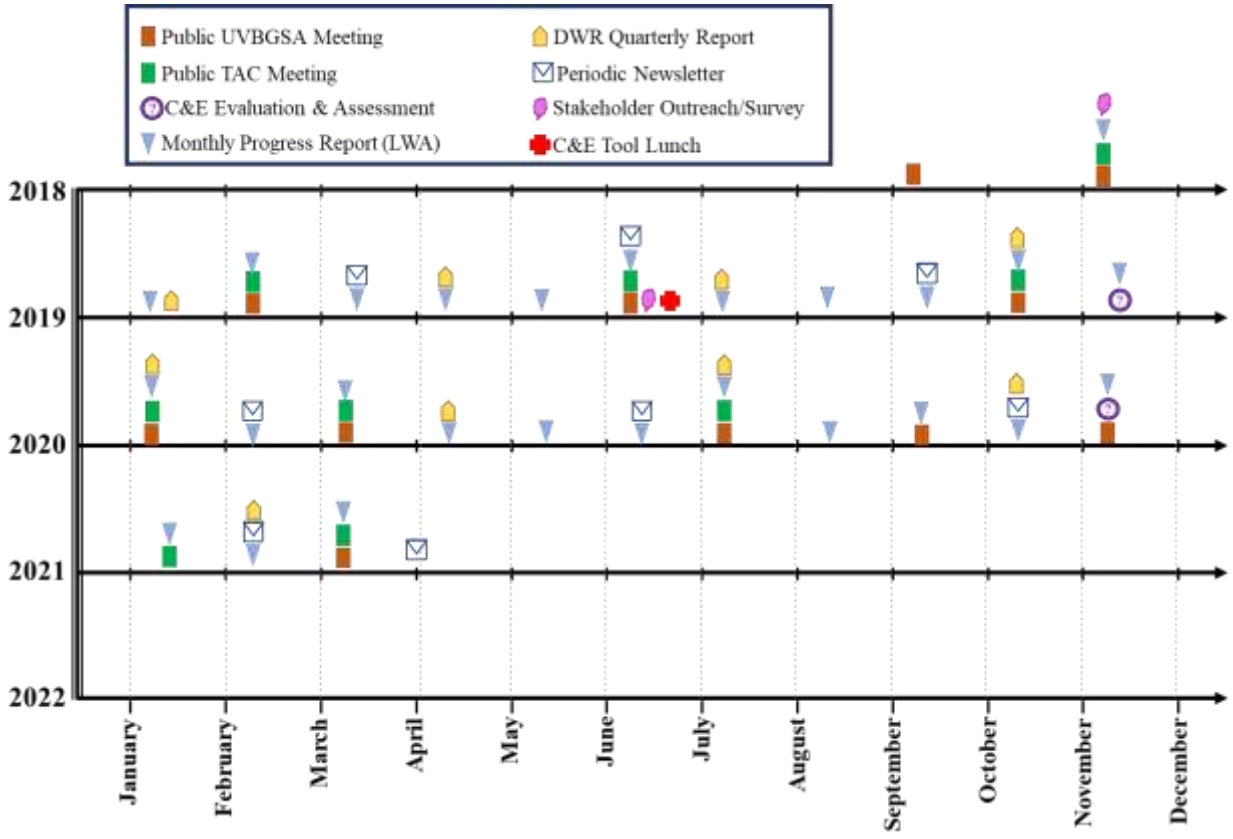


Figure 4. C&E implementation timeline.

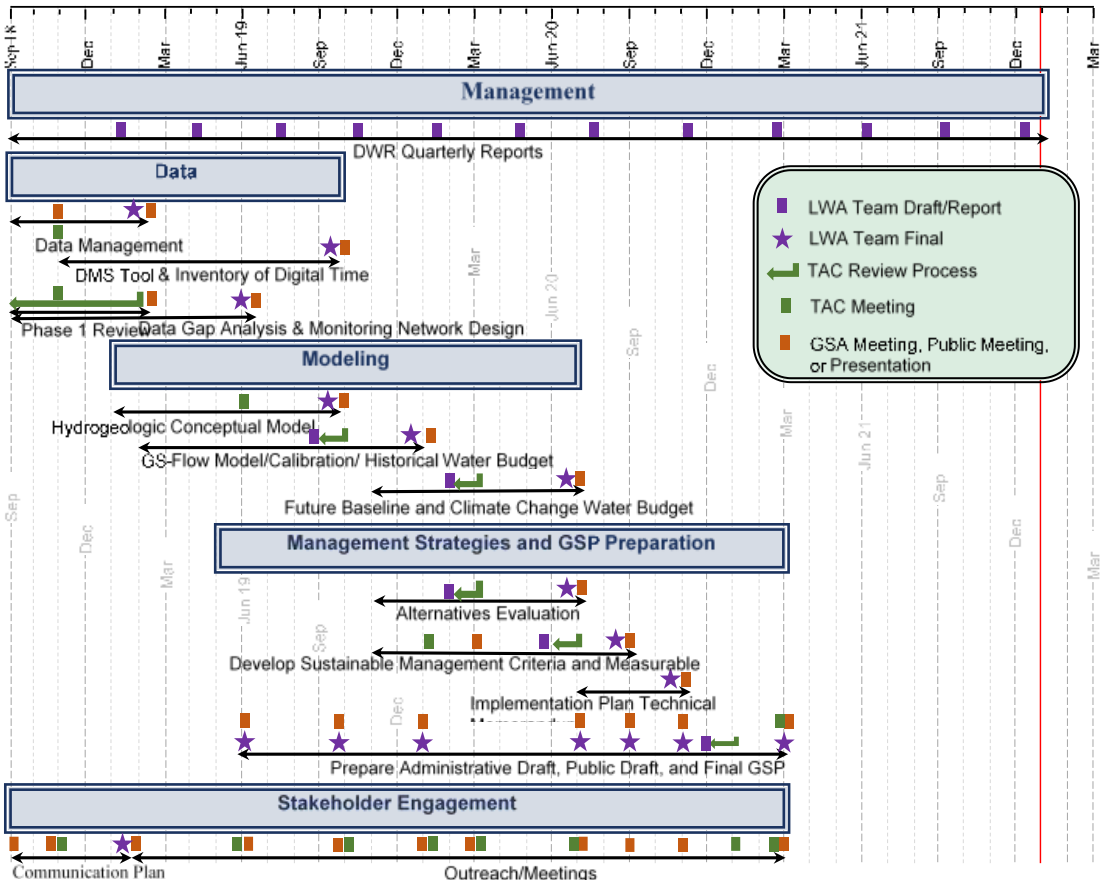
Evaluation and Assessment

At key C&E milestones laid out in the **C&E Implementation Timeline Section,** the UVBGSA will evaluate the effectiveness of its responses to the following questions:

- Is there a shared understanding of the GSP's goals and its implementation timeline?
- Are stakeholders educated about the GSP development process and their own role?
- Has the GSA received positive press coverage?
- Do diverse stakeholders feel included?
- Has there been behavior changes related to the program goals? Or is improved trust/relationships in evidence among participants?
- Has the CommPlan been implemented and updated?
- Has the interested parties' list been expanded?
- Have there been well-attended and robust public hearings at all of the necessary junctures?
- Are all established venues for stakeholders open and effective?
- Are there formal mechanisms to assess outcomes and make improvements?

Reviewing these results will help identify what worked well, what did not work as planned, and to summarize lessons learned.

Appendix A. GSP Development Schedule



Appendix 1-B Ukiah Valley Basin JPA

BOS AGREEMENT # 17-015*

Joint Powers Agreement Forming the Ukiah Valley Basin Groundwater Sustainability Agency

This Joint Powers Agreement ("Agreement") is made and entered into by and among the Russian River Flood Control and Water Conservation Improvement District ("RRFC"), and the Upper Russian River Water Agency, both of which are California special districts, the City of Ukiah, a municipal corporation, and the County of Mendocino, a political subdivision of the State of California, which are together referred to herein individually as "Member" and collectively as "Members," for the purposes of forming a joint powers agency, to be known as the Ukiah Valley Basin Groundwater Sustainability Agency, to serve as the Groundwater Sustainability Agency in the Ukiah Valley basin.

Recitals

A. Each of the Members is a local agency, as defined by the Sustainable Groundwater Management Act of 2014 (Division 2, Part 2.74 (commencing with §10720), Part 5 (commencing with Section4999), Part 5.1 (commencing with Section5100) and Part 5.2 (commencing with Section5200) of the California Water Code Section *et seq*.; "SGMA"), duly organized and existing under, and by virtue, of the laws of the State of California, and each Member has water supply, water management or land use responsibilities within the Ukiah Valley.

B. SGMA seeks to provide sustainable management of groundwater basins, enhance local management of groundwater, establish minimum standards for sustainable groundwater management, and provide local groundwater agencies with the authority and the technical and financial assistance necessary to sustainably manage groundwater.

C. Section 10720.7 of SGMA requires all basins designated as high or medium priority basins by the Department of Water Resources ("DWR") in its Bulletin 118 be managed under groundwater sustainability plans, or coordinated groundwater sustainability, plans pursuant to SGMA.

D. The Ukiah Valley basin (designated basin number 1-52 in Bulletin 118; the "Basin") is designated as a medium-priority basin.

E. The Members have determined that the sustainable management of the Basin pursuant to SGMA may best be achieved through the cooperation of the Members operating through a joint powers agency.

F. The Joint Exercise of Powers Act (Chapter 5 (commencing with § 6500) of Division 7, of Title 1 of the California Government Code; the "Act"), authorizes two or more public agencies to, by agreement, jointly exercise any power held in common by agencies entering into such an Agreement and to exercise additional powers granted under the Act.

G. Based on the foregoing legal authority, the Members desire to create a joint powers agency for the purpose of taking all actions deemed necessary by the joint powers agency to ensure sustainable management of the Basin, as required by SGMA.

H. The governing board of each Member has determined it to be in the Member's and in the public's best interest that this Agreement be executed.

Terms of Agreement

Article 1. Definitions

As used in this Agreement, unless context requires otherwise, the meanings of the terms set forth below shall be as follows:

1.1. "Act" means the Joint Exercise of Powers Act, set forth in Chapter 5 of Division 7of Title 1 of the Government Code, sections 6500, *et seq.*, including all laws supplemental thereto.

1.2. "Agency" means the Ukiah Valley Basin Groundwater Sustainability Agency.

1.3. "Agreement" means this joint powers agreement, which creates the Ukiah Valley Basin Groundwater Sustainability Agency.

1.4. "Basin" means the Ukiah Valley basin, as shown on the map attached as Exhibit A, which is incorporated herein by this reference.

1.5. "Board of Directors" or "Board" means the governing body of the Agency as established by Article 7 of this Agreement.

1.6. "Board Member" or "Director" shall mean a member of the Agency's Board of Directors.

1.7. "Committee" shall mean any committee established pursuant to Article Twelve (12) of this Agreement.

1.8. "Effective Date" means the date on which the last Member executes this Agreement.

1.9. "Fiscal Year" means July 1 through June 30.

1.10. "GSA" shall mean a groundwater sustainability agency.

1.11. "GSP" shall mean a groundwater sustainability plan.

1.12. "Member" has the meaning assigned to it in the Preamble and further means each party to this Agreement that satisfies the requirements of Section 6.1 of this Agreement, including any new members, as may be authorized by the Board pursuant to Section 6.2 of this Agreement.

1.13. "Member Director" means a director or alternate director appointed by a Member pursuant to Article 7 of this Agreement.

1.14. "Member's Governing Body" means the board of directors or other voting body that controls the individual public agencies that are Members.

1.15. "RRFC" has the meaning assigned to it in the Preamble of this Agreement.

1.16. "SGMA" has the meaning assigned to it in Recital A.

1.17. "Special Project" means a project undertaken by some, but not all Members of the Agency, pursuant to Article 14 of this Agreement.

1.18. "Stakeholder Director" means a Director appointed pursuant to Article 6 that represents stakeholder interests.

1.19. "State" means the State of California.

Article 2. Creation of a Separate Entity

2.1. Upon the effective date of this Agreement, Ukiah Valley Basin Groundwater Sustainability Agency ("Agency") is hereby created. Pursuant to the provisions of the Act, the Agency shall be a public agency separate from its members. The principal office shall be provided for in the Bylaws.

2.2. The boundaries of the Agency shall be as shown on the map on Exhibit A, attached and incorporated herein by this reference. The boundary shown on Exhibit A is an updated version of the Bulletin 118 boundary, based on the 2005 Larsen and Kelsey Map approved by the Department of Water Resources on January 26, 2017.

Article 3. Term

3.1. This Agreement shall become effective upon execution by each of the Parties and shall continue in full force and effect until terminated pursuant to the provisions of Article 17.

Article 4. Purpose of the Agency and this Agreement

4.1. The purpose of this Agreement is to create a joint powers agency separate from its Members that will elect to be the GSA for the entire Basin. The purpose of the Agency is to (a) develop, adopt, and implement a GSP for the Basin in order to implement SGMA requirements and achieve the sustainably goals outlined in SGMA; and (b) involve the public and area stakeholders through outreach and engagement in developing and implementing the Ukiah Valley Basin Groundwater Sustainability Plan.

Article 5. Powers of the Agency

5.1. Restrictions on Exercise of Powers. For purposes of Government Code Section 6509, the powers of the Agency shall be exercised subject to the restrictions upon the manner of exercising such powers as are imposed on the County of Mendocino, and in the event of the withdrawal of the County of Mendocino as a Member under this Agreement, then the powers of the Agency shall be exercised subject to the restrictions upon the manner of exercising such powers as are imposed on the City of Ukiah.

5.2. Powers. Subject to the limitations addressed herein, the Agency shall have the power in its own name to exercise any and all common powers of the Members reasonably related to the purposes of the Agency, including but not limited to, the following powers, together with such other powers as are expressly set forth in the Act and SGMA:

5.2.1. To exercise all powers afforded to a GSA pursuant to, and as permitted by, SGMA upon electing in accordance with SGMA to become the GSA for the Ukiah Valley Basin.

5.2.2. To develop, adopt and implement a GSP for the Basin pursuant to SGMA.

5.2.3. To adopt rules, regulations, policies, bylaws and procedures governing the operation of the Agency; and adoption and implementation of a GSP for the Basin.

5.2.4. To obtain rights, permits and other authorizations for, or pertaining to, implementation of a GSP for the Basin; and to exercise the common powers of the Members, as directed by the Board, in developing and implementing a GSP for the Basin.

5.2.5. To perform other ancillary tasks relating to the operation of the Agency pursuant to SGMA, including, without limitation, environmental review, engineering and design.

5.2.6. To employ, designate or otherwise contract for the services of agents, officers, employees, attorneys, engineers, planners, financial consultants, advisors, independent contractors, technical specialists and other consultants.

5.2.7. To make and enter into contracts necessary to the full exercise of the Agency's power.

5.2.8. To investigate legislation and proposed legislation affecting the Basin and to make appearances regarding such matters.

5.2.9. To acquire property and other assets by grant, lease, purchase, bequest, devise, gift or eminent domain; and to hold, enjoy, lease, sell, or otherwise dispose of property, including real property, water rights and personal property, necessary for the full exercise of the Agency's powers.

5.2.10. To cooperate, act in conjunction and contract with the United States, the State of California, or any agency thereof, counties, municipalities, public and private corporations of any kind (including, without limitation, investor-owned utilities), and individuals, or any of them, for any and all purposes necessary or convenient for the full exercise of the powers of the Agency.

5.2.11. To incur debts, obligations, and liabilities; to issue bonds, notes, certificates of participation, guarantees, equipment leases, reimbursement obligations and other indebtedness, and, to the extent provided for in a duly adopted Agency, to impose assessments, groundwater extraction fees or other charges, and other means of financing the Agency as authorized by Chapter 8 of SGMA (commencing at Section 10730 of the Water Code).

5.2.12. To apply for, accept, and receive contributions, grants or loans from any public or private agency or individual in the United States, or any department, instrumentality, or agency thereof for the purpose of financing the Agency's activities.

5.2.13. Invest money that is not needed for immediate necessities, as the Board of Directors determines advisable, in the same manner and upon the same conditions as other local entities in accordance with Section 53601 of the California Government Code, as that section now exists, or may hereafter be amended.

5.2.14. Reimburse Board Members for the actual amounts of reasonable and necessary expenses incurred in attending the Agency's meetings or any committee of the Agency in performing the duties of their officer, subject to Board of Directors policy and budget authorization.

5.2.15. To sue and be sued in the Agency's own name; provided that a Member may determine not to contribute to the expenses of litigation initiated by the Agency.

5.2.16. To provide for the prosecution of, defense of, or other participation in actions or proceedings at law or in public hearings in which the Members, pursuant to this Agreement, may have an interest; and may employ counsel and other expert assistance for these purposes.

5.2.17. To exercise the common powers of its Members to develop, collect, provide and disseminate information that furthers the purposes of the Agency, including, but not limited to the operation of the Agency and adoption and implementation of a Groundwater Sustainability Plan for the Basin, to the Members' legislative, administrative, and judicial bodies, as well as the public generally.

5.2.18. Employ or retain a full time or part time supporting staff.

5.2.19. To perform all other acts necessary or proper to fully carry out the purposes of this Agreement.

5.3. The Agency and all of its Members confirm that nothing contained herein shall grant the Agency any power to alter any water right, contract right, or any similar right held by its Members, or amend a Member's water delivery practice, course of dealing, or conduct without the express consent of the holder thereof.

Article 6. Membership

6.1. Initial Members. The initial Members of the Agency shall be the County of Mendocino, City of Ukiah, Russian River Flood Control and Water Conservation Improvement District, and the Upper Russian River Water Agency.

6.2. New Members. Additional Parties may join the Agency and become a Member provided that the prospective new member: (a) is eligible to join a GSA as provided by SGMA, (b) possesses powers common to all other Members, and (c) receives unanimous consent of the existing Members, evidenced by the execution of a written amendment to this Agreement signed by all Members, including the additional public agency. Additional Stakeholders Directors may be created by the execution of a written amendment to this Agreement signed by all Members.

Article 7. Agency Board of Directors

7.1. Formation of the Board of Directors. The Agency shall be governed by a Board of Directors ("Board of Directors" or "Board"). The Board shall be composed of six (6) Directors consisting of the following representatives, who shall be appointed in the manner set forth in Section 7:

7.1.1. One (1) representative appointed by the governing board of each Member, who shall be a member of the governing board of the Member (each, a "Member Director").

7.1.2. Two (2) Stakeholder Directors, one (1) of which shall be representative of agricultural stakeholders and interests within the Basin; and one (1) of which shall be representative of tribal stakeholders and interests within the Basin. The two (2) Stakeholder Directors shall meet the following qualifications: ¶

(a) One (1) Agricultural Stakeholder Director. The Agricultural Stakeholder Director shall meet the following criteria, determined at the sole discretion of the Board Members: (1) be a resident of Mendocino County; (2.a) own/ lease real property in active commercial agricultural production overlying the Basin or (2.b) be an employee of a commercial agricultural production operation overlying the basin involved with water use decisions and (3) extract groundwater from the Basin for the irrigation/frost protection of at least fifteen (15) acres of agricultural crops in commercial operation. The Agricultural Stakeholder may not be a party to any pending litigation against the Agency or any of its Members.

(b) One (1) Tribal Stakeholder Director shall be appointed by the six tribes exercising jurisdiction over Indian lands within the Ukiah Valley Basin identified as Redwood Valley Rancheria, Coyote Valley Reservation, Pinoleville Pomo Nation, Potter Valley Rancheria, Guidiville Rancheria and the Hopland Reservation.

7.1.3. Relationship of Members. The Upper Russian River Water Agency is a joint powers authority consisting of several water districts within the Ukiah Valley and the RRFC. For purposes of the Agency, the RRFC desires to be a separate member of the Agency with a separate vote, and as such, will not take part in any action or discussion, and shall not vote on any item of the Upper Russian River Water Agency related to the Agency. The abstention of the RRFC from such agenda items of the Upper Russian River Water Agency shall be separately reflected in documents of the Upper Russian River Water Agency. Should the RRFC fail to abstain from taking part in any vote relating to the Agency before the Upper Russian River Water Agency, it shall not be entitled to vote on that matter when it comes before the Agency.

Members of the Upper Russian River Agency are also contemplating the consolidation of all members of the joint powers authority into a single water district. Should such consolidation occur, this JPA shall be amended to reflect the consolidation of members.

7.2. Duties of the Board of Directors. The business and affairs of the Agency, and all of the powers of the Agency, including without limitation all powers set forth in Article 5, are reserved to and shall be exercised by and through the Board of Directors, except as may be expressly delegated to the Executive Director or others pursuant to this Agreement, Bylaws, or by specific action of the Board of Directors.

7.3. Appointment of Directors. The Directors shall be appointed as follows:

7.3.1. Member Directors. Each Member Director must sit on the governing board of the Member and be appointed by that governing board by Resolution, which Resolution shall be transmitted to the Secretary of the Agency following adoption by the Member.

7.3.2. Stakeholder Directors. The two (2) Stakeholder Directors shall be appointed as follows:

(a) One (1) stakeholder shall be chosen by the Member Directors to represent agricultural interests within the Ukiah Valley Groundwater Basin. This stakeholder shall meet the qualifications as described in 7.1.2. (a). This stakeholder shall be selected from a list of three (3) nominations submitted from the Mendocino County Farm Bureau, but the three (3) nominees need not be a member of the organization. Nominees shall be submitted to the Member Directors pursuant to a process specified in the Bylaws, unless directed otherwise by the Member Directors. The Member Directors shall consider the nominees at a regular meeting of the Board and shall appoint the Agricultural Stakeholder Director upon simple majority vote of all Member Directors.

(b) Tribal Stakeholder Director. The Member Directors shall confirm the nomination for the Tribal Stakeholder Director submitted by the six (6) Tribes within the Ukiah Valley. The Member Directors shall confirm the nominee at a regular meeting and shall appoint the Tribal Stakeholder Director upon simple majority vote of all Member Directors.

7.4. Alternate Directors. Each Member may also appoint one (1) Alternate Director to the Board of Directors, and an Alternate Director shall be appointed for each Stakeholder Director. All Alternate Directors shall be appointed in the same manner as set forth in Section 7.3. Alternate Directors shall have no vote, and shall not participate in any discussions or deliberations of the Board unless appearing as a substitute for a Director due to absence or conflict of interest. If the Director is not present, or if the Director has a conflict of interest which precludes participation by the Director in any decision-making process of the Board, the Alternate Director appointed to act in his/her place shall assume all rights of the Director, and shall have the authority to act in his/her absence, including casting votes on matters before the Board. Each Alternate Director shall be appointed prior to the third meeting of the Board. Alternate Directors are encouraged to attend all Board meetings and stay informed on current issues before the Board. Alternate Board Members have no vote at Board of Director meetings if the Board Member is present. If the Board Member is not present, the Alternate Board Member shall be entitled to participate in all respects as a regular Board Member.

7.5. Terms of Office. The term of office for each member of the Agency's Board of Directors is two (2) years. Each member of the Board of Directors shall serve at the pleasure of the appointing Member and may be removed from the Board of Directors by the appointing members at any time. If at any time a vacancy occurs on the Board of Directors, a replacement shall be appointed to fill the unexpired term of the previous Board Member, pursuant to Article 7 and within ninety (90) days of the date that such position becomes vacant.

7.6. Removal of Board Members. Board Members and Alternate Board Members shall serve at the pleasure of their appointing Member's governing board and may be removed or replaced at any time. A Board Member that no longer meets the qualifications set forth in section 7.1 is automatically removed from the Agency Board of Directors. Upon removal of a Board Member, the Alternate Board Member shall serve as a Board Member until a new Board Member is appointed by the Member. Members must submit any changes in Board Member or Alternate Board Member positions to the Secretary in writing and signed by the Member. A Stakeholder Director may be removed or reappointed by a simple majority vote of all Member Directors.

7.7. Vacancies. A vacancy on the Board of Directors shall occur when a Director resigns or reaches the end of that Director's term, as set forth in Section 7.5. For Member Directors, a vacancy shall also occur when he/she is removed by his/her appointing Member. For Stakeholder Directors, a vacancy shall also occur when the Stakeholder Director is removed, as set forth in Section 7.5. Upon the vacancy of a Member Director, the Alternate Director shall serve as Director until a new Director is appointed, as set forth in Section 7.3, unless the Alternate Director is already serving as a Member Director in the event of a prior vacancy, in which case, the seat shall remain vacant until a replacement Director is appointed as set forth in Section 7.3. Members shall submit any changes in Director or Alternate Director positions to the Board of Directors or Executive Director by written notice, signed by an authorized representative of the Member. The written notice shall include a Resolution of the governing board of the Member directing such change in the Director or Alternative Director position.

7.8. Adjustment to Composition of the Board of Directors. Should the circumstances change in the future, any person or entity may petition the Members hereto to amend this Agreement so as to add or delete representatives to the Governing Board to accurately reflect groundwater production within the boundaries of the authority.

Article 8. Agency Meetings

8.1. Initial Meeting. The initial meeting of the Agency's Board of Directors shall be called by the County of Mendocino and held in the Mendocino County Board of Supervisors Chambers, 501 Low Gap Road, Ukiah, California within 60 days of the effective date of this Agreement. All Members shall be required to attend the initial meeting.

8.2. Time and Place. The Board of Directors shall provide in its adopted bylaws or by other means authorized or required by law, for the time and place for holding regular meetings, at least quarterly, and at such other times as determined by the Board of Directors.

8.3. Conduct. All meetings of the Governing Board shall be noticed, held, and conducted in accordance with the Ralph. M. Brown Act to the extent applicable. Board Members and Alternate Board Members may use teleconferencing in connection with any meeting in conformance with and to the extent authorized by the applicable laws.

8.4. Local Conflict of Interest Code. The Board of Directors shall adopt a local conflict of interest code pursuant to the provisions of the Political Reform Act of 1974 (Government Code sections 81000, *et seq.*).

Article 9. Board of Directors Voting

9.1. Quorum. A majority of the members of the Board of Directors shall constitute a quorum for purposes of transacting business, except less than a quorum may vote to adjourn a meeting.

9.2. Director Votes. Each member of the Board of Directors of the Agency shall have one (1) vote. Except as otherwise specified in this Agreement, all affirmative decisions of the Board of Directors shall require the affirmative vote of a simple majority of all Directors participating in voting on a matter of Agency business; provided that if a Director is disqualified from voting on a matter before the Board because of a conflict of interest, that Director shall be excluded from the calculation of the total number of Directors that constitute a majority. The Board of Directors shall strive for consensus of all members on items.

9.3. Voting on Fiscal Items. Fiscal items, approval of the annual budget of the Agency and any expenditures, and any projects shall require an affirmative vote by a majority of the Board of Directors.

Article 10. Officers

10.1. Officers. The Board of Directors shall select a Chairman, Vice-Chairman, Secretary, and any other officers as determined necessary by the Board of Directors.

10.1.1. The Chairman shall preside at all Board Meetings.

10.1.2. The Vice-Chairman shall act in place of the Chairman at meetings should the Chairman be absent.

10.1.3. The Secretary shall keep minutes of all meetings of the Board of Directors and shall, as soon as possible after each meeting, forward a copy of the minutes to each member and alternate of the Board of Directors.

10.1.4. All Officers shall be chosen at the first Board of Directors meeting and serve a term for two (2) years. An Officer may serve for multiple consecutive terms. Any Officer may resign at any time upon written notice to the Agency.

Article 11. Committee Formation

11.1. Internal Committee Formation. There shall be established such internal committees as the Board of Directors shall determine from time to time. Each such internal committee shall be comprised of two (2) Directors, shall exist for the term specified in the action establishing the committee, shall meet as directed by the Board of Directors, and shall make recommendations to the Board of Directors on the various activities of the Agency.

11.2. External Advisory Committee Formation. The Board of Directors may establish, as deemed necessary, one or more advisory committees comprised of diverse social, cultural, and economic elements of the population and area stakeholders within the Ukiah Valley Basin. The Board of Directors shall encourage the active involvement of the advisory committee(s) prior to and during the development and implementation of the Groundwater Sustainability Plan. The Board of Directors will ensure that at least one (1) member from the Board of Directors or Agency employee attends and participates in each advisory committee meeting.

11.3. Technical Advisory Committee. There shall be established a technical advisory committee, the purpose of which shall be to provide advice to the Board of Directors on issues of a technical nature related to the activities of the Agency. The technical advisory committee shall be comprised of at least one (1) representative of each Member; one (1) representative for each of the Agricultural Stakeholders and the Tribal Stakeholders; at least one (1) representative from the Sonoma County Water Agency; and at least one (1) representative from the Mendocino County Resource Conservation District. The technical advisory committee shall meet as directed by the Board of Directors, and shall make recommendations to the Board of Directors as requested. The role and responsibilities of the technical advisory committee will be established in a Memorandum of Understanding between the Agency, the Mendocino County Resource Conservation District, and the Sonoma County Water Agency.

Article 12. Treasurer, Controller, and Legal Counsel

12.1. Treasurer and Controller. The County of Mendocino shall act as Treasurer and Controller for the Agency. The Controller of the Agency shall cause an independent audit of the Agency's finances to be made by a certified public accountant in compliance with California Government Code Section 6505. The Treasurer of the Agency shall be the depositor and shall have custody of all money of the Agency from whatever source. The Controller of the Agency shall draw warrants and pay demands against the Agency when the demands have been approved by the Agency, or any authorized representative pursuant to any delegation of Agency adopted by the Agency. The Treasurer and Controller shall comply strictly with the provisions of statutes relating to their duties found in Chapter 5 (commencing with Section 6500) of Division 7 of Title 1 of the California Government Code.

12.2. Legal Counsel. The Board of Directors may appoint legal counsel as it deems appropriate.

Article 13. Executive Director

13.1. Appointment. The Board of Directors may hire an Executive Director who shall be compensated for his or her services, as determined by the Board of Directors. The Executive Director may, though need not be, an officer, employee or representative of one of the Members.

13.2. Duties. The Executive Director shall be the Chief Administrative Officer of the Agency, shall serve at the pleasure of the Board of Directors, and shall be responsible to the Board of Directors for the proper and efficient administration of the Agency. The Executive Director shall have the powers designated in the Bylaws.

13.3. Term and Termination. The Executive Director shall serve until he/she resigns or the Board of Directors terminates his/her appointment.

13.4. Staff. The Executive Director may employ such additional full-time and or part-time employees, assistants, and independent contractors that may be necessary from time to time to accomplish the purposes of the Agency, subject to approval of the Board of Directors. The Agency may contract with a Member or other public agency or private entity for various services, including without limitation, those related to the Agency's finances, purchasing, risk management, information technology, human resources and other technical and non-technical staff assistance as may be required. A written Agreement shall be entered between the Agency and the Member or other public agency or private entity contracting to provide such service, and that Agreement shall specify the terms on which such services shall be provided, including without limitation, the compensation, if any, that shall be made for the provision of such services.

Article 14. Specific Projects

14.1. Projects. The Agency intends to carry out activities in furtherance of its purposes and consistent with the powers established by the Agreement with the participation of all Members.

14.2. Member Specific Projects. In addition to the general activities undertaken by all Members of the Agency, the Agency may initiate specific projects or litigation that involves less than all Members. No Member shall be required to be involved in a project that involves less than all the Members.

14.3. Project Agreement. Prior to undertaking any project or litigation that does not involve all Member Agencies, the Members electing to participate in the project shall enter into a Project Agreement. A Member may elect not to participate in a specific project or litigation matter by providing notice and not entering into the Project Agreement specific to the matter in which the Member has elected not to participate. Each Project Agreement shall provide the terms and conditions by which the Members that enter into the Project Agreement will participate in the project. All assets, rights, benefits, and obligations attributable to the Project shall be assets, rights, benefits, and obligations of those Members which have entered into the Project Agreement. Any debts, liabilities, obligations, or indebtedness incurred by the Agency in regard to a particular Project shall be the debts, liabilities, obligations, and indebtedness of those Members who have executed the Project Agreement in accordance with the terms thereof and shall not be the debts, liabilities, obligations, and indebtedness of those Members who have not executed the Project Agreement. Further, to the extent the Project is litigation, the Members who have not entered into the Project Agreement shall not be named or otherwise listed in the pleadings and/or appear on litigation materials.

14.4. Board of Directors Approval. The Board of Directors shall have the authority to disapprove any Project Agreement upon a determination that the Project Agreement has specific, substantial adverse impacts upon Members that have not executed the Project Agreement.

Article 15. Budget and Expenses

15.1. Budgets. Within ninety (90) days after the first meeting of the Governing Board of the Agency, and thereafter prior to the commencement of each fiscal year, the Board of Directors shall adopt a budget for the Agency for the ensuing fiscal year.

15.2. Agency Funding and Contributions. In order to provide the needed capital to initially fund the Agency, the Agency shall be initially funded by a contribution from initial Members in the amount established in the bylaws, which contribution shall be set at an equal dollar amount for initial Members. In subsequent years, the Agency may be funded through additional voluntary contributions by all Members, and as otherwise provided in Chapter 8 of SGMA (commencing with Section 10730 of the Water Code).

Article 16. Liability and Indemnification

16.1. Liability. The Members do not intend hereby to be obligated either jointly or severally for the debts, liabilities or obligations of the Agency, except as may be specifically provided for in California Government Code Section 895.2, as amended or supplemented. Therefore unless and to the extent otherwise required by law or agreed to herein by the Members, in accordance with California Government Code Section 6507, the debts, liabilities and obligations of the Agency shall not be the debts, liabilities or obligations of the Member entities. The Agency shall own and hold title to all funds, property and works acquired by it during the term of this Agreement.

16.2. Indemnification. Funds of the Agency may be used to defend, indemnify, and hold harmless the Agency, each Member, each Director, and any officers, agents and employees of the Agency for their actions taken within the course and scope of their duties while acting on behalf of the Agency. Other than for gross negligence or intentional acts, to the fullest extent permitted by law, the Agency agrees to save, indemnify, defend and hold harmless each Member from any liability, claims, suits, actions, arbitration proceedings, administrative proceedings, regulatory proceedings, losses, expenses or costs of any kind, whether actual, alleged or threatened, including attorney's fees and costs, court costs, interest, defense costs, and expert witness fees, where the same arise out of, or are in any way attributable in whole or in part to, negligent acts or omissions of the Agency or its employees, officers or agents or the employees, officers or agents of any Member, while acting within the course and scope of a Member relationship with the Agency.

Article 17. Withdrawal and Termination

17.1. Withdrawal. A Member may unilaterally withdraw from this Agreement without causing or requiring termination of this Agreement, effective upon sixty (60) days written notice to the remaining Members.

17.2. Termination of Agency. This Agreement may be rescinded and the Agency terminated by unanimous written consent of all Members, except during the outstanding term of any Agency indebtedness.

17.3. Effect of Withdrawal or Termination. Upon termination of this Agreement or unilateral withdrawal, a Member shall remain obligated to pay its share of all debts, liabilities and obligations of the Agency required of the Member pursuant to the terms of this Agreement which were incurred or accrued prior to the date of such termination or withdrawal, including without limitation, those debts, liabilities and obligations pursuant to Section 5.2.11. Any Member that withdraws from the Agency shall have no right to participate in the business and affairs of the Agency, or to exercise any rights of a Member under this Agreement or the Act, but shall continue to share in distributions from the Agency on the same basis as if such Member had not withdrawn, provided that a Member that has withdrawn from the Agency shall not receive distributions in excess of the contributions made to the Agency while a Member. The right to share in distributions granted under this section shall be in lieu of any right the withdrawn Member may have to receive a distribution or payment of the fair value of the Member's interest in the Agency.

17.4. Disposition of Agency Assets upon Termination.

17.4.1. Surplus Funds. Upon termination of this Agreement, any reserves or surplus money on-hand shall be returned to the Members in the same proportion said Members have funded such reserves or surplus, in accordance with California Government Code section 6512.

17.4.2. Agency Property. The Agency shall first offer any assets of the Agency for sale to the Members on terms and conditions determined by the Board of Directors. If no such sale to Members is consummated, the Board shall offer the assets of the Agency for sale to any non-member for good and adequate consideration on terms and conditions determined by the Board of Directors.

Article 18. Miscellaneous

18.1. No Predetermination or Irretrievable Commitment of Resources. Nothing in this Agreement shall constitute a determination by the Agency or any of its Members that any action shall be undertaken or that any unconditional or irretrievable commitment of resources shall be made, until such time as the required compliance with all local, state, or federal laws, including without limitation the California Environmental Quality Act, National Environmental Policy Act, or permit requirements, as applicable, has been completed.

18.2. Notices. Notices hereunder shall be sufficient if delivered via electronic mail, First-Class mail to the addresses below:

Russian River Flood Control and Water Conservation Improvement District: 151 Laws Avenue, Suite D, Ukiah, CA 95482
County of Mendocino: 501 Low Gap Road, Room 1010, Ukiah, CA 95482
City of Ukiah: 300 Seminary Avenue, Ukiah, CA 95482
Upper Russian River Water Agency: 151 Laws Avenue, Ukiah, CA 95482

18.3. Bylaws. At, or as soon as practicable after the first Board of Directors meeting the Board of Directors shall draft and approve Bylaws of the Agency to govern day-to-day operations of the Agency.

18.4. Amendment. This Agreement may be amended at any time, by mutual agreement of the Members, provided that before any amendments shall be operative or valid, it shall be reduced to writing and signed by all Members hereto.

18.5 Agreement Complete. This Agreement constitutes the full and complete Agreement of the Members. This Agreement supersedes all prior Agreements and understandings, whether in writing or oral, related to the subject matter of this Agreement that are not set forth in writing herein.

18.6. Severability. If any provision of this Agreement is determined to be invalid or unenforceable, the remaining provisions will remain in force and unaffected to the fullest extent permitted by law and regulation.

18.7. Execution in Counterparts. The Parties intend to execute this Agreement in counterparts. It is the intent of the Parties to hold one (1) counterpart with single original signatures to evidence the Agreement and to thereafter forward three (3) other original counterparts on a rotating basis for all signatures. Thereafter, each Member shall be delivered an originally executed counterpart with all Member signatures.

18.8. Withdrawal by Operation of Law. Should the participation of any Member to this Agreement be decided by the courts to be illegal or in excess of that Member's authority or in conflict with any law, the validity of this Agreement as to the remaining Members shall not be affected thereby.

18.9. Assignment. The rights and duties of the Members may not be assigned or delegated without the written consent of all other Members. Any attempt to assign or delegate such rights or duties in contravention of this Agreement shall be null and void.

18.10. Binding on Successors. This Agreement shall inure to the benefit of, and be binding upon, the successors or assigns of the Members.

18.11. Other Joint Power Agreements. Nothing in this Agreement shall prevent the Members from entering into other joint exercise of power Agreements.

[Signature Pages Below]

IN WITNESS WHEREOF, the parties hereto execute this Agreement as of the Effective Date.

COUNTY OF MENDOCINO

By: _____
JOHN MCCOWEN, Chair
BOARD OF SUPERVISORS

Date: APR 18 2017

By signing above, signatory warrants and represents that he/she executed this Agreement in his/her authorized capacity and that by his/her signature on this Agreement, he/she or the entity upon behalf of which he/she acted, executed this Agreement

ATTEST:
CARMEL J. ANGELO, Clerk of said Board

By: _____
Deputy

Date: APR 18 2017

I hereby certify that according to the provisions of Government Code Section 25103, delivery of this document has been made.

CARMEL J. ANGELO, Clerk of said Board

By: _____
Deputy

Date: APR 18 2017

COUNTY COUNSEL REVIEW:

APPROVED AS TO FORM:

KATHARINE L. ELLIOTT,
County Counsel

By: _____
Deputy

Date: 4/6/17

DEPARTMENT FISCAL REVIEW:

_____
DEPARTMENT HEAD

FISCAL REVIEW

_____
Deputy CEO/Fiscal

INSURANCE REVIEW:
RISK MANAGER

_____
ALAN D. FLORA
RISK MANAGER

EXECUTIVE REVIEW:
APPROVAL RECOMMENDED

_____
CARMEL J. ANGELO
CHIEF EXECUTIVE OFFICER

IN WITNESS WHEREOF, the parties hereto execute this Agreement as of the Effective Date.

CITY OF UKIAH

BY: _____ 5.10.17

Jim O. Brown, MAYOR

Date

BY: _____ 5-10-17

CITY MANAGER

Date

ATTEST

_____ 5-10-17

CITY CLERK

Date

IN WITNESS WHEREOF, the parties hereto execute this Agreement as of the Effective Date.

Russian River Flood Control and Water Conservation Improvement District

By: William Carson Date: 4/10/17

William Carson, President

Board of Trustees

IN WITNESS WHEREOF, the parties hereto execute this Agreement as of the Effective Date.

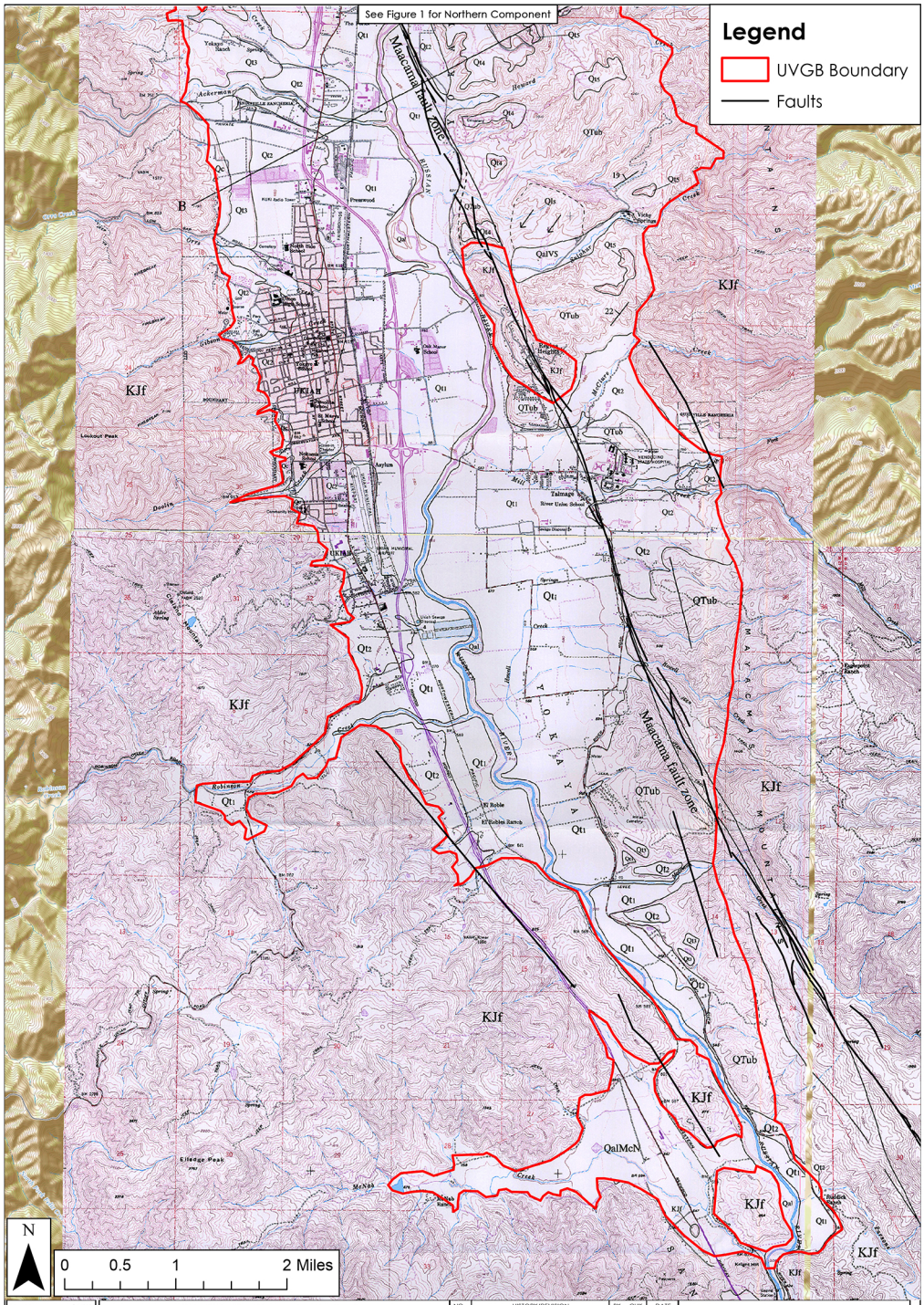
Upper Russian River Water Agency

By: Jerry Cardoza Date: 4-5-17

Jerry Cardoza, President

Board of Directors

Date: 1/10/2017 Time: 1:39:11 PM



DRAWN	BMW
CHECK	BAV
APPROVED	CJW
DATE	1/10/2017
JOB NO.	7746.09
FIGURE	Figure 2

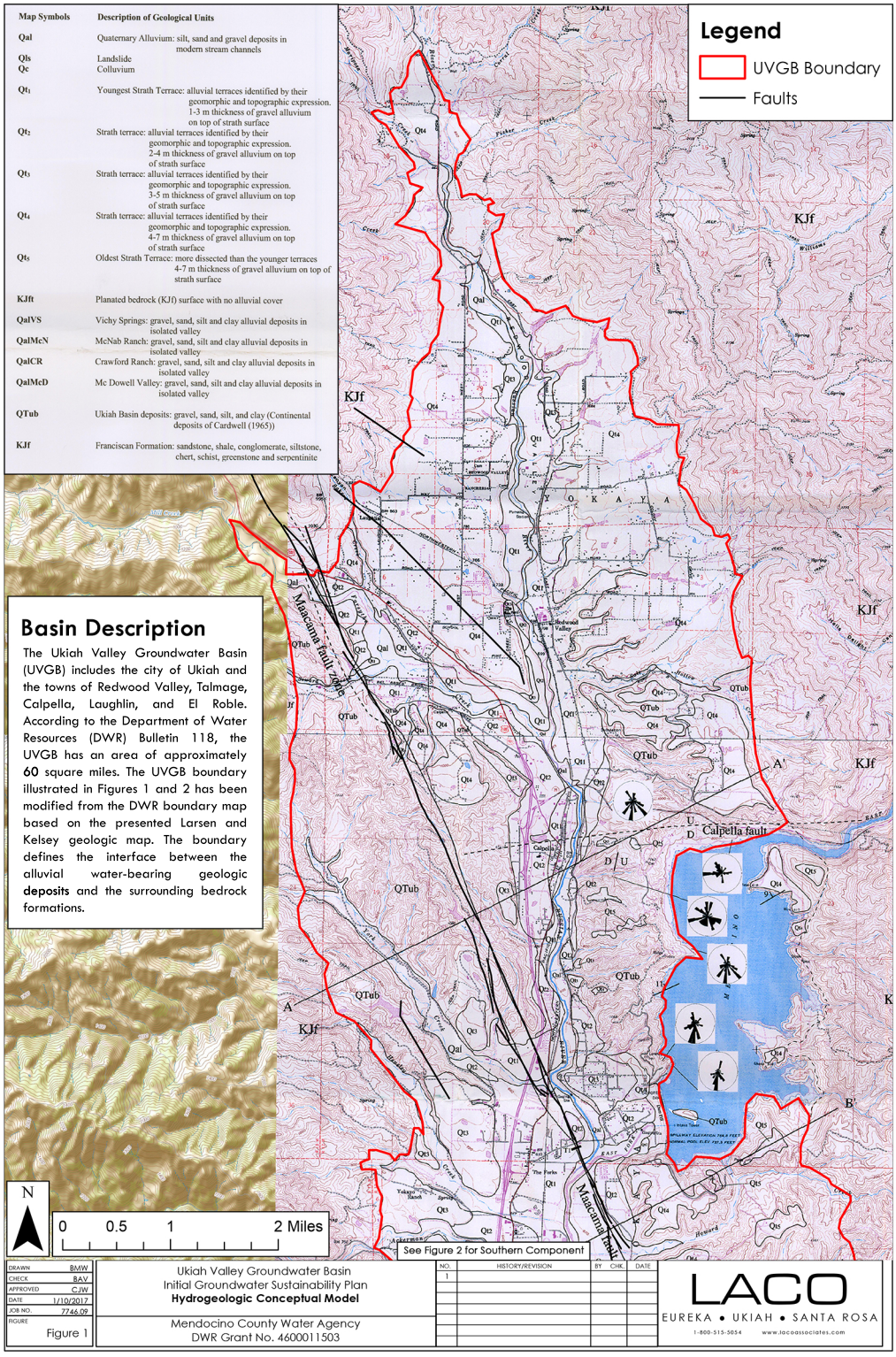
Ukiah Valley Groundwater Basin
Initial Groundwater Sustainability Plan
Hydrogeologic Conceptual Model

Mendocino County Water Agency
DWR Grant No. 4600011503

NO.	HISTORY/REVISION	BY	CHK.	DATE
1				

LACO
EUREKA • UKIAH • SANTA ROSA
1-800-515-5054 www.lacoassociates.com

Date: 1/10/2017 Time: 1:25:37 PM



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APPROVED	CJW
DATE	1/10/2017
JOB NO.	7746.09
FIGURE	Figure 1

Ukiah Valley Groundwater Basin
Initial Groundwater Sustainability Plan
Hydrogeologic Conceptual Model

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NO.	HISTORY/REVISION	BY	CHK.	DATE
1				

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Appendix 1-C Ukiah Valley Basin GSA ByLaws

UKIAH VALLEY BASIN GROUNDWATER SUSTAINABILITY AGENCY

BYLAWS

ADOPTED BY: Board of Directors

ADOPTED: November 9, 2017

These Bylaws are adopted and effective as of November 9, 2017, pursuant to the Joint Powers Agreement of the UKIAH VALLEY BASIN GROUNDATER SUSTAINABILITY AGENCY.

Table of Contents

PREAMBLE

These Bylaws are adopted and effective as of October 12, 2017, pursuant to the Joint Powers Agreement of the UKIAH VALLEY BASIN GROUNDWATER SUSTAINABILITY AGENCY (Agreement).

ARTICLE 1. THE AGENCY

1.1 NAME OF AGENCY. The name of the Agency created by the Agreement shall be the Ukiah Valley Basin Groundwater Sustainability Agency (Agency).

1.2 OFFICE OF AGENCY. The principal office of the Agency shall be at the Mendocino County Water Agency, 501 Low Gap Road, Room 1010, Ukiah, CA 95482, or at such other location as the Board may designate by resolution.

1.3 POWERS. The powers of the Agency shall be as set forth in Article 5 of the Agreement.

ARTICLE 2. BOARD OF DIRECTORS

2.1 BOARD OF DIRECTORS. The Agency shall be governed by a Board of Directors (Board) as set forth in Article 7 of the Agreement.

2.2 PROCEDURE FOR APPOINTMENT OF BOARD MEMBERS

2.2.1 Appointment. Each Member Agency is responsible for appointing a Board Member and an alternate Board Member, pursuant to its own procedures and authorities. The appointment shall be made by Resolution.

2.2.2 Notification. Each Member Agency shall notify the Agency when it appoints or changes its Board Member and/or alternate Board Member.

2.2.3 Tribal Member. The six (6) Tribes within the Ukiah Valley identified as Redwood Valley Rancheria, Coyote Valley Reservation, Pinoleville Pomo Nation, Potter Valley Rancheria, Guidiville Rancheria and the Hopland Reservation, shall submit a letter nominating a Director and Alternative Director. The Board shall confirm the nominee at a regular meeting and shall appoint the Tribal Director upon simple majority vote of all Members.

2.2.4. Agricultural Member. The Agricultural Member shall meet the qualifications as described in 7.1.2(a) of the Agreement. The Members shall be selected from a list of three (3) nominations submitted from the Mendocino County Farm Bureau (MCFB), but the three (3) nominees need not be a member of the organization. The MCFB shall submit a nomination letter and completed applications of all three nominees. The MCFB must use the application approved by the Board of Directions (Appendix A). The Board shall consider the nominees at a regular meeting of the Board and may interview the nominees. The Board shall appoint the Agricultural Member and alternate member upon simple majority vote of all Member Directors.

ARTICLE 3. BOARD MEETINGS

3.1 MEETINGS. The Board shall meet regularly, at least once per quarter on the second Thursday of the first month of the quarter, at 1:30 PM, at Mendocino County Board of Supervisors Chambers, 501 Low Gap Road, Room 1070, Ukiah, CA 95482 and as often as needed. Special meetings of the Board may be called by the Chair or any four directors by written request. Board meetings shall be conducted in compliance with all applicable laws, and as further specified herein. Meeting agendas shall be posted 72 hours before each meeting in compliance with the requirements of the Ralph M. Brown Act.

3.2 QUORUM. In determining a quorum as defined by Section 9.1 of the Agreement, Alternate Directors attending meetings shall not be counted as part of any meeting quorum unless such Alternate Director is formally representing an absent appointed Director.

3.3 ORDER OF BUSINESS. In general, at the regular meetings of the Board, the following will be the order of business:

3.3.1 Call to Order.

3.3.2 Roll Call.

3.3.3 Approval of Minutes of the Previous Meeting.

3.3.4 Public Comment Period

3.3.5 Staff Updates.

3.3.6 Agenda Items, including any appropriate combination of consent items, regular business items, public hearing items or closed session items.

3.3.7 Directors Reports.

3.3.8 Adjournment.

3.4 AGENDA. Members may submit items for the agenda at a minimum of seven (7) days prior to the publication of the agenda for any regular meeting. The agenda shall be published seventy-two (72) hours prior to regular board meeting and twenty-four (24) hours prior to a special board meeting in accordance with the Brown Act. Agenda publication shall conform to all required provisions of the Brown Act. Nothing herein shall prohibit the board from considering any late-submitted or emergency item to the extent permitted by the Brown Act.

3.5 ACTION BY THE BOARD. Action by the Board on all resolutions or ordinances shall be taken using a roll call vote and shall be recorded in writing, signed by the Chair, and attested to by the Secretary. All other actions of the Board shall be by motion recorded in written minutes. The clerk or Chair in an absence of a clerk shall announce the results of the vote including the names of the Directors, if any, voting in the minority.

3.6 RULE OF ORDER. All rules of order not otherwise provided for In these Bylaws or applicable statute, regulation, or other law shall be determined, to the extent practicable, in accordance with "Robert's Rules of Order;" provided, however, that no action of the Board shall be invalidated or its legality otherwise affected by the failure or omission to observe or follow "Robert's Rules of Order."

ARTICLE 4. OFFICERS

4.1 OFFICERS. The Officers of the Agency are the Chair, Vice-Chair, and Secretary, as provided for in Article 10 of the Agreement. All Directors are eligible to serve as an Officer. The Chair and the Vice Chair must be Directors.

4.2 ELECTION OF OFFICERS. At the first meeting of the Board, and every two (2) years hence, nominations for the Officers will be made and seconded by a Director. If more than two Directors are nominated for any one office, voting occurs until a nominee receives a majority of the votes cast. The initial term of the elected Officers shall run from the date of their election to until the Board meeting two years after the election. Thereafter, each Officer shall serve a term of two years. At the expiration of the term, the Officer shall continue to fulfill the responsibilities of their office until such time as a successor is appointed. An Officer may succeed himself/herself and may serve any number of consecutive or non-consecutive terms.

4.3 REMOVAL OF DIRECTORS. Board Members and Alternate Board Members serve at the pleasure of their appointing Member's governing board and may be removed or replaced at any time. Stakeholder Directors that no longer meet the qualifications set forth in section 7.1 of the JPA will be automatically removed from the Board of Directors. A Stakeholder Director may be removed or reappointed by a simple majority vote of the Board. Upon removal of a Board Member, the Alternate Board Member shall serve as the Board member until a new Board member is appointed.

4.4. REMOVAL OF OFFICERS. Prior to the expiration of their term, an officer may be removed only by a majority vote of the board or as a result of resignation, removal from or replacement on the board of directors, or by operation of law.

4.5 VACANCIES. Any vacancy in the offices because of death, resignation, removal, disqualification, or any other cause will be filled for the balance of the vacated term in the manner prescribed in these Bylaws for regular appointments to that office; provided, however, that such vacancies may be filled at any regular or special meeting of the Board. Alternate Directors shall serve as the Board member until a new Board member is appointed. Members shall submit any changes in Director or Alternate Director positions to the Board of Directors or Executive Director by written noticed signed by an authorized representative from the Member. The written noticed must include a Resolution of the governing board of the Member directing such change in the Director or Alternative Director position.

4.6 RESIGNATION OF OFFICERS. Any Officer may resign at any time by giving written notice to the Board Chair or Secretary. Any resignation takes effect at the date of the receipt of that notice or at any later time specified in that notice. Unless otherwise specified in that notice, the acceptance of the resignation is not necessary to make it effective.

4.7 RESPONSIBILITIES OF OFFICERS.

4.6.1 Chair of the Board. The Chair of the Board shall preside at meetings of the Board and exercise and perform such other powers and duties as may be assigned to him/her by the Board or prescribed by these Bylaws. The Chair shall have the power to enforce meeting decorum and rules of order. The Chair shall rule on all questions of procedure, unless overruled by the Board.

4.7.2 Vice-Chair of the Board. The Vice-Chair of the Board shall fulfill all the duties of the Chair in his/her absence and exercise and perform such other powers and duties as may be assigned to him/her by the Board.

4.7.3 Secretary. The Secretary shall perform duties assigned by the Board, such duties shall include, but not be limited to, the following:

i. Book of Minutes. Keep or cause to be kept, at the principal executive office of the Agency or such other place as the Board may direct, a book of minutes of all meetings and actions of Directors and Committees of the Agency, with the time and place of holding the meeting, whether regular or special, and, if special, how authorized, the notice given, the names of those present and absent at such meetings and the proceedings of such meetings. Minutes will be in the form of Action Minutes.

ii. Notices and Other Duties. Prepare, give, or cause to be given, notice of, and agendas for, all meetings and/or hearings of the Board and committees of the Agency.

iii. Exercise and perform such other powers and perform such other duties as may be assigned to him/her by the Board.

ARTICLE 5. BOARD COMMITTEES, WORKING GROUPS, ADVISORY COMMITTEES AND TECHNICAL ADVISORY COMMITTEE

5.1 INTERNAL BOARD COMMITTEES. The Board may establish temporary or permanent Board Committees composed of two (2) Board Members to facilitate conduct of its work. Temporary Board Committees will have a specific charge and operational duration not to exceed six months and are not subject to the Brown Act. All Board Committees will provide regular updates to the full Board about their activities and the progress of their work.

5.2 WORKING GROUPS. Informal working groups may be formed from time to time to provide opportunities for a small subset of Directors to work with staff on specific planning, analytical, or community engagement activities. Such working groups will have a defined area as the focus for its work and may function for up to six months, and may include such membership as needed to accomplish the objectives for which the working group was created, to the extent permitted by law.

5.3 ADVISORY COMMITTEES. Pursuant to Section 11 of the Agreement, the Board may establish one or more advisory committees to assist in carrying out the purposes and objectives of the Agency.

5.3.1 In establishing an Advisory Committee, the Board shall provide specific direction to the Committee as to its charge, expected duration for completion of its charge, and a summary of the resources, including staff or consultant support available to the Committee in performing its work.

5.3.2 Advisory Committee membership and appointments shall be at the Board's discretion based on creating the membership needed to meet the purpose for which the Advisory Committee was created.

5.3.3 The Board will ensure that at least one (1) member from the Board of Directors or Agency employee attends and participates in each advisory committee meeting.

5.3.4 Any advisory committee shall exercise such powers as may be delegated to it, except that no committee may:

i. Take any final action on matters which, under the Agreement, require approval by a majority vote of the Board;

ii. Amend or repeal the Bylaws or adopt new Bylaws;

iii. Amend or repeal any resolution of the Board; or,

iv. Appoint any other committees of the Board or the members of these committees.

5.3.5 Advisory committees shall meet at the call of their respective committee chairs. All advisory committee meetings shall be conducted in accordance with the Ralph M. Brown Act (California Government Code sections 54950 et seq.). Minutes of committee meetings shall be recorded and upon approval shall be distributed to the Board.

5.4 TECHNICAL ADVISORY COMMITTEE. Pursuant to Section 11 of the Agreement there shall be established a technical advisory committee, the purpose of which shall be to provide advice to the Board on issues of technical nature related to the activities of the Agency.

5.4.1 The technical advisory committee shall be comprised of at least one (1) representative of each Member; one (1) representative for each of the Agricultural Stakeholders and the Tribal Stakeholders; at least one (1) representative from the Sonoma County Water Agency; at least one (1) representative from the Mendocino County Resource Conservation District; and at least one representative from the California Land Stewardship Institute.

5.4.2 The technical advisory committee shall meet as directed by the Board of Directors, and shall make recommendations to the Board of Directors as requested.

5.4.3 The role and responsibilities of the technical advisory committee will be established in a Memorandum of Understanding between the Agency, the Mendocino County Resource Conservation District, the Sonoma County Water Agency, and the California Land Stewardship Institute.

5.4.3 Additional Members to the technical advisory committee may be added by recommendation of the Board, followed by an amendment of the Memorandum of Understanding signed by all parties.

5.4.4 The Technical Advisory committee shall exercise such powers as may be delegated to it, except that no committee may:

i. Take any final action on matters which, under the Agreement, require approval by a majority vote of the Board;

ii. Amend or repeal the Bylaws or adopt new Bylaws;

iii. Amend or repeal any resolution of the Board; or

iv. Appoint any other committees of the Board or the members of these committees.

5.4.5 Technical advisory committees may meet at the call of their respective committee chairs. All advisory committee meetings shall be conducted in accordance with the Ralph M. Brown Act (California Government Code sections 54950 et seq.). Minutes of committee meetings shall be recorded and distributed upon approval to the Board.

5.4.6 In the event that a technical advisory committee includes a quorum of the Board of Directors, including alternates, then all meetings of that committee shall be noticed and treated as joint meetings of the technical advisory committee and the Board of Directors.

ARTICLE 6. AGENCY ADMINISTRATION, MANAGEMENT AND STAFFING

6.1 COLLABORATIVE MANAGEMENT. Except for the Agency's Treasurer and Controller functions, Agency administration and management will be determined by resolution of the board. The Agency intends to initially utilize a collaborative staffing model in which the professional and technical staff of the member agencies work together to provide staff leadership, management and administration of the agency. The Board, however, shall have the authority to adopt such staffing solutions as it determines appropriate to meet the Agency's needs and are consistent with the terms of the JPA Agreement.

6.3 TREASURER AND CONTROLLER. The Treasurer shall be the depository and have custody of all the money of the Agency from whatever source, and shall provide strict accountability of Agency funds in accordance with Government Code Sections 6505 and 6505.5. The Treasurer shall possess the powers of, and shall perform those functions required by Government Code Sections 6505, 6505.5, and all other applicable laws and regulations, including any subsequent amendments thereto. The Controller of the Agency shall cause an independent audit of the Agency's finances to be made by a certified public accountant in compliance with California Government Code Section 6505. The Treasurer and Controller shall comply strictly with the provisions of statutes relating to their duties found in Chapter 5 (commencing with Section 6500) of Division 7 of Title 1 of the California Government Code.

6.3.1 Pursuant to Government Code section 6505.5, the Treasurer for the County of Mendocino shall act as Treasurer for the Agency.

6.3.1.1 Treasurer's Duties. Particularly, the Treasurer shall perform, but not be limited to, the following duties:

i. Books of Account. Keep and maintain, or cause to be kept and maintained, adequate and correct books and records of accounts of the properties and business transactions of Agency, including accounts of its assets, liabilities, receipts, disbursements, gains, losses, capital, retained earnings, and other matters customarily included in financial statements. The books of account will be open to inspection by any Director at all reasonable times.

ii. Deposit and Disbursement of Money and Valuables. Consistent with the provisions of Article 12 of the Agreement, deposit all money and other valuables in the name and to the credit of the Agency within such depository funds and accounts as may be designated by the Board; disburse the funds of the Agency as may be ordered by the Board; and render to the Board, whenever requested, an account of all of his/her transactions as Treasurer and of the financial condition of the Agency.

iii. Treasurer Report. On a quarterly basis provide the Directors with a Treasurer's report that includes a summary of revenue and expenditure activity to date for the current fiscal year.

6.3.2 Pursuant to Government Code section 6505.5, the Mendocino County Auditor shall perform the functions of the Controller of the Agency.

6.3.2.1 Independent Audit. The annual independent audit will be conducted or coordinated by the Mendocino County Auditor pursuant to Government Code section 6505(b).

6.4 LEGAL COUNSEL. The Board of Directors may appoint legal counsel as it deems appropriate and may request that Members utilize their counsel on Agency business when requested by the Board.

6.5 STAFFING STRATEGY REVIEW UPON COMPLETION OF THE GROUNDWATER SUSTAINABILITY PLAN. The staffing model for the Agency will be reviewed and revised as needed. In particular, the performance of the collaborative staffing model in meeting the Agency's needs and the proposed role of the Agency in developing the GSA and GSP will be considered when determining the potential future staffing needs of the Agency. Future staffing of the Agency shall be in accordance with Article 13 of the Agreement.

ARTICLE 7. FINANCES

7.1 DEPOSIT AND DISBURSEMENT OF FUNDS. All funds of the Agency shall be deposited in one or more depository accounts as may be designated by the Board. Such accounts shall be independent of any account owned by or exclusively controlled by any of the Members. No disbursements of such funds shall be made unless the disbursements have been approved in the annual operating budget, or otherwise specifically approved by the Board. Disbursements of not more than one thousand dollars

($1,000) may be issued pursuant to the Treasurer's sole signature. Disbursements in excess of one thousand dollars ($1,000) may only be issued upon the signature of the Treasurer and Chair, or in the Chair's absence, the Vice-Chair. The Treasurer may establish and implement a protocol allowing for electronic signatures by the Chair or Vice-Chair in order to facilitate efficient operation of the Agency.

7.2 BUDGET. The Agency shall operate pursuant to an operating budget to be adopted prior to the beginning of each new fiscal year. The Agency shall endeavor to operate each year pursuant to an annual budget so that projected annual expenses do not exceed projected annual revenues. Budget adjustments to the annual budget shall be reviewed and acted upon by the Board at a regularly or specially scheduled Board meeting occurring after January 1 of each calendar year. The Board may take action to amend the budget at other times if circumstances require more immediate action.

7.3 CONTRACTS. The Agency shall utilize the County of Mendocino procurement process for professional services, including use of the County's contract boilerplate, legal review and contract administration. All contracts require approval by the Agency Board of Directors. The contract administration for the Agency will be reviewed and revised as needed.

7.4 AGENCY FUNDING AND CONTRIBUTIONS. In order to provide the needed capital to initially fund the Agency, the Agency shall be initially funded by a contribution from initial Members in the amount of five thousand dollars ($5,000). In subsequent years, the Agency may be funded through additional voluntary contributions by all Members, and as otherwise provided in Chapter 8 of SGMA (commencing with Section 10730 of the Water Code).

ARTICLE 8. SPECIAL PROJECTS

8.1 PROJECTS. The Agency intends to carry out activities in furtherance of its purposes and consistent with the powers established by the Agreement with the participation of all Members.

8.2 MEMBER SPECIFIC PROJECTS. In addition to the general activities undertaken by all Members of the Agency, the Agency may initiate specific projects or litigation that involves less than all Members. No Member shall be required to be involved in a project that involves less than all the Members

8.2.1 PROJECT AGREEMENT. Prior to undertaking any project or litigation that does not involve all Member Agencies, the Members electing to participate in the project shall enter into a Project Agreement. A Member may elect not to participate in a specific project or litigation matter by written notice in accordance with Section 14.3 of the Agreement. Each Project Agreement shall provide specific terms and conditions in accordance with Section 14.3 of the Agreement.

8.3 BOARD OF DIRECTORS APPROVAL. The Board of Directors shall have the authority to disapprove any Project Agreement upon a determination that the Project Agreement has specific, substantial adverse impacts upon Members that have not executed the Project Agreement.

ARTICLE 9. DEBTS AND LIABILITIES

The debts, liabilities and obligations of the Agency are not and will not be the debts, liabilities or obligations of any or all of the Members. However, nothing in this Article or in the Agreement prevents, or impairs the ability of, a Member or Members, from agreeing, in a separate agreement, to be jointly and/or severally liable, in whole or in part, for any debt, obligation or liability of the Agency, including but not limited to, any bond or other debt instrument issued by the Agency.

ARTICLE 10. RECORDS RETENTION

10.1 MAINTENANCE OF THE AGENCY RECORDS. The Agency will keep:

10.1.1 Adequate and correct books and records of account; and of the Board.

10.1.2 Minutes in written form of the proceedings of its Board, and committees, and advisory committees, if any.

10.1.3 Approved Resolutions and Agreements.

10.1.4 All such records will be kept at the Agency's principal office.

10.2 RECORDS RETENTION POLICY AND SCHEDULE. The Board may review and adopt a Records Retention Policy and Schedule that specifies the retention period of different categories of materials. Implementation of this Policy will be the responsibility of Agency staff if adopted.

10.3 PUBLIC RECORDS ACT REQUESTS. The Agency shall comply with Government Code Section 6250 et seq. known as the California Public Records Act. The Agency may review and adopt a Public Access to Records policy. Implementation of this Policy will be the responsibility of Agency staff if adopted.

ARTICLE 11. ETHICS AND CONFLICTS OF INTEREST

The Agency shall be subject to the conflict of interest rules set forth in the Political Reform Act (commencing with Section 81000 of the Government Code of the State of California) and Sections 1090 et seq. of the Government Code of the State of California, and the Agency shall adopt an ethics policy as well as a conflict of interest code as required and as provided by the implementing regulations of the Political Reform Act.

ARTICLE 12. AMENDMENT

These Bylaws may be amended from time to time by resolution of the Board duly adopted upon majority of the Board at its regular or special meeting; provided, however, that no such amendment shall be adopted unless at least thirty (30) days written notice thereof has previously been given to all members of the Board. Such notice shall identify the Article to be amended, the proposed amendment, and the reason for the proposed amendment.

ARTICLE 13. DEFINITIONS AND CONSTRUCTION

Unless specifically defined in these Bylaws, all defined terms shall have the same meaning ascribed to them in the Agreement. If any term of these Bylaws conflicts with any term of the Agreement, the Agreement's terms shall prevail, and these Bylaws shall be amended to eliminate such conflict of terms. Unless the context or reference to the Agreement requires otherwise, the general provisions, rules of construction, and definitions in the California Civil Code will govern the construction of these Bylaws.

Appendix 1-D Public Comment Responses

Ukiah Valley Basin
Groundwater Sustainability Plan
Public Comment Summary

FINAL

November 2021

Prepared for:

Ukiah Valley Basin Groundwater Sustainability Agency

Prepared by:

Stantec Consulting Services, Inc.

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Table of Contents

LIST OF TABLES

ABBREVIATIONS

§	Section
County	Mendocino County
Board	Ukiah Valley Basin Groundwater Sustainability Agency Board of Directors
DWR	California Department of Water Resources
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
Matrix	Comment and Comment Response Matrix
SGMA	Sustainable Groundwater Management Act of 2014
Summary	Public Comment Summary

TAC	Ukiah Valley Basin Groundwater Sustainability Agency Technical Advisory Committee
UVBGSA	Ukiah Valley Basin Groundwater Sustainability Agency

ATTACHMENTS

Attachment A – Notice to Cities and Counties in the Plan Area

Attachment B – Comment Letters Received on Draft Groundwater Sustainability Plan

Attachment C – Ukiah Valley Basin Groundwater Sustainability Plan Comment and Comment Response Matrix

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November 2021

1.0 INTRODUCTION

This Public Comment Summary (Summary) describes the process and tools used by the Ukiah Valley Basin Groundwater Sustainability Agency (UVBGSA) to solicit, review, and respond to public and stakeholder comments on the Ukiah Valley Basin Groundwater Sustainability Plan (GSP) and notify cities and counties within the plan area of the UVBGSA's intent to adopt the GSP. These public review and notification processes were developed pursuant to the Sustainable Groundwater Management Act of 2014 (SGMA) and the California Department of Water Resources' (DWR) Groundwater Sustainability Plan Emergency Regulations, developed in May 2016.

California Code of Regulations Section (§) 355.4 provides the basis for DWR's determination of a GSP's compliance with SGMA and whether a GSP is likely to achieve the sustainability goal for the basin. As part of this criteria, DWR will consider:

> *(10) Whether the Agency has adequately responded to comments that raise credible technical or policy issues with the Plan. (§ 355.4(b)(10))*

This document summarizes the UVBGSA's actions to notify the public and other interested parties of the availability of the Draft GSP and describes the UVBGSA's approach to soliciting, reviewing, and responding to technical and policy comments submitted by the public and other interested parties.

1.1 DOCUMENT FORMAT

This Summary is comprised of the following four sections:

- Section 1 – Introduction: Section 1 provides an overview of the purpose and structure of the document, as well as the GSP evaluation criteria for addressing comments on the GSP.
- Section 2 – Commenting Process: Section 2 describes the public comment process for the Draft GSP and method by which the UVBGSA notified cities and counties within the plan area of the proposed plan.
- Section 3 – Submitted Comments: Section 3 provides an overview of comment letters received on the Draft GSP during the public comment periods. The comment letters in their entirety are included as **Attachment B** to this Summary.
- Section 4 – Comment Management and Review: Section 4 describes how the UVBGSA reviewed and responded to comment letters received during the public comment period, including the processes for identifying and categorizing individual comments and responding to comments that raised credible technical and policy issues. This section also describes the tool used to manage the comments and comment responses. A copy of the final Matrix is provided as **Attachment C** to this document.

2.0 COMMENTING PROCESS

The UVBGSA solicited public comments from individuals, agencies, and organizations representing beneficial uses and users of groundwater described in Water Code § 10723.2; as well as any other interested members of the public. The UVBGSA authorized release of the Public Draft GSP on August 16, 2021 for a 45-day public comment period that ended September 24, 2021. The Public Draft GSP was posted on UVBGSA website for review. Written comments on the Public Draft GSP were accepted via an email or public comment card sent to Mendocino County (County) staff. This section further describes the Draft GSP notification and public comment process. In addition, it describes the method by which the UVBGSA notified cities and counties of availability of the Draft GSP, pursuant to California Water Code §10728.4.

2.1 PUBLIC AND STAKEHOLDER INPUT ON DRAFT GSP CHAPTERS

The UVBGSA solicited input on the Draft GSP from stakeholders and members of the public through public meetings, workshops, and engagement with key stakeholder organizations. The Ukiah Valley Basin Technical Advisory Committee (TAC) is composed of nine individuals representing beneficial users of groundwater in the basin. The TAC includes representation from agricultural groundwater users, water agencies, environmental organizations, and Tribal governments. The group provides information and recommendations to the UVBGSA Board of Directors (Board). The TAC was actively involved and provided input in development of the Draft GSP. Draft GSP chapters were brought to the TAC for their review at regular public meetings and during internal public comment periods. TAC members also provided input on key GSP topics.

Members of the public had the opportunity to provide comments on Draft GSP chapters during public Board and TAC meetings, public workshops, and Draft GSP chapter public comment periods. The technical team also solicited comments via emails and phone calls with TAC members and other key stakeholders in the Basin, including Sonoma Water, Mendocino County Resource Conservation District, Mendocino County Farm Bureau, National Oceanic and Atmospheric Administration, University of California Cooperative Extension, and Tribal governments.

Draft GSP chapters and meeting materials were included in TAC and Board meeting packets and posted on the GSA website. Preliminary drafts of GSP Chapters 2, 3, and 4 were made available on the GSA website to the public, TAC, and GSA Board on May 12, 2021. The TAC provided 43 comments on Draft Chapter 3 and 19 comments on Draft Chapter 4 to the technical team. Draft Chapters 3 and 4 were also presented and discussed at the Board meeting on July 8, 2021. All verbal and written comments provided by the TAC and Board on the draft chapters were received and addressed prior to the Public Draft GSP comment period described in Section 2.2 below.

The UVBGSA also held five public workshops to inform and solicit input from stakeholders and members of the public about the content of the Draft GSP. The workshops dates, formats, and

topics are provided in **Table 1** below. The workshops were noticed via emails to the GSA's Interested Parties Database, postings on the GSA and member agencies' websites and social media pages, press releases, and notices in County-wide drought newsletters. For the July and September workshops, one thousand bilingual (English and Spanish) flyers were distributed in public locations and at public events (e.g., Hispanic public markets and County drought drive-through event).

Table 1. Public Meetings

Date	Format - Location	Topic(s)
September 20, 2020	Virtual - Zoom	Introduction to SGMA, GSA governance, GSP development process, Communication and Engagement Plan
February 23, 2021	Virtual - Zoom	Projects and management actions, GSP monitoring network, GSP development process.
May 26, 2021	Virtual - Zoom	Integrated Hydrological Model, projects and management actions, Public Draft GSP and public comment process
July 15, 2021	In-person – Redwood Valley	Overview of the Public Draft GSP and public comment process, Integrated Hydrologic Model, sustainable management criteria, GSP implementation process
September 21, 2021	In-person – City of Ukiah	Public Draft GSP public hearing

Key: GSA = Groundwater Sustainability Agency, GSP = Groundwater Sustainability Plan, SGMA = The Sustainable Groundwater Management Act

A Tribal Outreach meeting was also hosted September 29, 2020 to provide an overview of SGMA and the Ukiah GSA.

2.2 PUBLIC DRAFT GSP RELEASE AND PUBLIC COMMENT PERIOD

The Public Draft GSP was released for public review and comment on August 16, 2021. This marked the beginning of a 40-day public comment period, which ended on September 24, 2021. The UVBGSA notified interested parties and members of the public of the release of the Public Draft GSP and public comment period through a press release that was emailed to the UVBGSA's interested parties database and posted to the UVBGSA website, Mendocino County Water Agency Facebook page, and the County of Mendocino Facebook page. The press release was also shared with the TAC agencies and other stakeholder organizations. A link to the Public Draft GSP and public review process instructions was also included in the August

18th, September 1st, and September 15th issues of the Mendocino County Water Agency newsletter.

Members of the public could provide comments on the Public Draft GSP via an email sent to County staff, verbal comments provided at regular Board or TAC meetings, and written comment cards provided at a September 21, 2021 public workshop. The UVBGSA held the workshop in the City of Ukiah to solicit feedback about the Public Draft GSP and inform the public about the GSP submittal and review process. The workshop was noticed to all members on the interested parties database, on the UVBGSA website, through partner social media and newsletters, and in a press release. The County also promoted the event through information distributed by TAC and Board members to their members. During the workshop, the UVBGSA staff and consultants summarized each GSP chapter and answered participant questions. Participants could provide comments on the Public Draft GSP verbally or via comment cards that could be turned in at the end of the meeting or mailed to County staff by September 24, 2021.

2.3 NOTICE TO CITIES AND COUNTIES

SGMA (as chaptered in California Water Code § 10728.4) requires that:

> *A groundwater sustainability agency may adopt or amend a groundwater sustainability plan after a public hearing, held at least 90 days after providing notice to a city or county within the area of the proposed plan or amendment. The groundwater sustainability agency shall review and consider comments from any city or county that receives notice pursuant to this section and shall consult with a city or county that requests consultation within 30 days of receipt of the notice. Nothing in this section is intended to preclude an agency and a city or county from otherwise consulting or commenting regarding the adoption or amendment of a plan.*

Pursuant these regulations, the UVBGSA notified cities and counties within the GSP area of its intention to adopt the GSP at least 90 days before adoption of the Final GSP. This notification included a letter sent to the City of Ukiah and Mendocino County on July 19, 2021, provided as **Attachment A** to this Summary. The GSA did not receive any formal requests for consultation pursuant to § 10728.4.

3.0 SUBMITTED COMMENTS

The UVBGSA received eight comment letters on the Public Draft GSP during the public comment period. One additional letter was provided after the public comment period and accepted by the UVBGSA. One letter was submitted by individual contributors. Seven letters were submitted from organizations representing beneficial uses and users of groundwater in the region, including state and federal agencies, local government, public water agencies, and organizations representing agricultural, environmental, and domestic well users of groundwater.

Table 2, shown below, provides the list of comment letters that were received on the Public Draft GSP. Copies of each comment letter are provided as **Attachment B** to this Summary.

Table 2. Submitted Comments

Commenter or Agency Name	Commenter Type	Date Comment was Received
City of Ukiah	Local government	9/24/2021
Clean Water Action et al.	Non-governmental organization	9/20/2021
James Sullivan	Individual	9/24/2021
Mendocino County Farm Bureau	Stakeholder organization	9/24/2021
Mendocino County Resource Conservation District	Stakeholder organization	10/17/2021
National Marine Fisheries Service	Federal agency	9/20/2021
Russian Riverkeeper	Non-governmental organization	9/24/2021
Sonoma Water	Water agency	9/24/2021

4.0 COMMENT REVIEW AND RESPONSE

This section describes the process and tools the UVBGSA used to review and respond to comments on the Draft GSP. Following the close of the public comment period, the UVBGSA reviewed each comment letter to identify individual comments on the Draft GSP. To organize and manage the review of issue-specific comments, staff created a database, or matrix, that allowed for the categorization, grouping, and response to comments. This comment management approach is described below.

4.1 COMMENT MANAGEMENT

This subsection describes the process the UVBGSA used to categorize each of the comment letters received on the Draft GSP and identify issue-specific comments for review and response. Of those eight letters received, a total of 207 issue-specific comments applicable to the Draft GSP were identified. Each comment was assigned an individual comment identification number and entered into the database referred to as the Ukiah Valley GSP Comment and Comment Response Matrix (Matrix), further described below. UVBGSA staff then used the Matrix to group technical or policy issues raised on the GSP, identify potential changes to the GSP to address comments, and develop comment responses.

4.1.1 Comment Response Matrix

The Matrix is an Excel database developed and used by UVBGSA staff and consultants to categorize and respond to comments submitted on the Draft GSP. **Table 3**, shown below, describes the types of information included in the Matrix. A copy of the completed Matrix is provided as **Attachment C** to this Summary.

Table 3. Ukiah Valley Basin Groundwater Sustainability Plan Comment and Comment Response Matrix Columns

Matrix Column	Column Description
Author	Name of agency or organization that signed or submitted the comment letter.
Sub-Category	Topic within the Draft GSP that the comment identifies with, describes, or otherwise raises questions about.
Comment Identification Number (CIN)	Unique identifier assigned to each comment received. A single comment letter may contain multiple individual comments, each with its own comment identification number.
Multiple Comment Response (MCR) number	Comments that were similar in scope were grouped together based on the GSP sections or content they discussed. Each group of comments were assigned an MCR number, identified here.
Group	Comment grouping to facilitate structured review by Technical Advisory Committee and GSA staff.
Code/Regulation	The code or regulation cited in the comment, if referenced.
Chapter, Page, and Line Number	The chapter, page, and line number in the Draft GSP the comment is referring to, if referenced
Comment	Copies of the comment text directly from the comment letter.
Response/Recommended Action	Response or recommended action to address the comment.
Response Location in GSP	Location in Draft GSP text changes were made in response to comment, if applicable.

Key: GSA = Groundwater Sustainability Agency, GSP = Groundwater Sustainability Plan

4.1.2 Sub-Categories

To aid the comment management process, UVBGSA staff and consultants assigned all comments a sub-category based on primary topic or issue the topic raised. The sub-categories were used to sort comments by topic and assign the appropriate subject-matter expert to develop the comment response. **Table 4** provides a list of the comment sub-categories.

Table 4. Groundwater Sustainability Plan Comment Sub-Categories

Acronym	Sub-Category
AL	Pumping Allocations/Metering/De Minimus Extractors/Water Marketing/Extraction – Water Accounting Framework
BC	Basin Conditions
BE	Beneficial Users
BR	Broader Regulations (such as: Endangered Species Act, Public Trust Doctrine)
CC	Climate Change
DC	Disadvantaged Communities
DG	Data Gaps
DW	Domestic Wells
ED	Editorial comment
GA	GSA Organization
GD	Groundwater Dependent Ecosystems/ Environmental Beneficial Users
GE	General
GL	Groundwater Levels
GS	Groundwater Storage
GP	County General Plan
HCM	Hydrogeologic Conceptual Model
IS	Interconnected Surface Waters
WI	Well Inventory
WR	Water Resources/Water Rights
WQ	Water Quality

4.1.3 Comment Groups

Following completion of sub-category and group assignments to comments, UVBGSA staff and consultants conducted a detailed evaluation of the scope, relevance, and importance of each individual comment. As part of this evaluation, staff and consultants amended the database to include a draft response to each comment and the applicable GSP section. Through this activity, staff and consultants conducted an initial grouping, or prioritization, of these comments based, in part, on their applicability § 355.4(b)(10). These groupings are further described below.

- **"Group A":** Comments were assigned to Group A if they raised substantial technical or policy issues most likely to be subject to § 355.4(b)(10). Of the 207 comments received, 40 were assigned to Group A.

- **"Group B":** Comments were assigned to Group B if they required additional evaluation or significant changes to the GSP and considered valid technical or policy issues for focused review. This included comments that referred to content and themes included throughout the GSP and would require more consideration to address. Of the 207 comments received, 49 comments were assigned to Group B.

- **"Group C":** Comments were assigned to Group C if they primarily raised editorial issues or could be addressed without requiring further technical evaluations or significant changes to the GSP text. For example, if a comment indicated that a certain passage or section of the

GSP could be improved through a closer editorial review, it was categorized as Group C. Of the 207 comments, 118 were assigned to Group C and addressed directly by the GSA and consultant staff.

4.2 REVIEW AND RESPONSE

This subsection describes the approach and process UVBGSA and consultant staff used to review, respond to, and address comments received on the Draft GSP and approval of amendments to the Draft GSP. Comment letters received on the draft GSA were reviewed by UVBGSA and consultant staff, entered in the Matrix, and assigned an initial sub-category and group. Staff then developed draft individual and master comment responses in the Matrix.

The draft responses to comments were discussed at public meetings of the TAC and Board in October and November 2021. The TAC discussed the draft comment responses at its meetings held on October 13, October 20, and November 10. The Board discussed the comment response at its meeting held on October 21. At these meetings, UVBGSA staff summarized the comments received and identified recommended revisions to the Draft GSP to respond to public comments that raised credible technical or policy issues. The commenters and members of the public also had the opportunity to provide input or clarifications during these meetings. All the meetings of the TAC and Board were noticed via an email notice to the interested parties database. Meeting agendas and materials were posted on the Ukiah Valley Basin GSA website.

UVBGSA staff revised the comment responses and Draft GSP according to the comments and recommendations from the TAC and Board. The final comment response matrix and Draft-Final GSP were then circulated to the Board for final review and comment in mid-November 2021. Comments from the Board were incorporated into the Final GSP.

Ukiah Valley Basin Groundwater Sustainability Plan
Public Comment Summary

Attachment A – Notice to Cities and Counties in the Plan Area

UKIAH VALLEY BASIN GROUNDWATER SUSTAINABILITY AGENCY
340 Lake Mendocino Drive ♦ Ukiah ♦ California 95482 ♦ (707)463-4363 ♦ fax (707)463-5474

July 19, 2021

Sage Sangiacomo, City Manager
300 Seminary Avenue
Ukiah, CA 95482

Carmel J. Angelo, Chief Executive Officer
501 Low Gap Road, Room 1010
Ukiah, CA 95482

Subject: **Notice of Intent to Adopt Groundwater Sustainability Plan for Ukiah Valley Groundwater Basin**

Dear Ms. Angelo and Mr. Sangiacomo,

On behalf of the Ukiah Valley Basin Groundwater Sustainability Agency (referred to herein as the UVBGSA), in accordance with California Water Code Section 10727.8, the UVGBA hereby provides notice to the cities and counties within the geographic area covered by the Ukiah Valley Groundwater Basin of its intent to adopt a Groundwater Sustainability Plan (referred to herein as the GSP) no earlier than 90-days upon your receipt of this notice. Considerations to adopt this document shall occur as part of public hearings to be held by the UVBGSA. Once adopted, the GSP will govern sustainable groundwater management actions within the Ukiah Valley Groundwater Basin.

Recipients of this notice may request to consult on the GSP. These requests may be received within 30 calendar days upon receipt of this notice. Requests to consult with the UVBGSA intending to adopt the GSP can be directed to:

Email: uvbgsa@mendoinocounty.org

Mail: *Attention: Amber Fisette*
UVBGSA
340 Lake Mendocino Drive
Ukiah, CA 95482
fisettea@mendocinocounty.org

To download a copy of the Public Draft GSP (to be posted), and to receive other information, visit https://www.mendocinocounty.org/government/affiliated-agencies/ukiah-valley-basin-gsa

Sincerely,

Amber Fisette,
Deputy Director of Transportation
Solid Waste & Water Agency
County of Mendocino

Ukiah Valley Basin Groundwater Sustainability Plan
Public Comment Summary

Attachment B – Comment Letters Received on Draft Groundwater Sustainability Plan

City of Ukiah

Comments of the August 2021 Ukiah Valley Groundwater Sustainability Plan

Public Draft Report

Executive Summary

Pg. 5	List of Acronyms should include MO and MT
Pg. 10, Line 196	Should read 120,000-acre feet not 12,000
Pg. 11, Lines 224-229	This paragraph states that there is a groundwater depression "located around the City of Ukiah" that is the "most significant feature in the UVB" and "likely the greatest source of groundwater discharge in the basin". The City is aware of that data supporting this statement this may be erroneous. The City recommends reviewing the revised contour map and removing this paragraph.
Pg. 17, Line 295	"Little" should be removed as no subsidence has been observed.
Pg. 17, Lines 312-323	This section should acknowledge ESA-listed anadromous fisheries with the GSA
Pg. 21, Lines 349-353	This section should acknowledge the significant recharge contributions of the City of Ukiah's and Calpella's WWTPs. Data is available in *Characterization of the Ukiah Valley Groundwater Basin, Final Report, Prepared for: City of Ukiah Maritza Flores Marquez, M.S., EIT, Samuel Sandoval Solis, Ph.D., and, Romina Díaz Gómez, Ph.D. Postdoctoral Researcher, CONICET June 2017 Pg 78.*
Pg. 22, Table 2	Water Budget should include recharge contributions noted above.

Chapter 2: Plan Area and Basin Setting

Pg. 16, Line 266	The City no longer contracts with RRFC.
Pg. 16, line 269	The City has a pre-1914 right, not pre-1949.
Pg. 16, Line 273	The City no longer contracts with RRFC.
Pg. 32, Line 654	This section should acknowledge the significant recharge contributions of the City of Ukiah's and Calpella's WWTPs. Data is available in *Characterization of the Ukiah Valley Groundwater Basin, Final Report, Prepared for: City of Ukiah Maritza Flores Marquez, M.S., EIT, Samuel Sandoval Solis, Ph.D., and, Romina Díaz Gómez, Ph.D. Postdoctoral Researcher, CONICET June 2017 Pg 78.*

Pg.32, Line 658	The hydrology of the percolation ponds have been studied extensively and do not "flow to the river". See *Fate and Transport if Wastewater Treatment Plant Discharge Percolation Ponds, City of Ukiah, California, Balance Hydraulics, Inc. May 2010.*
Page 32, Lines 665-666	The cited 2010 UWMP is dated. Please referring to *City of Ukiah Final 2020 UWMP* for current information.
Pg. 96, Lines 1550-1551	Restates inaccurate information related to groundwater elevations near the City as a result of pumping.
Pg. 97, lines 1590-1593	Restates inaccurate information related to groundwater elevations near the City as a result of pumping.
Pg. 115, Lines 1846-1847	Restates inaccurate information related to groundwater elevations near the City as a result of pumping.
Pg. 120, Figure 39	Based on conversation with LWA staff this figure has been revised and should be replaced.
Pg. 121, Figure 40	Based on conversation with LWA staff this figure has been revised and should be replaced.
Pg. 129, Line 1929	The City, as part of its NPDES permit has monitored Groundwater WQ in the valley at a number of sites and has not observed any trends to support this statement.
Pg. 140-145	Figure legend color scale do not match figures icons.
Pg. 150	Figure depicts "measurements" outside range of accuracy and uses scales that artificially exaggerate observations.
Pg. 165	Distribution, density, and range described is inaccurate.
Pg. 172	Distribution, density, and range described is inaccurate.

Chapter 3: Sustainable Management Criteria

Pg. 32, Line 882	"not a problem" should be restated to not observed.
Pg. 53	Figure depicts "measurements" outside range of accuracy and uses scales that artificially exaggerate observations.

Chapter 4: Projects and Management Actions

Page 4, Lines 13-21	Section should note that currently neither actions or projects are needed to achieve sustainability as there are no indicators suggesting overdraft.
Page 8, line 115	The cited 2015 UWMP is dated. Please referring to *City of Ukiah Final 2020 UWMP* for current information.
Page 9, Table 2	The correct name for the City's reuse project is the Recycled Water Project.

September 24, 2021

Ukiah Valley Basin Groundwater Sustainability Agency
340 Lake Mendocino Dr.
Ukiah, CA 95482

Submitted via email: fisettea@mendocinocounty.org; lauraf@lwa.com

Re: Public Comment Letter for Ukiah Valley Basin Draft Groundwater Sustainability Plan

Dear Sarah Dukett,

On behalf of the above-listed organizations, we appreciate the opportunity to comment on the Draft Groundwater Sustainability Plan (GSP) for the Ukiah Valley Basin being prepared under the Sustainable Groundwater Management Act (SGMA). Our organizations are deeply engaged in and committed to the successful implementation of SGMA because we understand that groundwater is critical for the resilience of California's water portfolio, particularly in light of changing climate. Under the requirements of SGMA, Groundwater Sustainability Agencies (GSAs) must consider the interests of all beneficial uses and users of groundwater, such as domestic well owners, environmental users, surface water users, federal government, California Native American tribes and disadvantaged communities (Water Code 10723.2).

As stakeholder representatives for beneficial users of groundwater, our GSP review focuses on how well disadvantaged communities, tribes, climate change, and the environment were addressed in the GSP. While we appreciate that some basins have consulted us directly via focus groups, workshops, and working groups, we are providing public comment letters to all GSAs as a means to engage in the development of 2022 GSPs across the state. Recognizing that GSPs are complicated and resource intensive to develop, the intention of this letter is to provide constructive stakeholder feedback that can improve the GSP prior to submission to the State.

Based on our review, we have significant concerns regarding the treatment of key beneficial users in the Draft GSP and consider the GSP to be **insufficient** under SGMA. We highlight the following findings:

1. Beneficial uses and users **are not sufficiently** considered in GSP development.
    a. Human Right to Water considerations **are not sufficiently** incorporated.
    b. Public trust resources **are not sufficiently** considered.
    c. Impacts of Minimum Thresholds, Measurable Objectives and Undesirable Results on beneficial uses and users **are not sufficiently** analyzed.
2. Climate change **is not sufficiently** considered.

3. Data gaps **are not sufficiently** identified and the GSP **needs additional plans** to eliminate them.
4. Projects and Management Actions **do not sufficiently consider** potential impacts or benefits to beneficial uses and users.

Our specific comments related to the deficiencies of the Ukiah Valley Basin Draft GSP along with recommendations on how to reconcile them, are provided in detail in **Attachment A.**

Please refer to the enclosed list of attachments for additional technical recommendations:

Attachment A	GSP Specific Comments
Attachment B	SGMA Tools to address DAC, drinking water, and environmental beneficial uses and users
Attachment C	Freshwater species located in the basin
Attachment D	The Nature Conservancy's "Identifying GDEs under SGMA: Best Practices for using the NC Dataset"

Thank you for fully considering our comments as you finalize your GSP.

Best Regards,

Ngodoo Atume
Water Policy Analyst
Clean Water Action/Clean Water Fund

J. Pablo Ortiz-Partida, Ph.D.
Western States Climate and Water Scientist
Union of Concerned Scientists

Samantha Arthur
Working Lands Program Director
Audubon California

Danielle V. Dolan
Water Program Director
Local Government Commission

E.J. Remson
Senior Project Director, California Water Program
The Nature Conservancy

Melissa M. Rohde
Groundwater Scientist
The Nature Conservancy

Attachment A

Specific Comments on the Ukiah Valley Basin Draft Groundwater Sustainability Plan

1. Consideration of Beneficial Uses and Users in GSP development

Consideration of beneficial uses and users in GSP development is contingent upon adequate identification and engagement of the appropriate stakeholders. The (A) identification, (B) engagement, and (C) consideration of disadvantaged communities, drinking water users, tribes, groundwater dependent ecosystems, streams, wetlands, and freshwater species are essential for ensuring the GSP integrates existing state policies on the Human Right to Water and the Public Trust Doctrine.

A. Identification of Key Beneficial Uses and Users

Disadvantaged Communities, Drinking Water Users, and Tribes

The identification of Disadvantaged Communities (DACs), drinking water users, and tribes is **incomplete**. The GSP provides basic information on DACs, including identification by name and location on a map (Figure 2-4) as determined by the California Department of Water Resources DAC Mapping Tool, description of the size of the population in each DAC (p. 2-13), and a map of tribal lands (Figure 2-2).

The plan fails, however, to identify the population dependent on groundwater as their source of drinking water in these communities. The plan also fails to provide depth of domestic wells (such as minimum well depth, average well depth, or depth range) within the basin. These missing elements are required for the GSA to fully understand the specific interests and water demands of these beneficial users, to support the development of water budgets using the best available information, and to support the development of sustainable management criteria and projects and management actions that are protective of these users.

RECOMMENDATIONS

- Include a map showing domestic well locations and average well depth across the subbasin.
- Identify the sources of drinking water for DAC members, including an estimate of how many people rely on groundwater (e.g., domestic wells, state small water systems, and public water systems).

Interconnected Surface Waters

The identification of Interconnected Surface Waters (ISWs) is **insufficient**, due to lack of clarity around the monitoring well data (well location and screen depth) used to map interconnected stream reaches. The GSP took initial steps for the ISW analysis by comparing interpolated groundwater elevations to streambed elevations. The GSP states (p. 2-152): “To identify river reaches that are interconnected to groundwater, assumed streambed elevations were compared to representations of groundwater elevations above mean sea level.” Further information

regarding the actual data used in the analysis is not provided, however. The GSP also describes a saturated zone threshold analysis to determine interconnected reaches to account for the assumed presence of saturated zones in areas of data gaps. The following recommendations would strengthen the clarity and completeness of the ISW evaluation.

RECOMMENDATIONS

- Provide more discussion in the GSP about the groundwater elevation data and streambed elevation data used to verify interconnected reaches. Include a map of the interpolated groundwater elevations and spatial extent of groundwater monitoring wells used to produce the map. Discuss screening depth of monitoring wells and ensure they are monitoring the shallow principal aquifer.
- Identify gaining and losing reaches on the ISW map (Figure 60).
- On the ISW map (Figure 60), clearly label the areas with data gaps. While the GSP clearly identifies data gaps and their locations in the text, we recommend that the GSP considers any segments with data gaps as potential ISWs and clearly marks them as such on maps provided in the GSP.

Groundwater Dependent Ecosystems

The identification of Groundwater Dependent Ecosystems (GDEs) is **insufficient**, due to lack of clarity around the monitoring well data (well location and screen depth) used to map groundwater elevations and depth to groundwater. The GSP references TNC Best Practices for using the NC Dataset (2019) as the approach used to map depth to groundwater, using the difference between land surface elevation and interpolated groundwater elevation above mean sea level. However, as mentioned above in the ISW comments, the GSP does not further describe or present monitoring well data (well location and screen depth) used to create the depth-to-groundwater maps.

The GSP took initial steps to identify and map GDEs using the Natural Communities Commonly Associated with Groundwater dataset (NC dataset). However, we found that some mapped features in the NC dataset were improperly disregarded, as described below.

- NC dataset polygons were incorrectly removed in areas adjacent to irrigated fields due to the presence of surface water. However, this removal criteria is flawed since GDEs, in addition to groundwater, can rely on multiple water sources – including shallow groundwater receiving inputs from irrigation return flow from nearby irrigated fields – simultaneously and at different temporal/spatial scales. NC dataset polygons adjacent to irrigated land can still potentially be reliant on shallow groundwater aquifers, and therefore should not be removed solely based on their proximity to irrigated fields.
- NC dataset polygons were incorrectly removed based on the amount of time that they access groundwater. As presented in the GSP, assumed GDEs have access to groundwater >50% of time and assumed non-GDEs have access to groundwater <50% of the time. However, NC dataset polygons should not be assumed to be disconnected if there is any connection to groundwater (regardless of temporal percentage). Many GDEs often simultaneously rely on multiple sources of water (i.e., both groundwater and surface

water), or shift their reliance on different sources on an interannual or inter-seasonal basis.

RECOMMENDATIONS

- Include a map of the interpolated groundwater elevations and spatial extent of groundwater monitoring wells used to produce the map. Discuss screening depth of monitoring wells and ensure they are monitoring the shallow principal aquifer.
- Use depth-to-groundwater data from multiple seasons and water year types (e.g., wet, dry, average, drought) to determine the range of depth to groundwater around NC dataset polygons and to verify whether polygons in the NC Dataset are supported by groundwater.
- Use a baseline period (we recommend 10 years from 2005 to 2015) to characterize groundwater conditions over multiple water year types.
- If insufficient data are available to describe groundwater conditions within or near polygons from the NC dataset, include those polygons as "Potential GDEs" in the GSP until data gaps are reconciled in the monitoring network.

Native Vegetation and Managed Wetlands

Native vegetation and managed wetlands are water use sectors that are required[1,2] to be included into the water budget. The integration of native vegetation into the water budget is **insufficient**. The water budget did not explicitly include the current, historical, and projected demands of native vegetation. The omission of explicit water demands for native vegetation is problematic because key environmental uses of groundwater are not being accounted for as water supply decisions are made using this budget, nor will they likely be considered in project and management actions. Managed wetlands are not mentioned in the GSP, so it is not known whether or not they are present in the basin.

RECOMMENDATIONS

- Quantify and present all water use sector demands in the historical, current, and projected water budgets with individual line items for each water use sector, including native vegetation.
- State whether or not there are managed wetlands in the basin. If there are, ensure that their groundwater demands are included as separate line items in the historical, current, and projected water budgets.

[1] "'Water use sector' refers to categories of water demand based on the general land uses to which the water is applied, including urban, industrial, agricultural, managed wetlands, managed recharge, and native vegetation." [23 CCR §351(al)]

[2] "The water budget shall quantify the following, either through direct measurements or estimates based on data: (3) Outflows from the groundwater system by water use sector, including evapotranspiration, groundwater extraction, groundwater discharge to surface water sources, and subsurface groundwater outflow." [23 CCR §354.18]

B. Engaging Stakeholders

Stakeholder Engagement during GSP development

Stakeholder engagement during GSP development is **insufficient**. SGMA's requirement for public notice and engagement of stakeholders[3] is not fully met by the description in the Communication and Engagement Plan included in the GSP (Appendix 1-A).

We commend the GSA for their outreach to tribal members in the basin and for including a tribal member on the Technical Advisory Committee. However, we note the following deficiencies with other aspects of the stakeholder engagement process:

- The opportunities for public involvement and engagement are described in very general terms. They include attendance at public meetings, stakeholder email list, mailings of flyers and brochures, and updates to the GSP website.
- Environmental agencies are listed as stakeholders in Table 2-6, but specific engagement and outreach methods are not described.
- The Stakeholder Outreach Plan does not include a plan for continual opportunities for engagement through the *implementation* phase of the GSP for DACs, domestic well owners, and environmental stakeholders.

RECOMMENDATIONS

- Include a more detailed and robust Communication and Engagement Plan that describes active and targeted outreach to engage DAC members, domestic well owners, and environmental stakeholders during the remainder of the GSP development process and throughout the GSP implementation phase. Refer to Attachment B for specific recommendations on how to actively engage stakeholders during all phases of the GSP process.

C. Considering Beneficial Uses and Users When Establishing Sustainable Management Criteria and Analyzing Impacts on Beneficial Uses and Users

The consideration of beneficial uses and users when establishing sustainable management criteria (SMC) is **insufficient**. The consideration of potential impacts on all beneficial users of groundwater in the basin are required when defining undesirable results[4] and establishing minimum thresholds.[5,6]

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[3] "A communication section of the Plan shall include a requirement that the GSP identify how it encourages the active involvement of diverse social, cultural, and economic elements of the population within the basin." [23 CCR §354.10(d)(3)]

[4] "The description of undesirable results shall include [...] potential effects on the beneficial uses and users of groundwater, on land uses and property interests, and other potential effects that may occur or are occurring from undesirable results." [23 CCR §354.26(b)(3)]

[5] "The description of minimum thresholds shall include [...] how minimum thresholds may affect the interests of beneficial uses and users of groundwater or land uses and property interests." [23 CCR §354.28(b)(4)]

[6] "The description of minimum thresholds shall include [...] how state, federal, or local standards relate to the relevant sustainability indicator. If the minimum threshold differs from other regulatory standards, the agency shall explain the nature of and the basis for the difference." [23 CCR §354.28(b)(5)]

Disadvantaged Communities and Drinking Water Users

For chronic lowering of groundwater levels for drinking water users, the GSP describes impacts to domestic drinking water wells when defining undesirable results, and the GSP describes how the existing minimum threshold groundwater levels are consistent with avoiding undesirable results in the basin. This discussion is provided in Appendix 3-A, Shallow Well Protection Memorandum. The GSP does not however, specifically analyze direct and indirect impacts on DACs and tribes or evaluate the cumulative or indirect impacts of proposed minimum thresholds on DACs and tribes.

Minimum thresholds for two constituents of concern (COCs), nitrate and specific conductivity, are set at the primary (nitrate as N) or secondary (specific conductivity) maximum contaminant levels (MCLs). However, the GSP does not set SMC for the other naturally occurring constituents in the basin (i.e., iron, manganese, boron).

For degraded water quality, the GSP only includes a very general discussion of indirect impacts to drinking water users when defining undesirable results and evaluating the cumulative or indirect impacts of proposed minimum thresholds. The GSP does not, however, mention or discuss direct and indirect impacts on DACs or tribes when defining undesirable results for degraded water quality, nor does it evaluate the cumulative or indirect impacts of proposed minimum thresholds on DACs or tribes.

RECOMMENDATIONS

Chronic Lowering of Groundwater Levels

- Describe direct and indirect impacts on DACs and tribes when describing undesirable results and defining minimum thresholds for chronic lowering of groundwater levels (in addition to describing impacts to drinking water users).

Degraded Water Quality

- Describe direct and indirect impacts on drinking water users, DACs and tribes when defining undesirable results for degraded water quality. For specific guidance on how to consider these users, refer to "Guide to Protecting Water Quality Under the Sustainable Groundwater Management Act."[7]
- Evaluate the cumulative or indirect impacts of proposed minimum thresholds for degraded water quality on drinking water users, DACs, and tribes.
- Set minimum thresholds and measurable objectives for the naturally occuring COCs in the basin (iron, manganese, boron). Ensure they align with drinking water standards[8].

Groundwater Dependent Ecosystems and Interconnected Surface Waters

We commend the GSA for their comprehensive analysis of SMC for GDEs and ISWs. The GSP analyzes the impacts on GDEs when defining undesirable results for three sustainability indicators (i.e., chronic lowering of groundwater levels, degraded water quality, and depletions of

[7] Guide to Protecting Water Quality under the Sustainable Groundwater Management Act https://d3n8a8pro7vhmx.cloudfront.net/communitywatercenter/pages/293/attachments/original/1559328858/Guide_to_Protecting_Drinking_Water_Quality_Under_the_Sustainable_Groundwater_Management_Act.pdf?1559328858.

[8] "Degraded Water Quality [...] collect sufficient spatial and temporal data from each applicable principal aquifer to determine groundwater quality trends for water quality indicators, as determined by the Agency, to address known water quality issues." [23 CCR §354.34(c)(4)]

interconnected surface waters). Furthermore, the GSP evaluates the impacts of proposed minimum thresholds on GDEs or environmental beneficial users of surface water for these sustainability indicators. The GSP considers GDEs when establishing measurable objectives and evaluates the measurable objectives based on GDE water needs.

RECOMMENDATION

- After re-analyzing the extent of GDEs and ISWs in the basin based on our comments above, re-evaluate the SMC to ensure they are protective of GDEs and surface water users in the basin.

2. Climate Change

The SGMA statute identifies climate change as a significant threat to groundwater resources and one that must be examined and incorporated in the GSPs. The GSP Regulations[9] require integration of climate change into the projected water budget to ensure that projects and management actions sufficiently account for the range of potential climate futures.

The integration of climate change into the projected water budget is **insufficient**. The GSP does incorporate climate change into the projected water budget using DWR change factors for 2030 and 2070. However, the GSP did not consider multiple climate scenarios (e.g., the 2070 extremely wet and extremely dry climate scenarios) in the projected water budget. The GSP should clearly and transparently incorporate the extremely wet and dry scenarios provided by DWR into projected water budgets or select more appropriate extreme scenarios for their basins. While these extreme scenarios may have a lower likelihood of occurring, their consequences could be significant, therefore they should be included in groundwater planning.

The GSP includes climate change into precipitation, evapotranspiration, and surface water flow terms of the projected water budget. However, the GSP does not calculate a sustainable yield based on the projected water budget with climate change incorporated. If the water budgets are incomplete, including the omission of extremely wet and dry scenarios, and sustainable yield is not calculated based on climate change projections, then there is increased uncertainty in virtually every subsequent calculation used to plan for projects, derive measurable objectives, and set minimum thresholds. Plans that do not adequately include climate change projections may underestimate future impacts on vulnerable beneficial users of groundwater such as ecosystems, DACs, domestic well owners, and tribes.

RECOMMENDATIONS

- Integrate climate change, including extremely wet and dry scenarios, into all elements of the projected water budget to form the basis for development of sustainable management criteria and projects and management actions.
- Calculate sustainable yield based on the projected water budget with climate change incorporated.

[9] "Each Plan shall rely on the best available information and best available science to quantify the water budget for the basin in order to provide an understanding of historical and projected hydrology, water demand, water supply, land use, population, climate change, sea level rise, groundwater and surface water interaction, and subsurface groundwater flow." [23 CCR §354.18(e)]

- Incorporate climate change scenarios into projects and management actions.

3. Data Gaps

The consideration of beneficial users when establishing monitoring networks is **insufficient**, due to lack of clarity around the Representative Monitoring Points (RMPs) in the monitoring network that represent water quality conditions and shallow groundwater elevations around DACs, domestic wells, tribes, and GDEs. These beneficial users of groundwater may remain unprotected by the GSP without adequate monitoring and identification of data gaps in the shallow aquifer. The Plan therefore fails to meet SGMA's requirements for the monitoring network[10].

The GSP states (p. 3-11): "Importantly, monitoring well density is appropriate to extrapolate seasonal groundwater elevation maps to support the shallow well protection analysis, GDE impact analysis, and to monitor seasonal changes in hydraulic gradients that indicate changes in ISW depletion. Implementation actions are proposed to cover data gaps that still exist within the network and improvements that may help such assessments." Thus the GSP recognizes the importance of filling data gaps, however does not provide specific plans, well locations shown on a map, or a timeline to fill the data gaps. Without a map of proposed new monitoring well locations, a determination cannot be made regarding the adequacy of the monitoring network for sustainability indicators going forward into the GSP implementation phase.

RECOMMENDATIONS

- Provide maps that overlay monitoring well locations with the locations of DACs, domestic wells, tribes, and GDEs to clearly identify potentially impacted areas. Increase the number of representative monitoring points (RMPs) across the subbasin for all groundwater condition indicators. Prioritize proximity to GDEs and drinking water users when identifying new RMPs.
- Provide specific plans to fill data gaps in the monitoring network. Evaluate how the gathered data will be used to identify and map GDEs and ISWs, and identify DACs and shallow domestic well users that are vulnerable to undesirable results.
- Determine what biological monitoring can be used to assess the potential for significant and unreasonable impacts to GDEs or ISWs due to groundwater conditions in the subbasin.

4. Addressing Beneficial Users in Projects and Management Actions

The consideration of beneficial users when developing projects and management actions is **insufficient**, due to the failure to completely identify benefits or impacts of identified projects and management actions to beneficial users of groundwater such as DACs, drinking water users, and tribes.

[10] "The monitoring network objectives shall be implemented to accomplish the following: [...] (2) Monitor impacts to the beneficial uses or users of groundwater." [23 CCR §354.34(b)(2)]

We commend the GSA for including habitat and stream restoration projects in the GSP (described in Sections 4.1 and 4.3.2.2). The GSP discusses the manner in which these projects will benefit ecosystems, but does not discuss the manner in which DACs, drinking water users, and tribes may be benefitted or impacted by identified projects and management actions. Therefore, potential project and management actions may not protect these beneficial users. Groundwater sustainability under SGMA is defined not just by sustainable yield, but by the avoidance of undesirable results for *all* beneficial users.

RECOMMENDATIONS

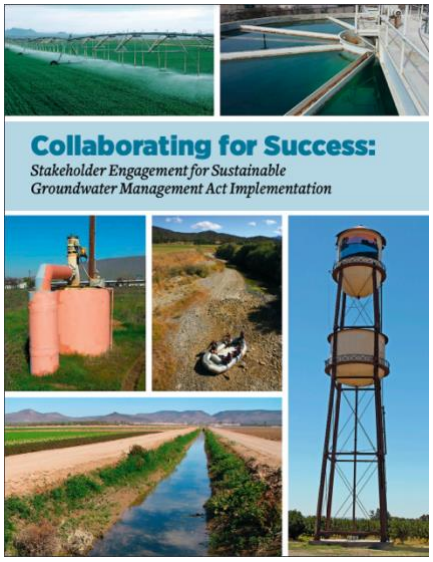
- For DACs and domestic well owners, include discussion of a drinking water well impact mitigation program to proactively monitor and protect drinking water wells through GSP implementation. Refer to Attachment B for specific recommendations on how to implement a drinking water well mitigation program.
- For DACs, domestic well owners, and tribes, include a discussion of whether potential impacts to water quality from projects and management actions could occur and how the GSA plans to mitigate such impacts.
- Recharge ponds, reservoirs and facilities for managed stormwater recharge can be designed as multiple-benefit projects to include elements that act functionally as wetlands and provide a benefit for wildlife and aquatic species. For guidance on how to integrate multi-benefit recharge projects into your GSP, refer to the "Multi-Benefit Recharge Project Methodology Guidance Document"[11].
- Develop management actions that incorporate climate and water delivery uncertainties to address future water demand and prevent future undesirable results.

[11] The Nature Conservancy. 2021. Multi-Benefit Recharge Project Methodology for Inclusion in Groundwater Sustainability Plans. Sacramento. Available at: https://groundwaterresourcehub.org/sgma-tools/multi-benefit-recharge-project-methodology-guidance/

Attachment B

SGMA Tools to address DAC, drinking water, and environmental beneficial uses and users

Stakeholder Engagement and Outreach



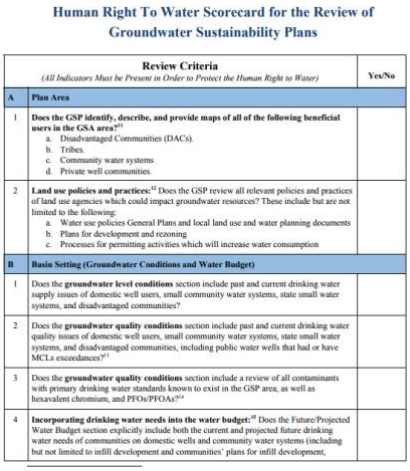
Clean Water Action, Community Water Center and Union of Concerned Scientists developed a guidance document called Collaborating for success: Stakeholder engagement for Sustainable Groundwater Management Act Implementation. It provides details on how to conduct targeted and broad outreach and engagement during Groundwater Sustainability Plan (GSP) development and implementation. Conducting a targeted outreach involves:

- Developing a robust Stakeholder Communication and Engagement plan that includes outreach at frequented locations (schools, farmers markets, religious settings, events) across the plan area to increase the involvement and participation of disadvantaged communities, drinking water users and the environmental stakeholders.

- Providing translation services during meetings and technical assistance to enable easy participation for non-English speaking stakeholders.

- GSP should adequately describe the process for requesting input from beneficial users and provide details on how input is incorporated into the GSP.

The Human Right to Water

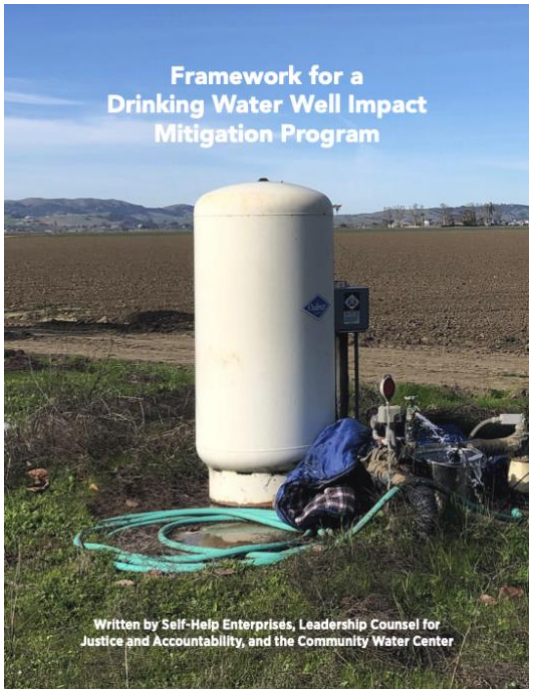


Human Right To Water Scorecard for the Review of Groundwater Sustainability Plans

	Review Criteria *(All Indicators Must be Present in Order to Protect the Human Right to Water)*	Yes/No
A	**Plan Area**	
1	**Does the GSP identify, describe, and provide maps of all of the following beneficial users in the GSA area?**[51] a. Disadvantaged Communities (DACs). b. Tribes. c. Community water systems. d. Private well communities.	
2	**Land use policies and practices:**[52] Does the GSP review all relevant policies and practices of land use agencies which could impact groundwater resources? These include but are not limited to the following: a. Water use policies General Plans and local land use and water planning documents b. Plans for development and rezoning c. Processes for permitting activities which will increase water consumption	
B	**Basin Setting (Groundwater Conditions and Water Budget)**	
1	Does the **groundwater level conditions** section include past and current drinking water supply issues of domestic well users, small community water systems, state small water systems, and disadvantaged communities?	
2	Does the **groundwater quality conditions** section include past and current drinking water quality issues of domestic well users, small community water systems, state small water systems, and disadvantaged communities, including public water wells that had or have MCLs exceedances?[53]	
3	Does the **groundwater quality conditions** section include a review of all contaminants with primary drinking water standards known to exist in the GSP area, as well as hexavalent chromium, and PFOs/PFOAs?[54]	
4	**Incorporating drinking water needs into the water budget:**[55] Does the Future/Projected Water Budget section explicitly include both the current and projected future drinking water needs of communities on domestic wells and community water systems (including but not limited to infill development and communities' plans for infill development,	

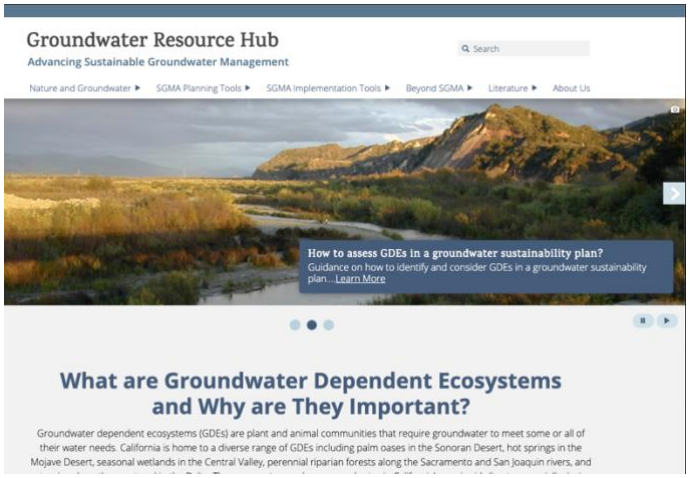
The Human Right to Water Scorecard was developed by Community Water Center, Leadership Counsel for Justice and Accountability and Self Help Enterprises to aid Groundwater Sustainability Agencies (GSAs) in prioritizing drinking water needs in SGMA. The scorecard identifies elements that must exist in GSPs to adequately protect the Human Right to Drinking water.

Drinking Water Well Impact Mitigation Framework



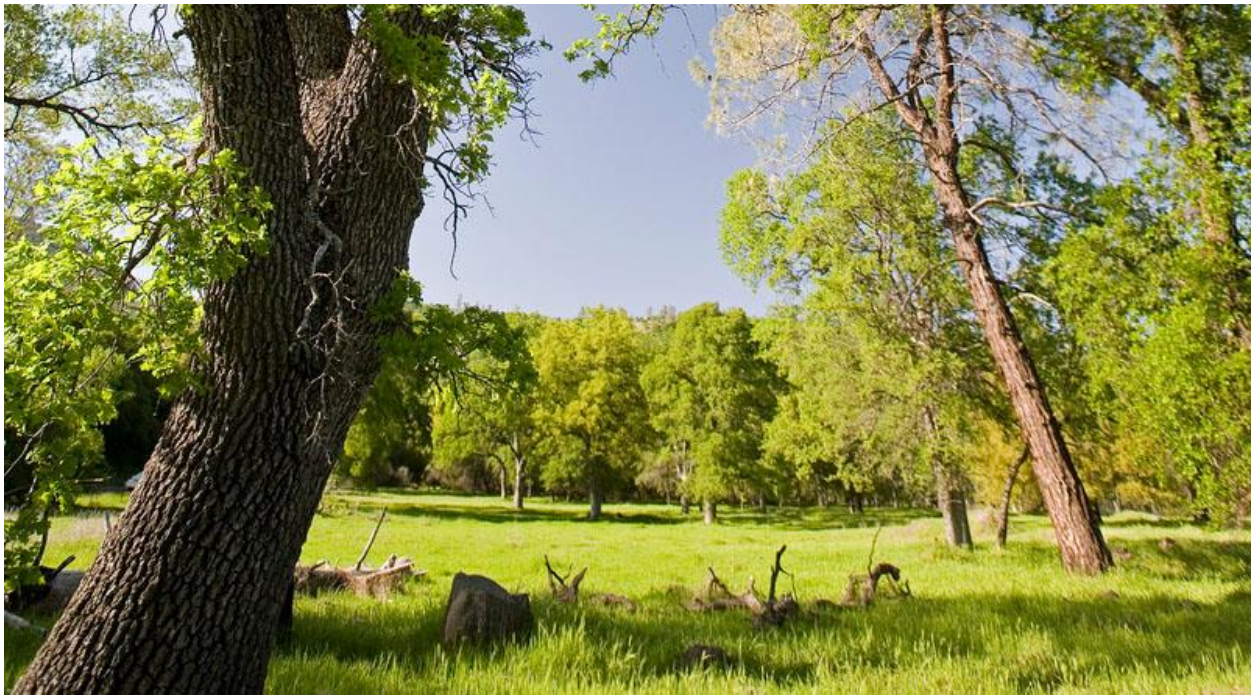
The Drinking Water Well Impact Mitigation Framework was developed by Community Water Center, Leadership Counsel for Justice and Accountability and Self Help Enterprises to aid GSAs in the development and implementation of their GSPs. The framework provides a clear roadmap for how a GSA can best structure its data gathering, monitoring network and management actions to proactively monitor and protect drinking water wells and mitigate impacts should they occur.

Groundwater Resource Hub



The Nature Conservancy has developed a suite of tools based on best available science to help GSAs, consultants, and stakeholders efficiently incorporate nature into GSPs. These tools and resources are available online at GroundwaterResourceHub.org. The Nature Conservancy's tools and resources are intended to reduce costs, shorten timelines, and increase benefits for both people and nature.

Rooting Depth Database



The Plant Rooting Depth Database provides information that can help assess whether groundwater-dependent vegetation are accessing groundwater. Actual rooting depths will depend on the plant species and site-specific conditions, such as soil type and

availability of other water sources. Site-specific knowledge of depth to groundwater combined with rooting depths will help provide an understanding of the potential groundwater levels are needed to sustain GDEs.

How to use the database

The maximum rooting depth information in the Plant Rooting Depth Database is useful when verifying whether vegetation in the Natural Communities Commonly Associated with Groundwater (NC Dataset) are connected to groundwater. A 30 ft depth-to-groundwater threshold, which is based on averaged global rooting depth data for phreatophytes[1], is relevant for most plants identified in the NC Dataset since most plants have a max rooting depth of less than 30 feet. However, it is important to note that deeper thresholds are necessary for other plants that have reported maximum root depths that exceed the averaged 30 feet threshold, such as valley oak (*Quercus lobata*), Euphrates poplar (*Populus euphratica*), salt cedar (*Tamarix spp.*), and shadescale (*Atriplex confertifolia*). The Nature Conservancy advises that the reported max rooting depth for these deeper-rooted plants be used. For example, a depth-to groundwater threshold of 80 feet should be used instead of the 30 ft threshold, when verifying whether valley oak polygons from the NC Dataset are connected to groundwater. It is important to re-emphasize that actual rooting depth data are limited and will depend on the plant species and site-specific conditions such as soil and aquifer types, and availability to other water sources.

The Plant Rooting Depth Database is an Excel workbook composed of four worksheets:

1. California phreatophyte rooting depth data (included in the NC Dataset)
2. Global phreatophyte rooting depth data
3. Metadata
4. References

How the database was compiled

The Plant Rooting Depth Database is a compilation of rooting depth information for the groundwater-dependent plant species identified in the NC Dataset. Rooting depth data were compiled from published scientific literature and expert opinion through a crowdsourcing campaign. As more information becomes available, the database of rooting depths will be updated. Please Contact Us if you have additional rooting depth data for California phreatophytes.

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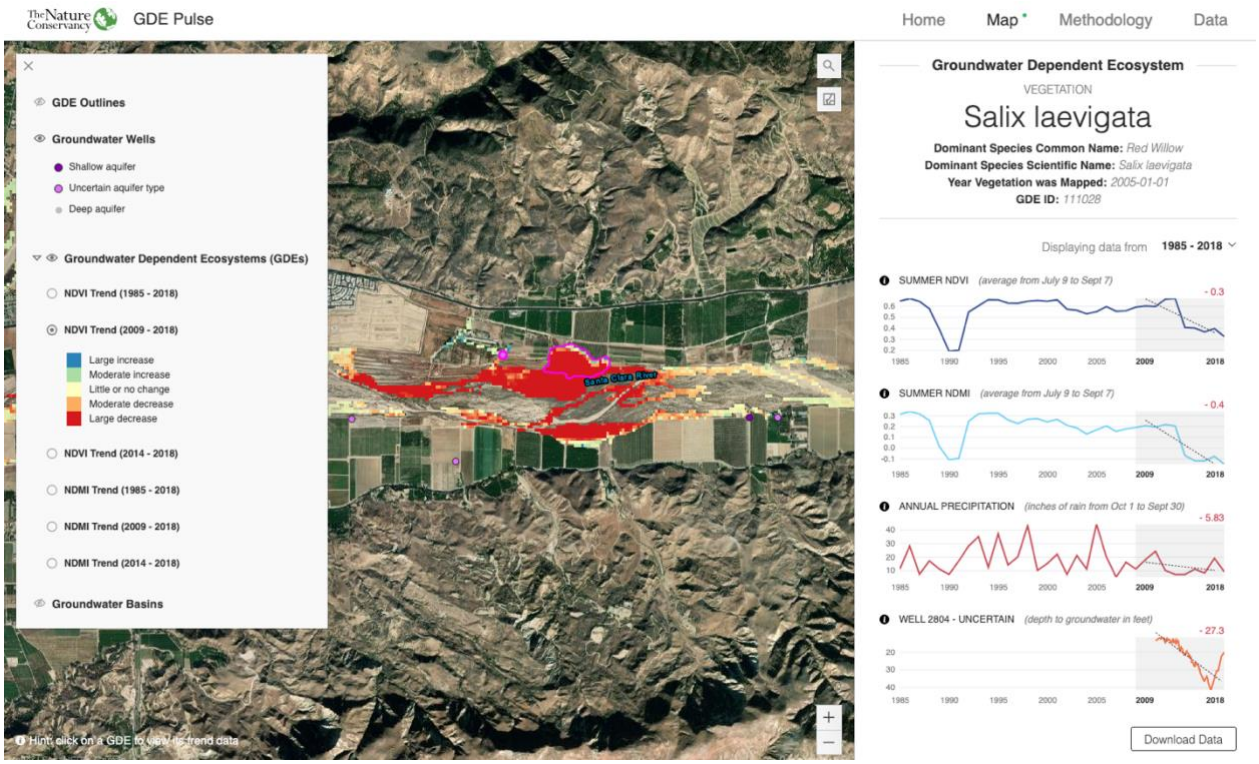
[1] Canadell, J., Jackson, R.B., Ehleringer, J.B. et al. 1996. Maximum rooting depth of vegetation types at the global scale. Oecologia 108, 583–595. https://doi.org/10.1007/BF00329030

GDE Pulse



GDE Pulse is a free online tool that allows Groundwater Sustainability Agencies to assess changes in groundwater dependent ecosystem (GDE) health using satellite, rainfall, and groundwater data. Remote sensing data from satellites has been used to monitor the health of vegetation all over the planet. GDE pulse has compiled 35 years of satellite imagery from NASA's Landsat mission for every polygon in the Natural Communities Commonly Associated with Groundwater Dataset. The following datasets are available for downloading:

Normalized Difference Vegetation Index (NDVI) is a satellite-derived index that represents the greenness of vegetation. Healthy green vegetation tends to have a higher NDVI, while dead leaves have a lower NDVI. We calculated the average NDVI during the driest part of the year (July - Sept) to estimate vegetation health when the plants are most likely dependent on groundwater.

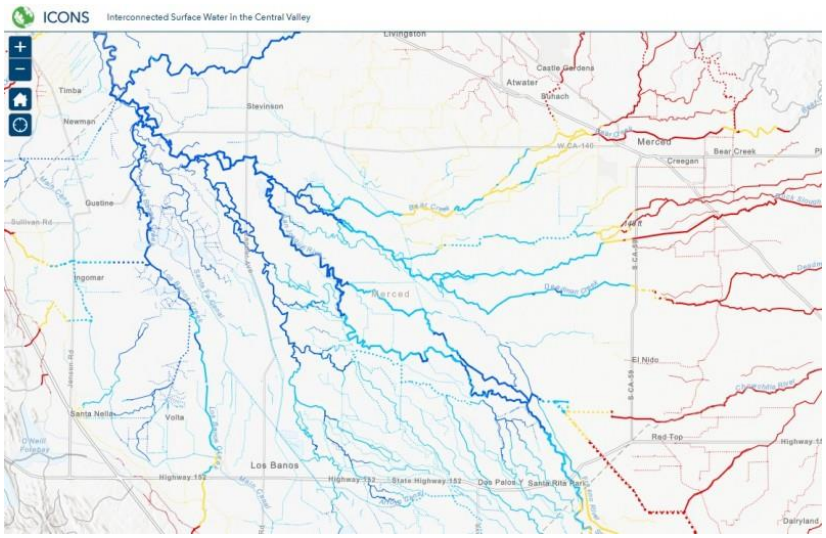
Normalized Difference Moisture Index (NDMI) is a satellite-derived index that represents water content in vegetation. NDMI is derived from the Near-Infrared (NIR) and Short-Wave Infrared (SWIR) channels. Vegetation with adequate access to water tends to have higher NDMI, while vegetation that is water stressed tends to have lower NDMI. We calculated the average NDVI during the driest part of the year (July–September) to estimate vegetation health when the plants are most likely dependent on groundwater.

Annual Precipitation is the total precipitation for the water year (October 1st – September 30th) from the PRISM dataset. The amount of local precipitation can affect vegetation with more precipitation generally leading to higher NDVI and NDMI.

Depth to Groundwater measurements provide an indication of the groundwater levels and changes over time for the surrounding area. We used groundwater well measurements from nearby (<1km) wells to estimate the depth to groundwater below the GDE based on the average elevation of the GDE (using a digital elevation model) minus the measured groundwater surface elevation.

ICONOS Mapper

Interconnected Surface Water in the Central Valley



ICONS maps the likely presence of interconnected surface water (ISW) in the Central Valley using depth to groundwater data. Using data from 2011-2018, the ISW dataset represents the likely connection between surface water and groundwater for rivers and streams in California's Central Valley. It includes information on the mean, maximum, and minimum depth to groundwater for each stream segment over the years with available data, as well as the likely presence of ISW based on the minimum depth to groundwater. The Nature Conservancy developed this database, with guidance and input from expert academics, consultants, and state agencies.

We developed this dataset using groundwater elevation data available online from the California Department of Water Resources (DWR). DWR only provides this data for the Central Valley. For GSAs outside of the valley, who have groundwater well measurements, we recommend following our methods to determine likely ISW in your region. The Nature Conservancy's ISW dataset should be used as a first step in reviewing ISW and should be supplemented with local or more recent groundwater depth data.

Attachment C

Freshwater Species Located in the Ukiah Valley Basin

To assist in identifying the beneficial users of surface water necessary to assess the undesirable result "depletion of interconnected surface waters", Attachment C provides a list of freshwater species located in the Ukiah Valley Basin. To produce the freshwater species list, we used ArcGIS to select features within the California Freshwater Species Database version 2.0.9 within the basin boundary. This database contains information on ~4,000 vertebrates, macroinvertebrates and vascular plants that depend on fresh water for at least one stage of their life cycle. The methods used to compile the California Freshwater Species Database can be found in Howard et al. 2015[1]. The spatial database contains locality observations and/or distribution information from ~400 data sources. The database is housed in the California Department of Fish and Wildlife's BIOS[2] as well as on The Nature Conservancy's science website[3].

Scientific Name	Common Name	Legal Protected Status		
		Federal	State	Other
BIRDS				
Actitis macularius	Spotted Sandpiper			
Aechmophorus clarkii	Clark's Grebe			
Aechmophorus occidentalis	Western Grebe			
Agelaius tricolor	Tricolored Blackbird	Bird of Conservation Concern	Special Concern	BSSC - First priority
Aix sponsa	Wood Duck			
Anas acuta	Northern Pintail			
Anas americana	American Wigeon			
Anas clypeata	Northern Shoveler			
Anas crecca	Green-winged Teal			
Anas cyanoptera	Cinnamon Teal			
Anas discors	Blue-winged Teal			
Anas platyrhynchos	Mallard			
Anas strepera	Gadwall			
Anser albifrons	Greater White-fronted Goose			
Ardea alba	Great Egret			
Ardea herodias	Great Blue Heron			
Aythya affinis	Lesser Scaup			
Aythya americana	Redhead		Special Concern	BSSC - Third priority

[1] Howard, J.K. et al. 2015. Patterns of Freshwater Species Richness, Endemism, and Vulnerability in California. PLoSONE, 11(7). Available at: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0130710

[2] California Department of Fish and Wildlife BIOS: https://www.wildlife.ca.gov/data/BIOS

[3] Science for Conservation: https://www.scienceforconservation.org/products/california-freshwater-species-database

Aythya collaris	Ring-necked Duck			
Aythya marila	Greater Scaup			
Aythya valisineria	Canvasback		Special	
Bucephala albeola	Bufflehead			
Bucephala clangula	Common Goldeneye			
Butorides virescens	Green Heron			
Calidris alpina	Dunlin			
Calidris mauri	Western Sandpiper			
Calidris minutilla	Least Sandpiper			
Chen caerulescens	Snow Goose			
Chen rossii	Ross's Goose			
Chlidonias niger	Black Tern		Special Concern	BSSC - Second priority
Chroicocephalus philadelphia	Bonaparte's Gull			
Cistothorus palustris palustris	Marsh Wren			
Cypseloides niger	Black Swift	Bird of Conservation Concern	Special Concern	BSSC - Third priority
Egretta thula	Snowy Egret			
Empidonax traillii	Willow Flycatcher	Bird of Conservation Concern	Endangered	
Fulica americana	American Coot			
Gallinago delicata	Wilson's Snipe			
Gallinula chloropus	Common Moorhen			
Haliaeetus leucocephalus	Bald Eagle	Bird of Conservation Concern	Endangered	
Himantopus mexicanus	Black-necked Stilt			
Icteria virens	Yellow-breasted Chat		Special Concern	BSSC - Third priority
Limnodromus scolopaceus	Long-billed Dowitcher			
Lophodytes cucullatus	Hooded Merganser			
Megaceryle alcyon	Belted Kingfisher			
Mergus merganser	Common Merganser			
Numenius americanus	Long-billed Curlew			
Numenius phaeopus	Whimbrel			
Nycticorax nycticorax	Black-crowned Night-Heron			
Oxyura jamaicensis	Ruddy Duck			
Pelecanus erythrorhynchos	American White Pelican		Special Concern	BSSC - First priority
Phalacrocorax auritus	Double-crested Cormorant			
Phalaropus tricolor	Wilson's Phalarope			

Plegadis chihi	White-faced Ibis		Watch list	
Pluvialis squatarola	Black-bellied Plover			
Podiceps nigricollis	Eared Grebe			
Podilymbus podiceps	Pied-billed Grebe			
Porzana carolina	Sora			
Rallus limicola	Virginia Rail			
Recurvirostra americana	American Avocet			
Setophaga petechia	Yellow Warbler			BSSC - Second priority
Tachycineta bicolor	Tree Swallow			
Tringa melanoleuca	Greater Yellowlegs			
Tringa semipalmata	Willet			
Tringa solitaria	Solitary Sandpiper			
Xanthocephalus xanthocephalus	Yellow-headed Blackbird		Special Concern	BSSC - Third priority
FISH				
Oncorhynchus mykiss - CCC winter	Central California coast winter steelhead	Threatened	Special	Vulnerable - Moyle 2013
Oncorhynchus tshawytscha - CCC fall	California Coast fall Chinook salmon	Threatened	Special	Vulnerable - Moyle 2013
HERPS				
Actinemys marmorata marmorata	Western Pond Turtle		Special Concern	ARSSC
Anaxyrus boreas boreas	Boreal Toad			
Dicamptodon tenebrosus	Pacific Giant Salamander			
Rana boylii	Foothill Yellow-legged Frog	Under Review in the Candidate or Petition Process	Special Concern	ARSSC
Taricha granulosa	Rough-skinned Newt			
Taricha rivularis	Red-bellied Newt			ARSSC
Taricha torosa	Coast Range Newt		Special Concern	ARSSC
Thamnophis sirtalis sirtalis	Common Gartersnake			
INSECTS & OTHER INVERTS				
Aeshna spp.	Aeshna spp.			
Aeshnidae fam.	Aeshnidae fam.			
Ambrysus spp.	Ambrysus spp.			
Amiocentrus aspilus	A Caddisfly			
Ampumixis dispar				Not on any status lists
Anacaena spp.	Anacaena spp.			
Argia spp.	Argia spp.			
Baetis spp.	Baetis spp.			
Belostomatidae fam.	Belostomatidae fam.			

Calineuria californica	Western Stone			
Callibaetis spp.	Callibaetis spp.			
Centroptilum spp.	Centroptilum spp.			
Cheumatopsyche spp.	Cheumatopsyche spp.			
Chironomidae fam.	Chironomidae fam.			
Chloroperlidae fam.	Chloroperlidae fam.			
Cleptelmis addenda				Not on any status lists
Cloeodes excogitatus	A Mayfly			
Cordulegaster dorsalis	Pacific Spiketail			
Deuterophlebia spp.	Deuterophlebia spp.			
Diphetor hageni	Hagen's Small Minnow Mayfly			
Dolophilodes spp.	Dolophilodes spp.			
Elodes spp.	Elodes spp.			
Enochrus spp.	Enochrus spp.			
Epeorus spp.	Epeorus spp.			
Ephemerella spp.	Ephemerella spp.			
Ephydridae fam.	Ephydridae fam.			
Eubrianax edwardsii				Not on any status lists
Eucorethra underwoodi				Not on any status lists
Fallceon quilleri	A Mayfly			
Farula spp.	Farula spp.			
Graptocorixa spp.	Graptocorixa spp.			
Gumaga spp.	Gumaga spp.			
Heptageniidae fam.	Heptageniidae fam.			
Heteroplectron californicum	A Caddisfly			
Hydraena spp.	Hydraena spp.			
Hydropsyche spp.	Hydropsyche spp.			
Hydropsychidae fam.	Hydropsychidae fam.			
Hydroptila spp.	Hydroptila spp.			
Hydroptilidae fam.	Hydroptilidae fam.			
Ironodes spp.	Ironodes spp.			
Isoperla spp.	Isoperla spp.			
Ithytrichia clavata	A Caddisfly			
Laccobius spp.	Laccobius spp.			
Lepidostoma spp.	Lepidostoma spp.			
Leucrocuta spp.	Leucrocuta spp.			
Malenka spp.	Malenka spp.			
Maruina lanceolata				Not on any status lists
Meringodixa chalonensis				Not on any status lists

Nixe kennedyi	A Mayfly			
Ochrotrichia spp.	Ochrotrichia spp.			
Octogomphus specularis	Grappletail			
Oecetis spp.	Oecetis spp.			
Optioservus spp.	Optioservus spp.			
Ordobrevia nubifera				Not on any status lists
Paraleptophlebia spp.	Paraleptophlebia spp.			
Parapsyche spp.	Parapsyche spp.			
Perlidae fam.	Perlidae fam.			
Procloeon venosum	A Mayfly			
Psephenus falli				Not on any status lists
Pteronarcys spp.	Pteronarcys spp.			
Rhyacophila spp.	Rhyacophila spp.			
Sanfilippodytes spp.	Sanfilippodytes spp.			
Serratella spp.	Serratella spp.			
Sialis spp.	Sialis spp.			
Simulium spp.	Simulium spp.			
Sperchon spp.	Sperchon spp.			
Stictotarsus spp.	Stictotarsus spp.			
Suwallia spp.	Suwallia spp.			
Sympetrum occidentale				Not on any status lists
Tinodes spp.	Tinodes spp.			
Tipulidae fam.	Tipulidae fam.			
Tricorythodes spp.	Tricorythodes spp.			
Uvarus subtilis				Not on any status lists
Wormaldia spp.	Wormaldia spp.			
Zaitzevia spp.	Zaitzevia spp.			
Zapada spp.	Zapada spp.			
MAMMALS				
Lontra canadensis canadensis	North American River Otter			Not on any status lists
Neovison vison	American Mink			Not on any status lists
Ondatra zibethicus	Common Muskrat			Not on any status lists
MOLLUSKS				
Margaritifera falcata	Western Pearlshell		Special	
Ferrissia spp.	Ferrissia spp.			
Juga spp.	Juga spp.			
Physa spp.	Physa spp.			
Anodonta californiensis	California Floater		Special	

Gonidea angulata	Western Ridged Mussel		Special	
PLANTS				
Alopecurus saccatus	Pacific Foxtail			
Arundo donax	NA			
Calochortus uniflorus	Shortstem Mariposa Lily		Special	CRPR - 4.2
Carex nudata	Torrent Sedge			
Cicendia quadrangularis	Oregon Microcala			
Cypripedium californicum	California Lady's-slipper			
Eryngium aristulatum aristulatum	California Eryngo			
Gratiola ebracteata	Bractless Hedge-hyssop			
Juncus xiphioides	Iris-leaf Rush			
Lilium pardalinum pardalinum	Leopard Lily			
Limnanthes bakeri	Baker's Meadowfoam		Rare	CRPR - 1B.1
Limnanthes douglasii nivea	Douglas' Meadowfoam			
Limnanthes douglasii rosea	Douglas' Meadowfoam			
Mimulus guttatus	Common Large Monkeyflower			
Paspalum distichum	Joint Paspalum			
Perideridia kelloggii	Kellogg's Yampah			
Pleuropogon californicus californicus				Not on any status lists
Salix exigua exigua	Narrowleaf Willow			
Salix lasiolepis lasiolepis	Arroyo Willow			
Sequoia sempervirens				

Attachment D

July 2019

IDENTIFYING GDEs UNDER SGMA

Best Practices for using the NC Dataset

The Sustainable Groundwater Management Act (SGMA) requires that groundwater dependent ecosystems (GDEs) be identified in Groundwater Sustainability Plans (GSPs). As a starting point, the Department of Water Resources (DWR) is providing the Natural Communities Commonly Associated with Groundwater Dataset (NC Dataset) online[1] to help Groundwater Sustainability Agencies (GSAs), consultants, and stakeholders identify GDEs within individual groundwater basins. To apply information from the NC Dataset to local areas, GSAs should combine it with the best available science on local hydrology, geology, and groundwater levels to verify whether polygons in the NC dataset are likely supported by groundwater in an aquifer (Figure 1)[2]. This document highlights six best practices for using local groundwater data to confirm whether mapped features in the NC dataset are supported by groundwater.

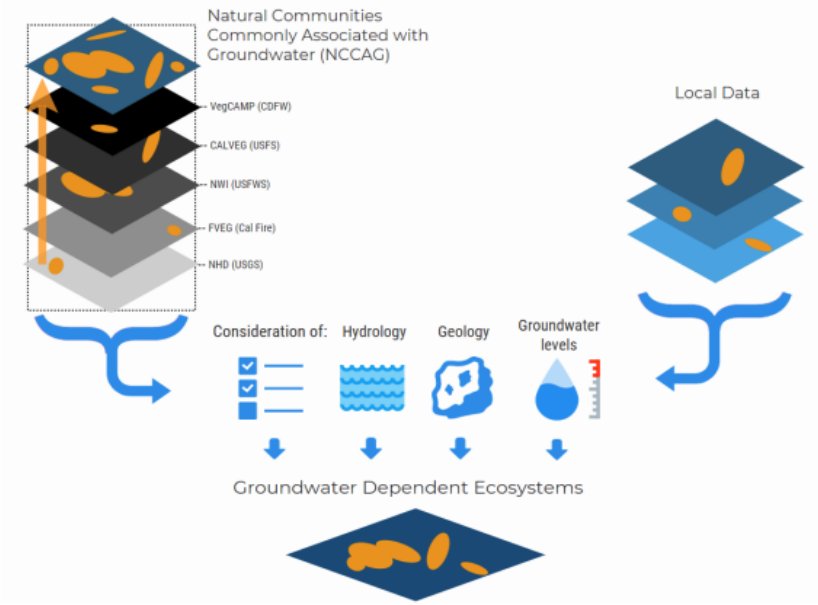


Figure 1. Considerations for GDE identification.
Source: DWR[2]

[1] NC Dataset Online Viewer: https://gis.water.ca.gov/app/NCDatasetViewer/
[2] California Department of Water Resources (DWR). 2018. Summary of the "Natural Communities Commonly Associated with Groundwater" Dataset and Online Web Viewer. Available at: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Data-and-Tools/Files/Statewide-Reports/Natural-Communities-Dataset-Summary-Document.pdf

The NC Dataset identifies vegetation and wetland features that are good indicators of a GDE. The dataset is comprised of 48 publicly available state and federal datasets that map vegetation, wetlands, springs, and seeps commonly associated with groundwater in California[3]. It was developed through a collaboration between DWR, the Department of Fish and Wildlife, and The Nature Conservancy (TNC). TNC has also provided detailed guidance on identifying GDEs from the NC dataset[4] on the Groundwater Resource Hub[5], a website dedicated to GDEs.

BEST PRACTICE #1. Establishing a Connection to Groundwater

Groundwater basins can be comprised of one continuous aquifer (Figure 2a) or multiple aquifers stacked on top of each other (Figure 2b). In unconfined aquifers (Figure 2a), using the depth-to-groundwater and the rooting depth of the vegetation is a reasonable method to infer groundwater dependence for GDEs. If groundwater is well below the rooting (and capillary) zone of the plants and any wetland features, the ecosystem is considered disconnected and groundwater management is not likely to affect the ecosystem (Figure 2d). However, it is important to consider local conditions (e.g., soil type, groundwater flow gradients, and aquifer parameters) and to review groundwater depth data from multiple seasons and water year types (wet and dry) because intermittent periods of high groundwater levels can replenish perched clay lenses that serve as the water source for GDEs (Figure 2c). Maintaining these natural groundwater fluctuations are important to sustaining GDE health.

Basins with a stacked series of aquifers (Figure 2b) may have varying levels of pumping across aquifers in the basin, depending on the production capacity or water quality associated with each aquifer. If pumping is concentrated in deeper aquifers, SGMA still requires GSAs to sustainably manage groundwater resources in shallow aquifers, such as perched aquifers, that support springs, surface water, domestic wells, and GDEs (Figure 2). This is because vertical groundwater gradients across aquifers may result in pumping from deeper aquifers to cause adverse impacts onto beneficial users reliant on shallow aquifers or interconnected surface water. The goal of SGMA is to sustainably manage groundwater resources for current and future social, economic, and environmental benefits. While groundwater pumping may not be currently occurring in a shallower aquifer, use of this water may become more appealing and economically viable in future years as pumping restrictions are placed on the deeper production aquifers in the basin to meet the sustainable yield and criteria. Thus, identifying GDEs in the basin should done irrespective to the amount of current pumping occurring in a particular aquifer, so that future impacts on GDEs due to new production can be avoided. A good rule of thumb to follow is: *if groundwater can be pumped from a well - it's an aquifer*.

[3] For more details on the mapping methods, refer to: Klausmeyer, K., J. Howard, T. Keeler-Wolf, K. Davis-Fadtke, R. Hull, A. Lyons. 2018. Mapping Indicators of Groundwater Dependent Ecosystems in California: Methods Report. San Francisco, California. Available at: https://groundwaterresourcehub.org/public/uploads/pdfs/iGDE_data_paper_20180423.pdf
[4] "Groundwater Dependent Ecosystems under the Sustainable Groundwater Management Act: Guidance for Preparing Groundwater Sustainability Plans" is available at: https://groundwaterresourcehub.org/gde-tools/gsp-guidance-document/
[5] The Groundwater Resource Hub: www.GroundwaterResourceHub.org

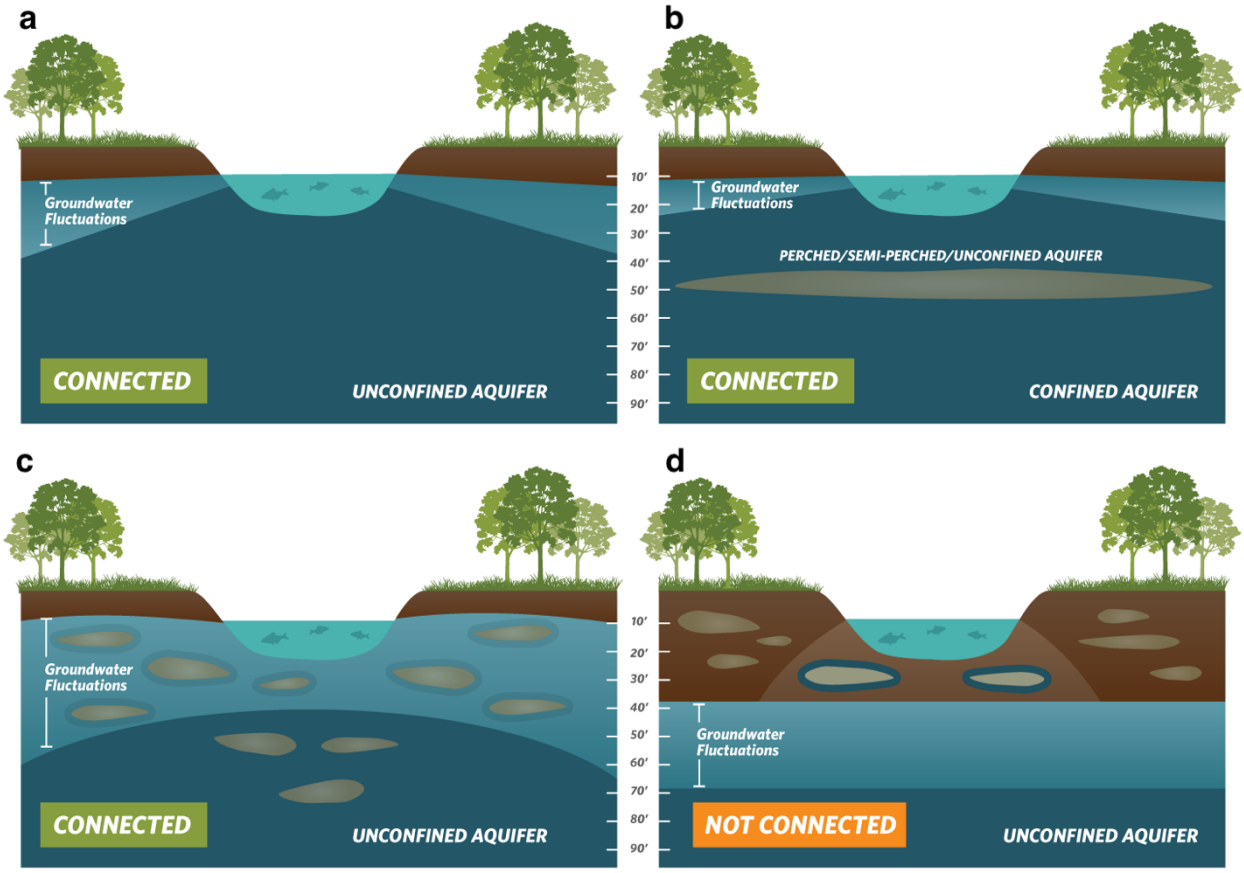


Figure 2. Confirming whether an ecosystem is connected to groundwater. Top: (a) Under the ecosystem is an unconfined aquifer with depth-to-groundwater fluctuating seasonally and interannually within 30 feet from land surface. **(b)** Depth-to-groundwater in the shallow aquifer is connected to overlying ecosystem. Pumping predominately occurs in the confined aquifer, but pumping is possible in the shallow aquifer. **Bottom: (c)** Depth-to-groundwater fluctuations are seasonally and interannually large, however, clay layers in the near surface prolong the ecosystem's connection to groundwater. **(d)** Groundwater is disconnected from surface water, and any water in the vadose (unsaturated) zone is due to direct recharge from precipitation and indirect recharge under the surface water feature. These areas are not connected to groundwater and typically support species that do not require access to groundwater to survive.

BEST PRACTICE #2. Characterize Seasonal and Interannual Groundwater Conditions

SGMA requires GSAs to describe current and historical groundwater conditions when identifying GDEs [23 CCR §354.16(g)]. Relying solely on the SGMA benchmark date (January 1, 2015) or any other single point in time to characterize groundwater conditions (e.g., depth-to-groundwater) is inadequate because managing groundwater conditions with data from one time point fails to capture the seasonal and interannual variability typical of California's climate. DWR's Best Management Practices document on water budgets[6] recommends using 10 years of water supply and water budget information to describe how historical conditions have impacted the operation of the basin within sustainable yield, implying that a baseline[7] could be determined based on data between 2005 and 2015. Using this or a similar time period, depending on data availability, is recommended for determining the depth-to-groundwater.

GDEs depend on groundwater levels being close enough to the land surface to interconnect with surface water systems or plant rooting networks. The most practical approach[8] for a GSA to assess whether polygons in the NC dataset are connected to groundwater is to rely on groundwater elevation data. As detailed in TNC's GDE guidance document[4], one of the key factors to consider when mapping GDEs is to contour depth-to-groundwater in the aquifer that is supporting the ecosystem (see Best Practice #5).

Groundwater levels fluctuate over time and space due to California's Mediterranean climate (dry summers and wet winters), climate change (flood and drought years), and subsurface heterogeneity in the subsurface (Figure 3). Many of California's GDEs have adapted to dealing with intermittent periods of water stress, however if these groundwater conditions are prolonged, adverse impacts to GDEs can result. While depth-to-groundwater levels within 30 feet[4] of the land surface are generally accepted as being a proxy for confirming that polygons in the NC dataset are supported by groundwater, it is highly advised that fluctuations in the groundwater regime be characterized to understand the seasonal and interannual groundwater variability in GDEs. Utilizing groundwater data from one point in time can misrepresent groundwater levels required by GDEs, and inadvertently result in adverse impacts to the GDEs. Time series data on groundwater elevations and depths are available on the SGMA Data Viewer[9]. However, if insufficient data are available to describe groundwater conditions within or near polygons from the NC dataset, include those polygons in the GSP until data gaps are reconciled in the monitoring network (see Best Practice #6).

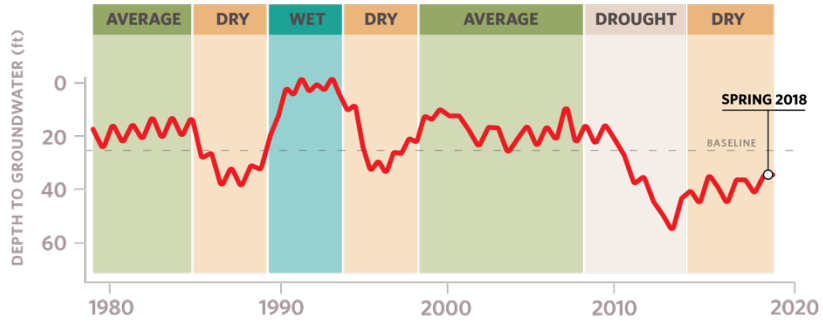


Figure 3. Example seasonality and interannual variability in depth-to-groundwater over time. Selecting one point in time, such as Spring 2018, to characterize groundwater conditions in GDEs fails to capture what groundwater conditions are necessary to maintain the ecosystem status into the future so adverse impacts are avoided.

[6] DWR. 2016. Water Budget Best Management Practice. Available at: https://water.ca.gov/LegacyFiles/groundwater/sgm/pdfs/BMP_Water_Budget_Final_2016-12-23.pdf

[7] Baseline is defined under the GSP regulations as "historic information used to project future conditions for hydrology, water demand, and availability of surface water and to evaluate potential sustainable management practices of a basin." [23 CCR §351(e)]

[8] Groundwater reliance can also be confirmed via stable isotope analysis and geophysical surveys. For more information see The GDE Assessment Toolbox (Appendix IV, GDE Guidance Document for GSPs[4]).

[9] SGMA Data Viewer: https://sgma.water.ca.gov/webgis/?appid=SGMADataViewer

BEST PRACTICE #3. Ecosystems Often Rely on Both Groundwater and Surface Water

GDEs are plants and animals that rely on groundwater for all or some of its water needs, and thus can be supported by multiple water sources. The presence of non-groundwater sources (e.g., surface water, soil moisture in the vadose zone, applied water, treated wastewater effluent, urban stormwater, irrigated return flow) within and around a GDE does not preclude the possibility that it is supported by groundwater, too. SGMA defines GDEs as "ecological communities and species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface" [23 CCR §351(m)]. Hence, depth-to-groundwater data should be used to identify whether NC polygons are supported by groundwater and should be considered GDEs. In addition, SGMA requires that significant and undesirable adverse impacts to beneficial users of surface water be avoided. Beneficial users of surface water include environmental users such as plants or animals[10], which therefore must be considered when developing minimum thresholds for depletions of interconnected surface water.

GSAs are only responsible for impacts to GDEs resulting from groundwater conditions in the basin, so if adverse impacts to GDEs result from the diversion of applied water, treated wastewater, or irrigation return flow away from the GDE, then those impacts will be evaluated by other permitting requirements (e.g., CEQA) and may not be the responsibility of the GSA. However, if adverse impacts occur to the GDE due to changing groundwater conditions resulting from pumping or groundwater management activities, then the GSA would be responsible (Figure 4).

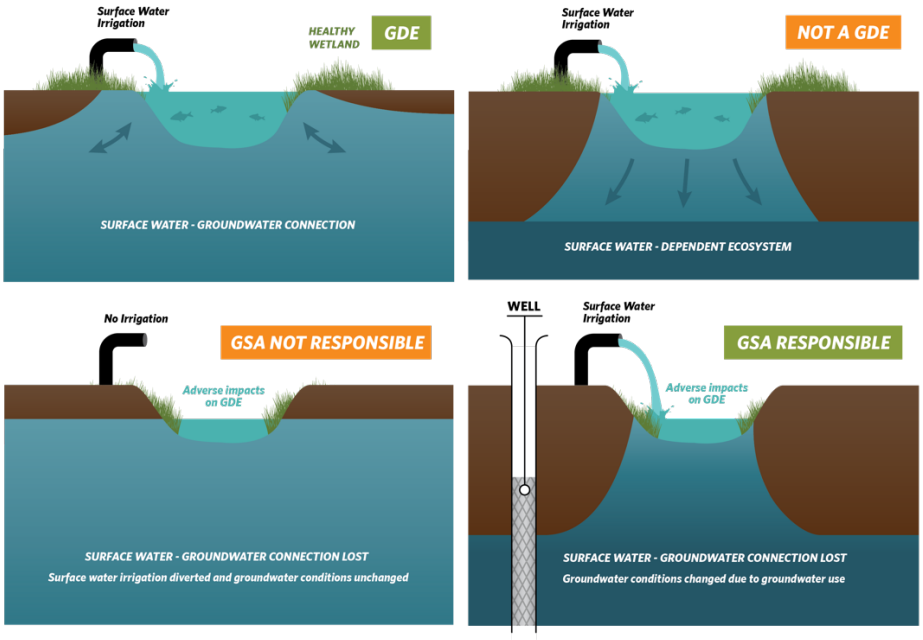


Figure 4. Ecosystems often depend on multiple sources of water. Top: (Left) Surface water and groundwater are interconnected, meaning that the GDE is supported by both groundwater and surface water. **(Right)** Ecosystems that are only reliant on non-groundwater sources are not groundwater-dependent. **Bottom: (Left)** An ecosystem that was once dependent on an interconnected surface water, but loses access to groundwater solely due to surface water diversions may not be the GSA's responsibility. **(Right)** Groundwater dependent ecosystems once dependent on an interconnected surface water system, but loses that access due to groundwater pumping is the GSA's responsibility.

[10] For a list of environmental beneficial users of surface water by basin, visit: https://groundwaterresourcehub.org/gde-tools/environmental-surface-water-beneficiaries/

BEST PRACTICE #4. Select Representative Groundwater Wells

Identifying GDEs in a basin requires that groundwater conditions are characterized to confirm whether polygons in the NC dataset are supported by the underlying aquifer. To do this, proximate groundwater wells should be identified to characterize groundwater conditions (Figure 5). When selecting representative wells, it is particularly important to consider the subsurface heterogeneity around NC polygons, especially near surface water features where groundwater and surface water interactions occur around heterogeneous stratigraphic units or aquitards formed by fluvial deposits. The following selection criteria can help ensure groundwater levels are representative of conditions within the GDE area:

- Choose wells that are within 5 kilometers (3.1 miles) of each NC Dataset polygons because they are more likely to reflect the local conditions relevant to the ecosystem. If there are no wells within 5km of the center of a NC dataset polygon, then there is insufficient information to remove the polygon based on groundwater depth. Instead, it should be retained as a potential GDE until there are sufficient data to determine whether or not the NC Dataset polygon is supported by groundwater.

- Choose wells that are screened within the surficial unconfined aquifer and capable of measuring the true water table.

- Avoid relying on wells that have insufficient information on the screened well depth interval for excluding GDEs because they could be providing data on the wrong aquifer. This type of well data should not be used to remove any NC polygons.

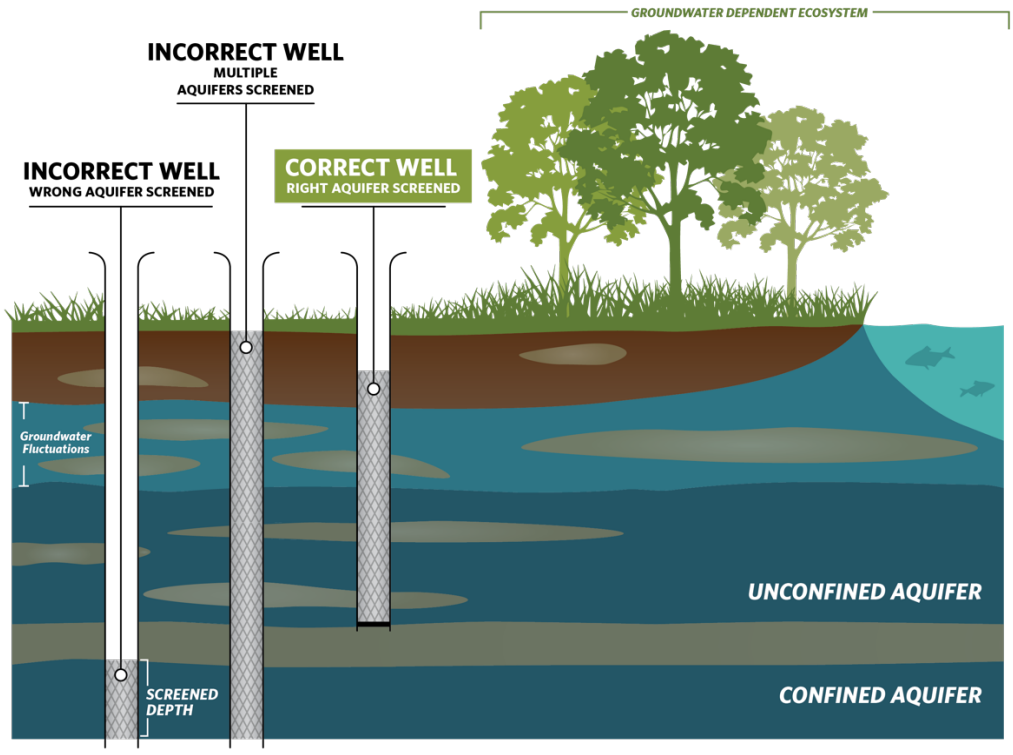


Figure 5. Selecting representative wells to characterize groundwater conditions near GDEs.

BEST PRACTICE #5. Contouring Groundwater Elevations

The common practice to contour depth-to-groundwater over a large area by interpolating measurements at monitoring wells is unsuitable for assessing whether an ecosystem is supported by groundwater. This practice causes errors when the land surface contains features like stream and wetland depressions because it assumes the land surface is constant across the landscape and depth-to-groundwater is constant below these low-lying areas (Figure 6a). A more accurate approach is to interpolate **groundwater elevations** at monitoring wells to get groundwater elevation contours across the landscape. This layer can then be subtracted from land surface elevations from a Digital Elevation Model (DEM)[11] to estimate depth-to-groundwater contours across the landscape (Figure b; Figure 7). This will provide a much more accurate contours of depth-to-groundwater along streams and other land surface depressions where GDEs are commonly found.

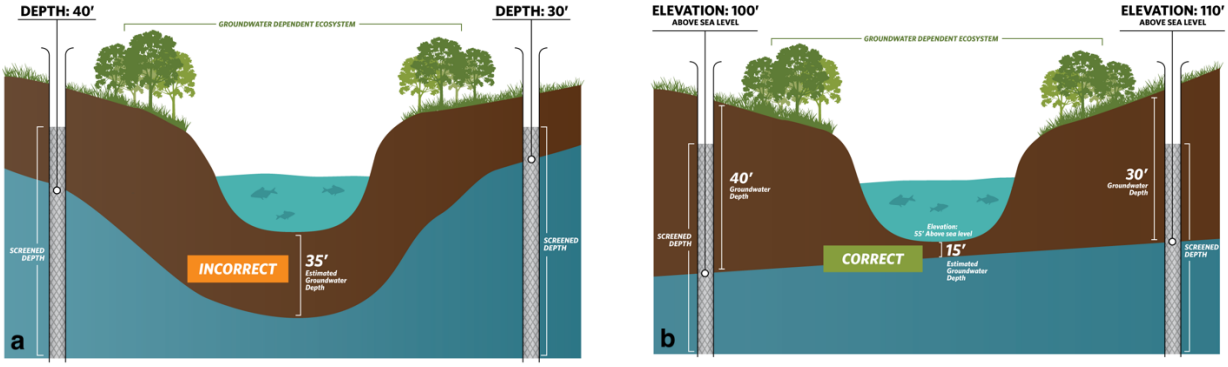


Figure 6. Contouring depth-to-groundwater around surface water features and GDEs. (a) Groundwater level interpolation using depth-to-groundwater data from monitoring wells. **(b)** Groundwater level interpolation using groundwater elevation data from monitoring wells and DEM data.

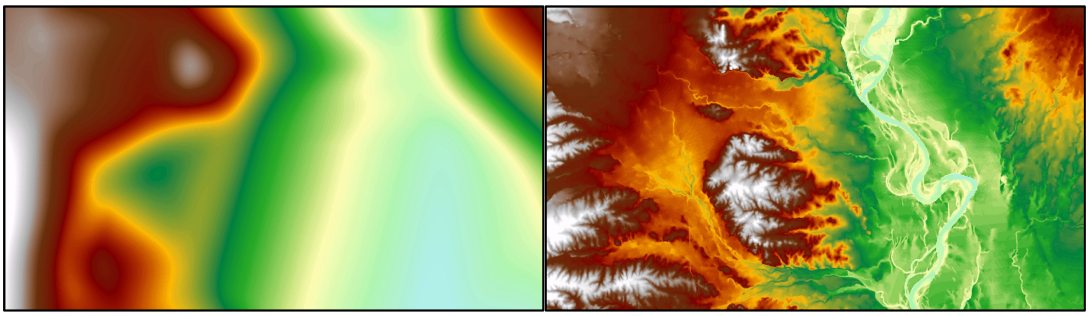


Figure 7. Depth-to-groundwater contours in Northern California. (Left) Contours were interpolated using depth-to-groundwater measurements determined at each well. **(Right)** Contours were determined by interpolating groundwater elevation measurements at each well and superimposing ground surface elevation from DEM spatial data to generate depth-to-groundwater contours. The image on the right shows a more accurate depth-to-groundwater estimate because it takes the local topography and elevation changes into account.

[11] USGS Digital Elevation Model data products are described at: https://www.usgs.gov/core-science-systems/ngp/3dep/about-3dep-products-services and can be downloaded at: https://iewer.nationalmap.gov/basic/

BEST PRACTICE #6. Best Available Science

Adaptive management is embedded within SGMA and provides a process to work toward sustainability over time by beginning with the best available information to make initial decisions, monitoring the results of those decisions, and using the data collected through monitoring programs to revise decisions in the future. In many situations, the hydrologic connection of NC dataset polygons will not initially be clearly understood if site-specific groundwater monitoring data are not available. If sufficient data are not available in time for the 2020/2022 plan, **The Nature Conservancy strongly advises that questionable polygons from the NC dataset be included in the GSP until data gaps are reconciled in the monitoring network.** Erring on the side of caution will help minimize inadvertent impacts to GDEs as a result of groundwater use and management actions during SGMA implementation.

KEY DEFINITIONS

Groundwater basin is an aquifer or stacked series of aquifers with reasonably well-defined boundaries in a lateral direction, based on features that significantly impede groundwater flow, and a definable bottom. *23 CCR §341(g)(1)*

Groundwater dependent ecosystem (GDE) are ecological communities or species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface. *23 CCR §351(m)*

Interconnected surface water (ISW) surface water that is hydraulically connected at any point by a continuous saturated zone to the underlying aquifer and the overlying surface water is not completely depleted. *23 CCR §351(o)*

Principal aquifers are aquifers or aquifer systems that store, transmit, and yield significant or economic quantities of groundwater to wells, springs, or surface water systems. *23 CCR §351(aa)*

ABOUT US

The Nature Conservancy is a science-based nonprofit organization whose mission is *to conserve the lands and waters on which all life depends*. To support successful SGMA implementation that meets the future needs of people, the economy, and the environment, TNC has developed tools and resources (www.groundwaterresourcehub.org) intended to reduce costs, shorten timelines, and increase benefits for both people and nature.

Ukiah Valley Groundwater Basin
Groundwater Sustainable Agency

Review Form
Ukiah Valley Basin Groundwater Sustainability Plan

Dear Reviewer,

Per SGMA requirements, a Groundwater Sustainability Plan (GSP) is under development for the Ukiah Valley Groundwater Basin (UVBGSP). Ukiah Valley Basin Groundwater Sustainability Agency (UVBGSA) welcomes feedback on draft sections of the GSP by the broad interests and perspectives of the public.

REVIEWER INSTRUCTIONS:
Given the large number of reviewers, accommodating track changes or other editing options within the original draft sections distributed to all committee members can be challenging. As an alternative to tracked changes editing, please consider using this reviewer form with the following instructions:

- Use the form below to provide comments. Feel free to expand the form as needed.
- For suggested text changes, please copy and paste the text you wish to change and place your suggested edits in track changes or strikethrough features in this document. What is important is that technical staff can see *both* the original draft text and your distinct suggestions.
- Note the line number—from the ***PDF version*** of the draft GSP section—where your comment, question or suggested text edit begins.
- Examples of how to provide feedback are listed in the review form below. Feel free to delete these examples with your submission, and only include your feedback.

Please email comments directly to Amber Fisette (fisettea@mendocinocounty.org), with a Cc to Technical Consulting Team Lead Laura Foglia (lauraf@lwa.com). Please use the following file nomenclature in saving your review document:

UVBGSP_Public Review_[Your name]_date

Please send your comments no later than September 24, 2021.

Thanks for contributing to the draft GSP for the Ukiah Valley Groundwater Basin.

Ukiah Valley Groundwater Basin
Groundwater Sustainable Agency

Reviewer name: James Sullivan
Submission date: 9/24/2021
GSP sections reviewed: **GSP Public Draft and emphasis on Sections 3, Chapters 4 and 5.**

Line number	Suggested revision (*please delete example text below once you submit*)
General Comment	I appreciate the opportunity to comment upon the Draft UVGB GSP and ongoing effort the GSA is investing in the SGMA effort. I have reviewed the referenced document and have a general comment that applies to the entire GSP. The document does not emphasize enough the need for a substantial investment towards installation of strategically located surface and groundwater monitoring locations to fill data gaps. As stated within the GSP, the Ukiah Valley groundwater basin is not currently adequately monitored. The success and relevance of the GSA will depend upon early projects investigating areas needing immediate installation of additional monitoring infrastructure and acquisition of resulting monitoring results prior to implementation of many of the PMA's. More data will be necessary for implementing meaningful PMA projects to protect and improve the health of the UVB aquifer and connected hydrology.
Section 3, lines 631 thru 633	At this time the statement: "Chronic well outages are not expected in Ukiah Valley due to the lack of long-term overdraft and seasonal variation in water levels." cannot be supported given the lack of adequate spatial data supporting time series groundwater recharge rates and long-term groundwater water level monitoring data. Suggest such statements be avoided within the GSP without supporting data and evidence.
Section 3, lines 1945 - 1962	Suggest that this is where the GSA initial energy and efforts focus upon. This section is the "KEY" to the GSA's success in management of SGMA. Without a pathway to achieve measurable objectives, and understanding the ISW's all efforts will have limited meaningful results. As stated many times within the GSP, at this time the basin is not monitored adequately. Conclusions within the GSP of the "health" of the aquifer cannot be adequately supported, promoted or stated other than without an adequate monitoring network of groundwater and surface water gauging this basin will not be adequately characterized. Promoting that the basin is healthy at this time cannot be support, and should not be promoted other than more information is necessary. This section needs stronger language and specific areas proposed to improve knowledge of groundwater and surface water conditions and the importance of the need for additional Basin monitoring. The pathway to achieve measurable objectives starts with designing and implementing an adequate monitoring network, which includes ISW's. Strongly suggest the use of "may" be used less in this vision document and the action verb of "will" be used to demonstrate the commitment the GSA in this effort. Especially the last sentence in this section…The GSA ~~may~~ will identify knowledge requirements, seek funding and help to implement additional studies.
Chapter 4	General Comment: Without an integrated groundwater/surface water monitoring

network achieving the GSP sustainability goals are abstract and easily ignored. The GSA needs to know the science before it can propose the solutions. Chapter 4 is where the GSP should have a blueprint for the GSA to act upon. Increased monitoring (both quantity and quality) should be more specific throughout the document and not as general, as presented. Adequate monitoring networks and their results will be the driver for projects to reach SGMA goals. Chapter 4 needs to expand upon monitoring generalities to establish concrete goals in establishing an adequate monitoring network as the keystone project in which each of the GMP PMA's effort will be based upon. As an example, in Section 3 part 3.4.3 Minimum Thresholds-Chronic Lowering of Groundwater Levels (lines 672 and 673), continuous groundwater monitoring is proposed to gather information on an identified data gap in the identification of high and low seasonal groundwater levels…This level of detail should be included and expanded upon in Chapter 4 as an opportunity to specify tasks.

Ukiah Valley Groundwater Basin
Groundwater Sustainable Agency

Review Form
Ukiah Valley Basin Groundwater Sustainability Plan

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UVBGSP_Public Review_[Your name]_date

Please send your comments no later than September 24, 2021.

Thanks for contributing to the draft GSP for the Ukiah Valley Groundwater Basin.

Ukiah Valley Groundwater Basin
Groundwater Sustainable Agency

Reviewer name: Devon Jones, Mendocino County Farm Bureau
Submission date: September 24, 2021
GSP sections reviewed: **GSP Public Draft**

Line Number	Suggested revision (*please delete example text below once you submit*)
Chapter 5:	
Line 94: Is water use sector mean groundwater use type such as municipal, residential, agricultural, etc?	
Line 95: What is considered "general location" of a well? If the data is being aggregated by use sector, is the "volume" of extraction affiliated with the "general location"such as a map quadrant?	
Line 101: Total water use by water source type. Is this proposing to summarize a total surface water diversion quantity within the basin? This is duplicative with the existing SWRCB water rights reporting process.	
Line 265-266: this sentence speaks to a communication process. Section 5.1.3.1 discusses various entities the GSA will continue to coordinate with. Is the communication process from line 265 intended to represent coordination with overlying landowners in relation to groundwater resources? If not, perhaps an additional bullet point can be added under line 264 to discuss coordination with property owners affiliated with groundwater use.	
299-300: Point of clarity. Is there a limit on fee assessment increases related to SGMA GSP implementation by a GSA if the GSA is holding a sizeable general reserve?	
CHAPTER 4:	
Line 18-21: If a GSA management action leads to a change in water use timing, quantity, etc. for an agricultural operation there will most likely be a capital investment (or loss) made to react to the management action and/or related project.	
Line 85-87: Related to the comment on line 18-21, there could be significant costs related to compliance with the GSP for farmers and ranchers depending on various unknown variables at this time. Fallowing productive land or not using an existing well is not a choice that will be made lightly. If actions like these are suggested, there are multiple factors that the GSA will need to consider, including a way to reimburse for these losses.	
Figure 1, Box 4: How did the scenario of curtailing ag pumping come to fruition? Wouldn't more appropriate scenarios look at overall reduced pumping for all beneficial uses?	

Ukiah Valley Groundwater Basin
Groundwater Sustainable Agency

Table 2, P. 3: What are the current water sources for the Mendocino College and Ukiah High projects? It is helpful to know where the current water source is coming from to understand the related water reduction from the projects in Table 2.

Line 146: I don't believe there are any DWR or Bureau of Rec. projects in the basin. Is this reference needed?

211-213: Are there numbers associated with the portion of water rights holders that don't have reliable wells? Is this under natural conditions of curtailment action by the SWRCB in low water years?

258: Understanding that site location for Flood-Mar projects is part of the process, it is a good reminder that during wet years, there is an existing flood plain along the main stem Russian that is mostly in agricultural use for just that reason. There are management issues with existing conditions to work to minimize damage to vineyards, orchards or properties from flooding. Flood-Mar can be appropriate in certain location, but implementation will require substantial interaction with property owners/managers to understand the existing issues with flood damage to avoid adding additional impacts from these projects. Similar comments apply to **lines 396-403.**

277-278: There could be situations where agreements can be made with agricultural property owners in the basin to release water into tributaries from stored water resources. There have been successful projects in Sonoma County on tributaries for instream fishery purposes, but there is most likely an added benefit of some degree of recharge.

375: creating recharge basins in the upper main stem Russian River below Lake Mendocino would be a challenge. Is the river channel referenced here the West Fork?

388: Urban stormwater runoff already travels through existing agricultural field during high flows. The urban areas on the West side of Highway 101 discharge onto the ag properties on the East side of 101. One reminder to incorporate into these concepts with stormwater management is the amount of debris and other components that are flushed onto agricultural properties from urban runoff. Looking at ways to reduce this "run-on" onto agricultural properties is important.

428: Conservation easements come with various conservation terms or requirements. Farm Bureau does not like to see working lands taken out of production solely for a conservation purpose. Looking for ways to maintain a working landscape while concurrently achieving a conservation goal is preferred.

455: snow shade and accumulation are not an issue in this basin

462-463: any chance of river disconnection during low flow years is associated with overall water demand from ALL beneficial uses and not just irrigation. The wording," lessening the chance of river disconnection during critical dry periods" should be removed.

Also, urban irrigation efficiency improvement should be included in this section.

489: what is the definition of full-season irrigation?

496-498: Crop rotation can be a challenge. Mendocino County does not have the machinery and infrastructure related to harvesting a lot of the winter crops that would only be dependent on natural water supply.

499-502: Most irrigation in the basin is via under canopy sprinklers in orchards or drip in vineyards. The presence of using irrigation pivots is minimal on a small acreage of hay ground.

507-509: Farm Bureau does not support the conversion of working lands into solar farms.

516-540: The history of crop production in Mendocino County has revolved around "cash crops" such as hops, prunes, pears and now wine grapes. There is some degree of crop variation, but our rural location and distance from processing infrastructure is what has limited diversity. Our last prune orchard was removed when the last prune dryer in Sonoma County closed. The point is, that there may be several lower ET crops that could be grown in the county, but economically, would not be viable. Any alternative crop would also have to be machine harvestable since labor intensive crops are also not viable.

Continuing to encourage the removal of water intense landscaping in urban settings, such as lawns (private and municipal), should also be included in this section.

583: The SWRCB and regional water boards don't have jurisdiction over percolating ground water. Farm Bureau is concerned that under emergency orders seen in 2021, the SWRCB is looking to expand this jurisdiction. Local well owners may be willing to collaborate with the GSA, but not if there is a chance that the data provided is shared with all the other agencies listed.

595-600: there are assumptions being made that all groundwater is hydrologically connected in the basin and that reducing the use of wells by increasing the use of contract water will automatically reduce an assumed loss of surface water to groundwater. This statement seems overly broad.

Chapter 3

Line 136: "significant additional". The GSP will work to analyze the surface to groundwater interaction to avoid any significant streamflow depletion that is determined to be related to groundwater pumping. The word "additional" makes assumptions of current conditions that have yet to be determined. The word additional should be removed.

Ukiah Valley Groundwater Basin
Groundwater Sustainable Agency

175: How are potential future economic impacts to groundwater users accounted for within a GSP?

390: “rivers cease to flow”. Is this referencing the West Fork Russian River?

641-644: this section is a bit confusing. Is the term Rural Residential and Agricultural Residential? Are these non-commercial agricultural wells?

652-653: The reference to beneficial users and water rights holders doesn’t seem to fit in the description of environmental uses.

817: specifying land trusts and resource conservation agencies does not match the other sections that just list coordination with other agencies and stakeholders. The use of other agencies is more consistent.

825-826: What is meant by lack of available information concerning surface water diversion data? Is this data not available in the SWRCB water rights reporting system?

912: is this figure in development?

997: NCRWQCB basin plan for clarification.

1201: What is the definition of agricultural residential?

1341: are naturally occurring NOIs reported to the NCRWQCB?

1423: It is agreed that there is not a historical documentation of subsidence, however there are active faults in the basin. Is there consideration for tectonic action in the SGMA process for land subsidence or surface/groundwater interaction?

1498: Has it been determined that the entirety of the basin is interconnected to the mainstem Russian River? What divides the sections of the basin considered main stem versus tributary?

It is recommended to rephrase line 1498.

1560: … will ultimately be used to quantify POTENTIAL ISW depletions…..

1606-1607: again, what is the lack of historical and surface water diversion referring to? Is this in addition to the SWRCB water rights reporting records?

1629: What are the surface water diversion data gaps?

1752: this line seems to be a combination of two lines. Agricultural Land Uses and Users should be moved down.

1756: when releases from LAKE MENDOCINO

Figure 10: NOTE: The Fort Jones reference is not applicable.

Chapter 2

Table 4: Update director for tribal seat and name alternates

Table 6: Update tribal seat

Table 6: ag use/ private user under public water systems needs to be moved up for Levi Paulin under the TAC.

1498: Cannabis isn't an agricultural commodity. It is an agricultural product.

1597: since this section describes surface water resources, should the Potter Valley Project be mentioned perhaps on line 1608 as the water in the East Fork coming into the lake is connected to the Project? There is reference to the PVP on line 1657.

Table 16: The NMFS gauge on Robinson Creek may not still be operated by NMFS

Ukiah Valley Groundwater Basin
Groundwater Sustainable Agency

Reviewer name: Mike Webster
Submission date: 10/17/2021
GSP sections reviewed: **GSP Public Draft**

Line number	Suggested revision (*please delete example text below once you submit*)
1626-1627	USGS gage 11461000 is still operated by USGS and can be found at https://waterdata.usgs.gov/ca/nwis/current/?type=flow USGS gage 11462000 is now operated by an ACOE contractor. Data can be found at the California Data Exchange, CDEC, http://cdec.water.ca.gov/cdecstation/ , station ID: CDM.

Ukiah Valley Groundwater Basin
Groundwater Sustainable Agency

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
777 Sonoma Avenue, Room 325
Santa Rosa, California 95404-4731

September 17, 2021

Amber Fisette
Ukiah Valley Basin
Groundwater Sustainability Agency
501 Low Gap Road, Room 1010
Ukiah, California 95482

Re: NOAA's National Marine Fisheries Service's Comments and Recommendations on the Developing Groundwater Sustainability Plan for the Ukiah Valley Basin

Dear Ms. Fisette:

NOAA's National Marine Fisheries Service (NMFS) is the federal agency responsible for managing, conserving, and protecting living marine resources in inland, coastal, and offshore waters of the United States. We derive our mandates from numerous statutes, including the Federal Endangered Species Act (ESA). The purpose of the ESA is to conserve threatened and endangered species and their ecosystems.

The California Department of Water Resources (DWR) has designated the Ukiah Valley basin a "medium" priority for groundwater management, necessitating the development of a Groundwater Sustainability Plan (GSP) by January 2022, as required under California's Sustainable Groundwater Management Act of 2014 (SGMA). A draft GSP was released for public comment by the Ukiah Valley Groundwater Sustainability Agency (GSA) in August, 2021. Several waterways that overlie portions of the Ukiah Valley basin support federally threatened Central California Coast (CCC) steelhead (*Oncorhynchus mykiss*) and California Coastal (CC) Chinook salmon (*O. tshawytscha*). This letter transmits NMFS' comments concerning the draft GSP for the Ukiah Valley basin.

Surface water and groundwater are hydraulically linked in the Ukiah Valley basin, and this linkage is critically important in creating seasonal habitat for steelhead and salmon. Where the groundwater aquifer supplements streamflow, the influx of cold, clean water is critically important for maintaining water quality (e.g., temperature and dissolved oxygen) and flow volume. Pumping water from these aquifer-stream complexes has the potential to affect salmon and steelhead habitat by lowering groundwater levels and interrupting the hyporheic flow between the aquifer and stream. NMFS is concerned that groundwater extraction in the Ukiah Valley basin is currently impacting CCC steelhead and CC Chinook salmon instream habitat, and submits the following comments and recommendations to assist the GSA in adequately addressing those impacts.

Comment 1: Re: Chapter 3, line 684: Proposing groundwater elevations representing the "average of the three lowest (fall season) historical measurements on record for depth to groundwater taken during drought periods" as streamflow depletion minimum thresholds will likely not avoid significant impacts to ESA-listed salmonids and their habitat. Basic hydraulic principles

dictate that groundwater flow is proportional to the difference between groundwater elevations at different locations along a flow path. Using this basic principle, groundwater flow to a stream, or conversely seepage from a stream to the underlying aquifer, is proportional to the difference between water elevation in the stream and groundwater elevations at locations away from the stream. Minimum thresholds and measurable objectives consistent with the lowest groundwater elevations on record would likely create historically high streamflow depletion rates, resulting in instream conditions characterized by low surface flow input and high groundwater pumping that would be very likely to adversely affect ESA-listed salmonids and their critical habitat.

Recommendation: The GSA should explain how the proposed measurable objective, which represents groundwater levels just a few feet higher than the minimum thresholds, are likely sustainability within 20 years. If a lack of data prevents the development of appropriate sustainable management criteria, the GSA should design and implement studies that better inform appropriate minimum thresholds and measurable objectives for streamflow depletion. In that circumstance, we again suggest the GSA follow guidance by the California Department of Fish and Wildlife that recommends conservative sustainability management criteria be established to ensure groundwater dependent ecosystem protection (CDFW 2019).

Comment 2: Re: Chapter 3, line 810: Comparing impact levels expected under the proposed minimum thresholds "to Fall 2015" is inappropriate for the reasons stated above (Fall 2015 coincides with the depths of California's historical drought). Furthermore, asserting that the "GSA and its technical advisory committee found that MTs are sufficiently protective of GDEs in the basin" offers little reasoned explanation as to how those minimum thresholds avoid the undesirable result of streamflow depletion (i.e., causing significant and unreasonable impacts to surface water beneficial uses). Were there specific analysis or past monitoring results that informed this determination? If so, the GSA should include this information in the draft GSP.

Recommendation: We recommend the GSA adequately address the following requirement for minimum thresholds as spelled out in the SGMA regulations as follows:

> "The relationship between the minimum thresholds for each sustainability indicator, including an explanation of how the Agency has determined that basin conditions at each minimum threshold will avoid undesirable results for each of the sustainability indicators." (CCR 23 §354.28(b)(2)

According to DWR (2021), "it is up to GSAs to define in their GSPs the specific significant and unreasonable effects that would constitute undesirable results and to define the groundwater conditions that would produce those results in their basins." The GSA should qualitatively describe what conditions within the subbasin would constitute an undesirable result with regard to streamflow depletion, ensuring that the description accounts for beneficial uses of surface water that support ESA-listed salmon and steelhead.

Comment 3: Re: Chapter 3, line 836: The plan states the following:

> "Through discussions with the GSA Board, technical advisory committee, stakeholder groups, and the public, and considering the analysis conducted on impacts on other beneficial users and uses in the basin, it was determined

> that impacts on ISWs and other beneficial uses and users such as shallow domestic wells during the recent drought (2012-2016) was considerable but not unreasonable. Therefore, since groundwater level MTs are set equal or very close to the groundwater levels experienced during the recent drought, impacts on ISWs are expected not to be significant and unreasonable during the first 5 to 10 years of the implementation."

Recommendation: The GSA should fully explain what reasoning and rationale was used to conclude that stream depletion impacts to surface water beneficial uses during California's historic drought were "considerable but not unreasonable." Designated beneficial uses within upper Russian River watershed include migration of aquatic organisms; spawning, reproduction, and/or early development; and cold freshwater habitat.[1] As noted earlier, during a historic drought, groundwater levels are likely the lowest they've ever been, meaning that streamflow depletion rates were likely the highest they've ever been. Additionally, surface water base-flows are naturally at their lowest during a drought, meaning that streamflow depletion impacts from groundwater pumping are likely accentuated as compared to other water year types. Given the above reasoning, the conclusion reached by the GSA that these acknowledged "considerable" impacts are not unreasonable strains credulity, and would benefit from further explanation. We recommend any further explanation be based upon hydrogeologic and ecological principles and reasoning, where available.

Comment 4: Chapter 3 line 1507, Section 3.9.1 Depletion of Interconnected Surface Waters Monitoring Network:

Regarding Figure 9: Depletion of interconnected surface waters monitoring network. NMFS is concerned that the monitoring network proposed may not be sufficient to detect changes in surface flow in tributary streams within the GSA. Many westside tributaries such as Orrs, Gibson, Doolin, Robinson creeks and others provide habitat for CCC steelhead. These tributaries typically dry in the low-gradient reaches of the valley floor during the spring and summer depending on the water-year. Detecting impacts from groundwater extraction to these tributary streams is extremely important because specific life-stage survival of ESA listed salmonids may be affected. Stream monitoring should have the ability to detect relatively small changes (tenths of feet) in stage elevation and flow that could impact survival of newly emerged steelhead fry from stream gravels. The fry lifestage is particularly sensitive to stages changes due to their preference to stream margins where they can become stranded or beached with small changes in stage elevation.

Other potential impacts in these tributary streams are associated with reduction of migration opportunity and habitat availability for various lifestages of juvenile steelhead attempting to access the mainstem Russian River or rear in upstream areas that provide summer refuge habitat. Reduction in stage elevation or loss of surface flow from groundwater extraction could reduce the number of days/opportunity for juveniles to migrate downstream into the Russian River, or upstream into higher gradient reaches that maintain surface flows during the summer months. Extraction may also affect available wetted habitat available in specific tributary reaches that are critical for survival during the summer months.

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[1] https://www.waterboards.ca.gov/northcoast/water_issues/programs/basin_plan/180710/BPChapter2BeneficialUses.pdf

Recommendation: The monitoring of interconnected streamflow should be implemented to detect "signals" in stage and flow changes from extraction. Specific high risk tributary reaches should be monitored in the spring and summer to determine if groundwater extraction has adversely affected ESA listed species or their habitat. Improving the number of monitoring well sites and stream gauges along high risk tributary reaches is recommended.

Finally, we offer these general comments and recommendation for future projects and management actions:

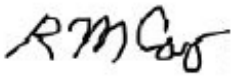
- We suspect that groundwater recharge projects are likely to be an important action implemented as part of the effort to achieve groundwater sustainability in the Ukiah Valley basin. NMFS encourages the GSA to consider implementing recharge projects that facilitate floodplain inundation, offering multiple benefits including downstream flood attenuation, groundwater recharge, and ecosystem restoration.

- Managed floodplain inundation can recharge floodplain aquifers, which in turn slowly release stored water back to the stream during summer months. These projects also reconnect the stream channel with floodplain habitat, which can benefit juvenile salmon, steelhead, and sturgeon by creating off-channel habitat characterized by slow water velocities, ample cover in the form of submerged vegetation, and high food availability.

- As an added bonus, these types of multi-benefit projects likely have more diverse grant funding that can lower their cost as compared to traditional off-channel recharge projects. NMFS stands ready to work with any GSA interested in designing and implementing floodplain recharge projects.

If you have any questions or concerns regarding this letter, please contact Rick Rogers at 707-578-8552 (rick.rogers@noaa.gov) or Tom Daugherty at tom.daugherty@noaa.gov).

Sincerely,



Robert Coey
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Dominic Gutierrez, Ukiah Valley basin SGMA Point of Contact, California Department of Water Resources (Dominic.Gutierrez@water.ca.gov)

References

California Department of Fish and Wildlife. 2019. Fish & Wildlife Groundwater Planning Considerations. California Department of Fish and Wildlife, Groundwater Program. June 2019. 28 pp. Available at: https://cawaterlibrary.net/document/fish-wildlife-groundwater-planning-considerations/

California Department of Water Resources. 2021. Letter from Craig Altare to Taylor Blakslee, re: Cuyama Valley - 2020 Groundwater Sustainability Plan. Available at: https://sgma.water.ca.gov/portal/gsp/assessments/32

September 24, 2021

Ukiah Valley Basin Groundwater Sustainability Agency
Mendocino County
501 Low Gap Road
Ukiah, CA 95482

Submitted via email to: fisettea@mendocinocounty.org; lauraf@lwa.com

RE: GSP for the Ukiah Valley Groundwater Basin

Amber Fisette,

On behalf of Russian Riverkeeper (RRK), I welcome the opportunity to submit these comments for the "Ukiah Valley Groundwater Basin GSP." Russian Riverkeeper is a local nonprofit that has been successfully protecting the Russian River watershed since 1993. Through public education, scientific research and expert advocacy, RRK has actively pursued conservation and protection for the River's mainstem, tributaries, and watershed. Our mission is to inspire the community to protect their River home, and to provide them with the tools and guiding framework necessary to do so. For that reason, we submit the following comments.

I. Primary Concerns

We appreciate the efforts of the Groundwater Sustainability Agency (GSA) to prepare this GSP. We recognize that GSPs are complicated and resource intensive to develop. Given that SGMA is based on local control and adaptive management, we offer our comments in an effort to ensure that local control is inclusive and that adaptive management prioritizes improvements in areas of concern to disadvantaged communities and environmental beneficial users.

A. Climate Change

Climate change is here in the Russian River watershed, and the impacts are only going to become more stark as we continue forward. The current dry period we are in has reduced our local surface waters to a mere 16% of Lake Mendocino's water supply pool and have tied the current storage level with the lowest water storage level ever over the course of just two summers. We are already in a far worse state than we were during the most recent 2012-2016 dry period, and that one lasted five years—we are only now entering into year three of a possible five or more years.

It is during these dry periods when users are faced with curtailments and other surface water shortages, that individuals, communities, local governments, and agriculture all turn to groundwater pumping as a replacement water source. This turn to groundwater pumping then increases the rates of depletion in the aquifer and in many areas, also causes further depletion of our local surface waters in the Russian River and its tributaries. As dry periods extend, groundwater pumping will continue with fewer and fewer opportunities for natural recharge to help replenish those losses. This results in harm to a multitude of beneficial uses like COLD habitat for our endangered salmon species and REC by further reducing depleted surface flows.

The Russian River alternates between a losing and gaining river throughout the year and surface water species are heavily reliant on those gaining periods, especially in dry periods, to provide necessary cold water flows to the river. As groundwater pumping increases to accommodate for surface water losses, the Russian River will lose these key "gaining periods" that are vital to extending the health of our endangered species and the impacts could be disastrous.

In turn, this means that as groundwater pumping increases and the aquifer reduces, the Russian River will likely become a "losing river" more often than not. With even less surface waters available for capture, the GSPs plan to capture surface waters to recharge the aquifers becomes even more limited. Beyond what the river recharges naturally through these "losing periods," excess surface waters available for recharge will be more limited. Though impacts may appear negligible to date, there does appear to be a downward trend and that trend is only growing to grow as our region continues to come to terms with living in a drier and hotter climate.

Combined with reduced annual precipitation, hotter weather, increased evapotranspiration rates, and more extreme atmospheric weather events where there is more sheet flooding than ground percolation, surface waters are going to be far more scarce than historically. This will significantly impact all abilities and plans to recharge aquifers, capture surface waters, and otherwise increase supply. Even in other medium priority basins these impacts are already being felt, such that groundwater wells are going dry and both domestic and agricultural taps are empty.[1] The Ukiah Basin will not be the exception to these impacts and the GSP must adequately consider all of the impacts of climate change so that the groundwater basin is sustainable 20 and 50 years out. As of right now there is insufficient evidence, support, and consideration for the impacts of climate change on the Ukiah Valley Groundwater Basin.

B. Water Use & Demand

The GSP currently puts a very heavy emphasis on surface water supply augmentation as opposed to demand reduction. There is also very little discussion of groundwater, groundwater use, and groundwater supply itself as part of the proposed mitigation projects.

While true one of the most promising approaches to increase supply is to expand groundwater recharge, climate change is likely to significantly reduce that ability compared to what might have been thought possible even five or ten years ago when SGMA was first being put together.

When it comes to recharge, all water users will be competing for any floodwaters and rain that can be feasibly captured—likely a much smaller volume than what is expected in these plans. Then depending on what that volume turns out to be, there are also going to be physical constraints in what can actually be captured for recharge. Between existing storage limits and then transport constraints between those storage areas to the ideal recharge locations, there are some significant and costly hurdles that must be overcome. For example, it is likely that substantial regional investments in conveyance and greater efforts to coordinate the management of surface and groundwater storage infrastructure will be required in order to expand their combined impact. By time these infrastructural pieces are in place to facilitate recharge efforts,

[1] https://calmatters.org/environment/2021/08/california-groundwater-dry/?utm_id=36094&sfmc_id=2382513

available surface waters and precipitation will have likely reduced even further away from the historical averages relied on in this GSP. In order for the GSP to rely on recharge and supply augmentation to such a great extent, the factors and obstacles noted above must be given more consideration and details provided on how those factors will be achieved. There must also be a showing that these substantial projects will be completed on a timeline that ensures sustainability within the Basin and in compliance with SGMA.

In addition to the above constraints to achieving groundwater recharge, climate change is also going to increase the amount of tension among other water users within the Basin with each competing to capture any high flow events for their own storage and use. This is going to further constrain the water volume available for recharge and supply augmentation, and needs to be included in any analysis that is done. Future impacts of climate change are likely to throw off projections within this GSP and will negatively impact the GSPs ability to achieve sustainability.

Due to the increasing issues surrounding future supply replenishment, it is vital that demand reductions be fully considered and given a higher priority throughout this GSP. To date, groundwater pumping has been allowed to continue unimpeded such that the GSA does not know how many groundwater wells are active within the Basin, nor how much water is pumped, how that amount changes across the seasons, or where all the wells are even located. Without any of this data it is impossible for the GSP to tackle the demand side of things and it is a necessary and vital component to achieving lasting sustainability. Monitoring and reporting data to obtain this key information must be given priority—in both time and funding.

Demand reduction methods that need to be considered include the feasibility of land fallowing, increased urban conservation, pumping restrictions through local government policies, fees for groundwater pumping, and irrigation reductions. The timeline for implementing such measures may not need to be immediate, but the GSP needs to properly allocate time and funding to determine the feasibility and beneficial impacts of demand reduction in order for the Ukiah Basin to actually obtain long-term sustainability. Without demand reduction and knowledge of how groundwater is used, the Ukiah Basin will not obtain long-term sustainability. Analysis of demand management must occur within this initial five year period so that later decisions are well-informed.

C. Surface-Groundwater Interface

Throughout the Ukiah Basin, groundwater and surface water are linked hydraulically. Where the groundwater aquifer supplements streamflow, the influx of cold, clean water is critically important for maintaining temperature and flow volume, and can comprise a significant percentage of surface flow during the summer dry season. Pumping from these aquifer-stream complexes can adversely affect juvenile salmon and steelhead habitat by lowering groundwater levels and interrupting the natural flow between the aquifer and stream, which degrades water quality and diminishes streamflow. Groundwater extraction has the potential and may be compromising endangered salmon instream habitat, and must be given more attention in the form of specific details on addressing data gaps, timeline on obtaining necessary data, and funding allocated to closing this data gap.

The GSP currently states that additional studies are needed to confirm past modeling on the surface-groundwater interchange, but then also appears to rely on that interchange for justifying the water budget and recharge assumptions. It cannot be both ways if the GSP wants to rely on this interchange for things that benefit certain stakeholder interests, but then say more information is needed when it does not benefit those same stakeholders.

The GSP must give further detail in how this interchange is going to be impacted by climate change and present a timeline for closing any existing data gaps. Funding for collecting this information must be made a priority and a detailed timeline should be provided. Details also need to be provided on mitigation measures and what conditions will trigger those measures, especially during dry periods with severely reduced precipitation—for instance pumping restrictions and moratoriums on new groundwater wells near interconnected surface waters when certain thresholds are exceeded in extended dry periods. There also needs to be analysis and consideration for how groundwater pumping may impact water rights in light of this surface-groundwater interchange.

Specifically, SGMA regulations identify the need for an adequate monitoring network to help characterize the surface and groundwater interface throughout the Basin, and allow for evaluation of changes over times. [CCR 23 § 354.32]. The regulations specifically require that "The monitoring network objectives shall be implemented to ... Monitor impacts to the beneficial uses or users of groundwater" [CCR 23 § 354.34(b)(2)]. Moreover, the regulations require GSPs to identify data gaps where the network "does not contain a sufficient number of monitoring sites, does not monitor sites at a sufficient frequency, or utilizes monitoring sites that are unreliable, including those that do not satisfy minimum standards of the monitoring network adopted by the Agency" [CCR 23 § 354.38(b)]. This monitoring network will also be key to determining what sustainable yields truly are, as it is currently possible to have overly inflated yield determinations which will only harm the Basin going forward.

Lastly, by the time of the 5-year update, the GSP should demonstrate whether "groundwater extractions result in significant depletions of interconnected surface waters" (CWC § 10735.2.(a)(5)(B)(ii)). To define significant depletions, beneficial users of surface water should be identified and considered in development of and reporting on sustainable management criteria.

D. Funding

There do not appear to be any clear plans for obtaining funding for PMPs, addressing data gaps, or ensuring that no undesirable results present. No timeline for applying for grants or initiating fees; no details on amounts or priority allocation for funds. Without funding and identification of priority projects to which detailed timelines can be applied, the GSP is without legs to stand on in regards to obtaining long term sustainability.

E. Data

There are frequent references in the GSP to data gaps, but there does not appear to be a clear path to closing those data gaps—especially in regards to the surface-groundwater interchange and