Preliminary Sustainable Management Criteria Report

Ukiah Valley Groundwater Basin Initial Groundwater Sustainability Plan
Mendocino County Water Agency DWR Grant No. 4600011503

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Mendocino County Water Agency

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1.0 INTRODUCTION

This Preliminary Sustainable Management Criteria Report (Report) has been prepared for the Ukiah Valley Groundwater Basin (UVGB) based on the requirements listed in the Emergency Sustainable Groundwater Management Act (SGMA) Regulations Chapter 1.5, Article 5, Subarticle 3: § 354.22 – 354.30 (DWR, 2014) (Appendix 1). Preparation of an Initial Groundwater Sustainability Plan (IGSP) for the UVGB was funded by the California Department of Water Resources (DWR). The information provided in this Report will be used by the UVGB Groundwater Sustainability Agency (GSA) to assist in the development of a Groundwater Sustainability Plan (GSP).

The regulatory requirements listed in §354.22 – §354.30 mandate the development of minimum numeric thresholds, interim milestones, measurable objectives, and a sustainability goal for the basin as a part of the Groundwater Sustainability Plan (GSP). Per the SGMA regulations:

- *"Minimum threshold" refers to a numeric value for each sustainability indicator used to define undesirable results.*
- *"Interim milestone" refers to a target value representing measurable groundwater conditions, in increments of five years, set by an Agency as part of a Plan.*
- *"Measurable objectives" refer to specific, quantifiable goals for the maintenance or improvement of specified groundwater conditions that have been included in an adopted Plan to achieve the sustainability goal for the basin.*
- *"Sustainability indicator" refers to any of the effects caused by groundwater conditions occurring throughout the basin that, when significant and unreasonable, cause undesirable results, as described in Water Code Section 10721(x).*

Government Code, §11345.5, subd. (a)(4), from the Finding of Emergency Government Code Gov. Code, §11346.1, subd. (b); Cal. Code Regs., tit.1, §50 (California Code of Regulations, 2016) states:

> *SGMA provides a framework for long-term sustainable groundwater management throughout California. Under SGMA, local agencies in medium and high priority groundwater basins will form GSAs that prepare and implement local GSPs. The Department's tasks under SGMA include:*
>
> *(1) Developing regulations to revise groundwater basin boundaries [these regulations became effective in November 2015];*
> *(2) Adopting regulations for evaluating and implementing GSPs and coordinating agreements;*
> *(3) Identifying basins subject to critical conditions of overdraft;*
> *(4) Identifying water available for groundwater replenishment; and*
> *(5) Publishing best management practices for the sustainable management of groundwater.*

2.0 UNDESIRABLE RESULTS

Undesirable results are defined to occur when significant and unreasonable effects are caused by groundwater conditions occurring throughout the basin. A description of undesirable results include: to cause conditions which lead to (or have led to) undesirable groundwater conditions, criteria used to define when and where the effects of the groundwater conditions cause undesirable results, and the potential effects on the beneficial uses and users of groundwater as they apply to land use, property interests, and other potential effects that may occur or are occurring from undesirable results. The UVGB GSA may need to evaluate multiple scenarios on multiple monitoring sites, based on the distribution of undesirable

conditions throughout the UVGB, to determine whether an undesirable result is occurring in the basin as a whole (DWR, 2014).

The determination of undesirable results is based on sustainability indicators, which have minimum thresholds and measurable objectives which are defined in the Emergency SGMA Regulations Chapter 1.5, Article 5, Subarticle 3. Sustainability indicators are any effects caused by groundwater conditions occurring throughout the basin, that when significant and unreasonable, will cause undesirable results. Minimum thresholds are defined as a numeric value for which a measurable quantification of each sustainability indicator shall not surpass. Measurable objectives are defined as goals to sustainably manage the groundwater basin by implementing the GSP, and can be measured with the same metrics as the minimum thresholds (DWR, 2014). Interim milestones, which occur every five years, will be determined with the same metrics as the measurable objectives, and culminate to the sustainability goal at the end of 20 years.

2.1 Chronic Lowering of Groundwater Levels

Chronic lowering of groundwater levels indicates a significant and unreasonable depletion of groundwater storage if continued beyond the passage of SGMA in 2014. Overdraft during a period of drought is not sufficient to establish a chronic lowering of groundwater levels if extractions and recharge are managed as necessary to ensure that reductions in groundwater levels or storage during a period of drought are offset by increases in groundwater levels or storage during other periods.

2.2 Reduction of Groundwater Storage

Reduction of groundwater storage is associated with multiple other sustainability indicators. Overdraft of groundwater can lead to land subsidence or saltwater intrusion, both of which reduce the available space in aquifers to store groundwater by reduction of aquifer size and displacement of freshwater with saltwater, respectively.

2.3 Saltwater Intrusion

Saltwater intrusion is a concern for groundwater basins near the coast. The saltwater proceeds to intrude into the aquifer if there is not enough pressure from the freshwater currently in the aquifer to create a barrier (***Exhibit 1***).

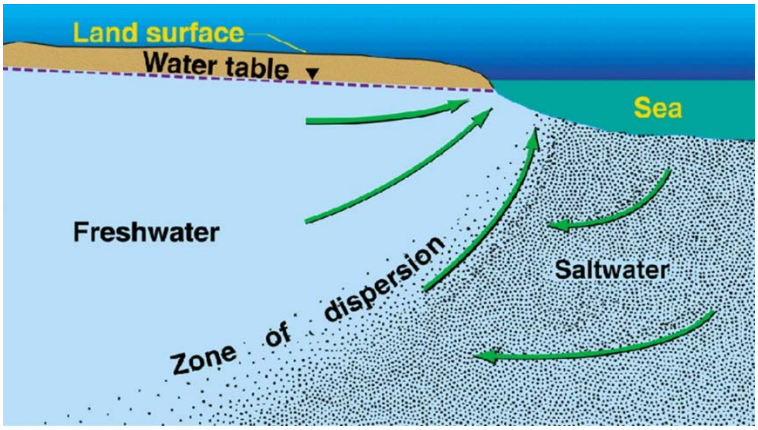

Exhibit 1. Seawater Intrusion

2.4 Degraded Water Quality

Significant and unreasonable degraded water quality, including the migration of contaminant plumes that impair water supplies, indicates health hazards and reduced water supplies (***Exhibit 2***).

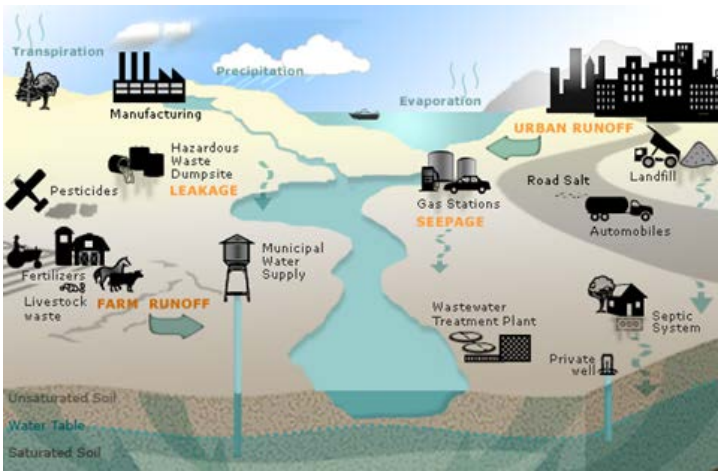

Exhibit 2. Sources of Groundwater Contamination

Within the UVGB, there are eight active Leaking Underground Storage Tanks (LUST) cleanup sites, all of which may have contributed to contamination of an aquifer used for drinking water supply. The LUST cleanup sites were located throughout the UVGB: two in Redwood Valley and six in Ukiah. Additionally, there are 21 active cleanup program sites, with 7 of them affecting aquifers used for drinking water supply: 1 in Redwood Valley, 4 in Calpella, 2 in The Forks, and 14 in Ukiah. The main contaminants, found at a majority of the cleanup sites, are gasoline and diesel. Other contaminants that may affect groundwater supply include toluene, waste oil, benzene, xylene, MTBE/TBA/fuel oxygenates, TCA/PAH/PCE, hydrocarbons, arsenic, chromium, and copper (Geotracker, 2017).

2.5 Land Subsidence

Significant and unreasonable land subsidence substantially interferes with surface land uses (*Exhibit 3).*

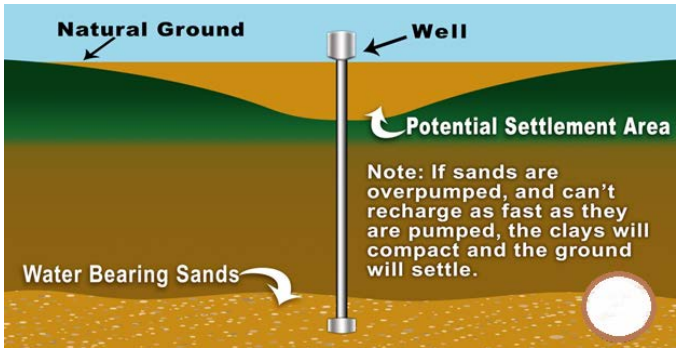

Exhibit 3. Land Subsidence.

2.6 Surface Water Depletions

Depletions of interconnected surface water have significant and unreasonable adverse impacts on beneficial uses of the surface water. Interconnected surface water refers to 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.

2.7 Summary

Rates of extraction are not exceeding recharge rates and are within reasonable yields, having remained steady since the 1960s (Mendocino County Water Agency, 2010). Local degradation of groundwater quality has been documented, with high boron concentrations have been recorded in several areas along the edges of the Ukiah Valley and in the north end of Redwood Valley (DWR, 2004). Additionally, flammable gas was reported in one well on the west side of UVGB (Cardwell 1965). While some local degradation of groundwater is present within the basin, the overall quality of water is considered sustainable and safe. The aforementioned areas would be considered minor indicators of water quality and do not meet the qualifications of significant or unreasonable. Land subsidence is not a significant effect in the UVGB because there is no chronic lowering of groundwater levels. Table 1 provides a summary of existing conditions of the undesirable results.

Table 1. Summary of Existing Conditions

Groundwater Sustainability Indicator	Existing Condition
Chronic Lowering of Groundwater Levels	Not present
Reduction of Storage	Not present based on previous studies from G.T. Cardwell (1965), C.D. Farrar (1986), Marquez (2015), and LACO Associates (2017)
Seawater Intrusion	Not applicable, only applicable for basins adjacent to the Pacific Ocean, bays, deltas, or inlets
Degraded Water Quality	No point source Impacts to Groundwater Wells. Nonpoint source impacts need evaluation
Land Subsidence	Not present because there is not chronic lowering of groundwater levels.
Interconnected Surface Water Depletion	Data gaps pertaining to surface water-groundwater interaction must be filled in order to document existing conditions.

3.0 MINIMUM THRESHOLDS

Undesirable results related to one or more sustainability indicators are not present within the UVGB, so minimum threshold definitions and values are not required. Minimum threshold values are determined for the applicable sustainability indicators as preventative action measures in implementation of the GSP.

3.1 Minimum Threshold Definitions

3.1.1 Chronic Lowering of Groundwater Levels

The minimum threshold for chronic lowering of groundwater levels shall be the groundwater elevation or head indicating a depletion of supply at a given location that may lead to undesirable results. The minimum threshold for chronic lowering of groundwater levels shall be supported with: (1) the rate of groundwater level decline based on historical trends, comparison between annual yield and historical average annual yield, and project water use; and (2) potential effects on other sustainability indicators.

3.1.2 Reduction of Groundwater Storage

The minimum threshold for reduction of groundwater storage shall be a total volume of groundwater that can be withdrawn from the basin without causing conditions that may lead to undesirable results.

3.1.3 Seawater Intrusion

Seawater intrusion is not applicable to the UVGB, so there is not a minimum threshold established.

3.1.4 Degraded Water Quality

The minimum threshold for degraded water quality shall be the degradation of water quality, including the migration of contaminant plumes into water supply sources or other indicators of water quality, which may lead to undesirable results. The minimum threshold for degraded water quality is based on the number of supply wells, a volume of water, or a location of an isocontour that exceeds concentrations of predetermined constituents of concern. Local, state, and federal water quality standards will be taken into consideration as applicable.

3.1.5 Land Subsidence

The minimum threshold for land subsidence shall be the rate and extent of subsidence that substantially interferes with surface land uses and reduces aquifer storage, leading to undesirable results. The minimum thresholds for land subsidence shall be supported by: (1) identification of land uses and property interests affected by land subsidence and the rationale of decisions made; and (2) maps and graphs showing the areas and extent of subsidence.

3.1.6 Interconnected Surface Water Depletion

Based on the SGMA regulations, the minimum threshold for interconnected surface water depletion shall be the 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 minimum threshold for interconnected surface water depletion shall be supported by: (1) the location, quantity, and timing of depletions of interconnected surface water; and (2) descriptions of the groundwater and surface water model used to quantify surface water depletion (DWR, 2014).

UVGB groundwater discharge occurs through seepage to the Russian River and tributaries, discharge to springs, evapotranspiration, underflow out of the valley, and well usage. A large portion of the discharge flows to streams. Discharge to channels is highest during spring and late winter and lowest in the summer. Much of the water at the southern end of the valley is discharged to the Russian River from constriction of the alluvial valley due to a small cross sectional area of permeable deposits where the valley narrows (G.T. Cardwell, 1965).

Surface water-groundwater interaction was described in a report characterizing the UVGB by UC Davis' Water Management Lab in June 2017. Based on the surface water budget, the Russian River gains groundwater from November to June, averaging a gain of 18,952 acre-feet per year, and loses surface water from July to October, averaging a loss of 393 acre-feet per year. The total average net gain of the Russian River over the course of a year is roughly 18,560 acre-feet. Surface water depletion was determined to not have an undesirable result in the UVGB (Marquez et al. 2017).

The results of the Preliminary Water Budget Study, prepared by LACO Associates in December 2017, average groundwater flow to surface water was estimated to be 136 acre-feet per month and 20,000 acre-feet of groundwater was estimated to flow to surface water over the three-year study period from 2014 to 2016 (LACO Associates, 2017).

Groundwater and surface water are often hydraulically connected in alluvial valleys. Water flows back and forth through the streambed depending on the hydraulic gradient between the two systems. Groundwater flows into a gaining stream when the hydraulic head elevation is greater than the adjacent stream stage, and groundwater flows out of a losing stream when the stream stage is greater than the adjacent hydraulic head (Exhibit4).

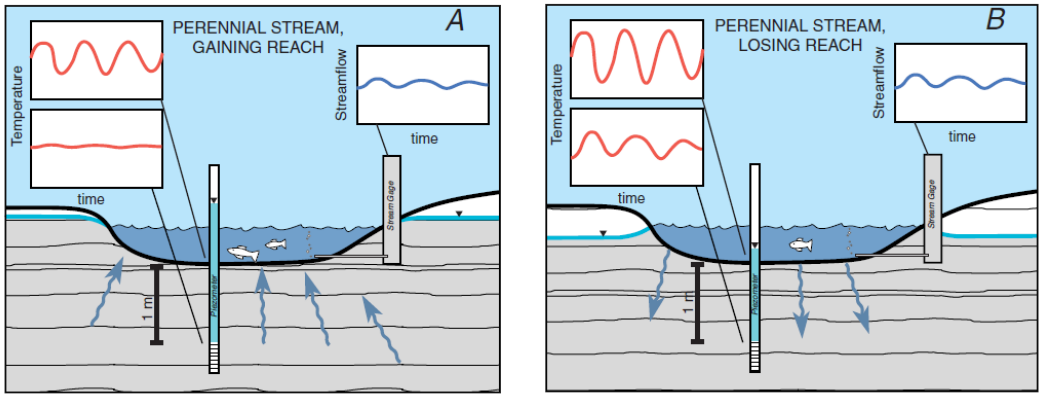

Exhibit 4. Gaining Streams versus Losing Streams (USGS, 2003)

Gaining and losing conditions may occur in the same stream segment at different times, or for stream segments that are in close proximity to each other at the same time. Cool groundwater discharge to

streams and rivers as baseflow is important in maintaining quality fisheries and wildlife habitat. Groundwater pumping either captures groundwater that would contribute to surface water flows or affects the rate at which surface water recharge groundwater systems. Gravels, sands, and clays are present in the regions along the Russian River in the UVGB, and the effect of pumping is a function of the distance between the well and the river, well depth and well screen intervals, and the presence of high permeability subsurface strata like boulders, cobbles, gravels, and sands. Groundwater extraction from deeper wells is likely to have less impact on surface water flows when clay layers are present.

Minimum thresholds should be implemented based on the direction of the flow gradient between surface water and groundwater. The quantitative metric values are not proposed because the GSA and technical advisory committee (TAC) need to debate and select the timing and value of minimum thresholds. An example of a four-tier threshold system is provided.

- **Tier 1**: When groundwater discharge to surface water is not affected, take no action.
- **Tier 2**: When groundwater discharge to surface water is decreased, initiate a monitoring protocol to ensure that undesirable results do not take place.
- **Tier 3**: When groundwater levels are equal to surface water levels, decrease pumping to ensure that they do not cause groundwater levels to become less than surface water levels.
- **Tier 4**: When groundwater levels are below surface water levels, stop pumping until Tier 2 conditions resume.

3.1.7 Summary

The sustainability indicators have minimum thresholds which UVGB conditions must satisfy to avoid undesirable results (Table 2). The GSA and TAC will debate and select values for the minimum thresholds. The chronic lowering of groundwater levels indicator requires that the groundwater head must remain at or above a quantified level over a period of time to be selected by the GSA and the TAC. Reduction of storage requires the volume of groundwater withdrawn from the UVGB to remain at or below a quantified volume. Seawater intrusion is not applicable to the UVGB, so it does not have a minimum threshold. Degraded water quality requires the number of wells that exceed a specified contaminant concentration to remain below a threshold amount. The land subsidence indicator requires that the rate and the extent of subsidence remain at or below a quantified amount. The interconnected surface water depletion indicator requires that the flux of the water into the surface water remain at or above a quantified amount. Surface water-groundwater flux values can be estimated using hydraulic head measurements in monitoring wells coupled with streamflow gauges placed in adjacent tributaries or the Russian River. Fluxes can also be estimated using a groundwater flow model that is calibrated to hydraulic head measurements in groundwater monitoring wells and streamflow gauge data.

Table 2. Minimum Thresholds for Sustainability Indicators

Sustainability Indicator	Minimum Threshold Unit
Chronic Lowering of Groundwater Levels	Head
Reduction of Storage	Volume withdrawn
Seawater Intrusion	-
Degraded Water Quality	No. of wells exceeding contaminant concentration
Land Subsidence	Rate of subsidence + Extent of subsidence
Interconnected Surface Water Depletion	Flux between surface and groundwater

3.2 Quantifying Minimum Threshold Values

Minimum threshold values are determined for all sustainable indicators for preventative action. The UVGB will be monitored to check that these indicators remain at a desirable condition. The GSA and TAC will establish values for the minimum thresholds.

4.0 MEASURABLE OBJECTIVES

Specific, quantifiable goals for the maintenance or improvement of specified groundwater conditions are included in the GSP to achieve the sustainability goal for the basin. Interim milestones must be defined in five-year increments at each representative monitoring site using the same metrics as the measurable objective. Interim milestones must be coordinated with projects and management actions proposed by the GSA to achieve the sustainability goal. The schedule for implementing projects and management actions will influence how rapidly the interim milestones approach measurable objectives and therefore approach the sustainability goal.

Each interim milestone, the conditions in the UVGB must be quantified to check that the minimum thresholds are satisfied and to track the progress of the groundwater basin toward the measurable objectives (Exhibit 5). Measurable objectives must provide flexibility to accommodate adverse conditions like drought, seasonal and long-term trends, and climate change.

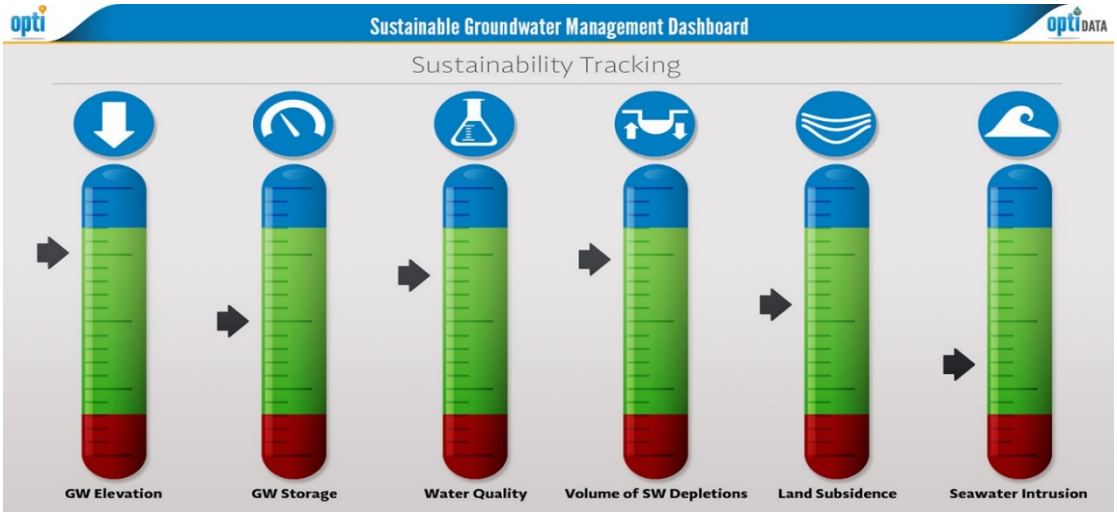

Exhibit 5. Sustainability Tracking Diagram with Measurable Objectives (Blue) and Minimum Thresholds (Red)

5.0 SUSTAINABILITY GOAL

The recommended sustainability goal based on LACO's understanding of economic and environmental conditions is: adaptively manage groundwater resources to provide sustainable water supply for future economic expansion, changes in land use, and baseflow for surface water that maintains groundwater dependent ecosystems by taking a forward-looking approach that is evolutionary resilient to variability in climate and imported water. It should be noted that most of the sustainability goal can only be finalized after minimum thresholds and undesirable results have been defined, projects and management actions

have been identified, and the projected impact of those projects and management actions on groundwater conditions have been evaluated.

6.0 ACTION PLAN

6.1 Recommended Projects

Projects recommended during the development and implementation of the GSP are related to filing data gaps and obtaining the necessary data to quantify surface water-groundwater interaction fluxes and generally include aquifer characterization and expansion of monitoring networks. The following are proposed for consideration by the GSA and the TAC:

- Use the groundwater model calibration system to identify areas and parameters that are sensitive to data gaps and areas that do not have a significant effect on model results.
- Install coupled streamflow gauges and groundwater monitoring wells on tributaries and the Russian River to calibrate the groundwater flow model and provide hydraulic head measurements to compare to streamflow stage in areas that have high sensitivity during the model calibration process.
- Enhance the understanding of hydrogeologic properties related to specific storage and specific yield by conducting pump tests with monitoring wells in the different hydrogeologic formations in areas that are sensitive to groundwater model results.

6.2 Recommended Actions

- Work with GSA and TAC to establish management areas within the basin for which the GSP identifies different minimum thresholds, measurable objectives, monitoring, or projects and management actions based on differences in water use sector, water source type, geology, aquifer characteristics, or other factors.
- Work with GSA and TAC to establish numeric values for minimum thresholds, measurable objectives, and interim milestones.
- Prepare a final GSP and implement necessary regulations to maintain stability over the SGMA planning horizon.

7.0 REFERENCES

Cardwell, G.T. (1965) Geology and Ground Water in Russian River Valley Areas and in Round, Laytonville and Little Lake Valleys, Sonoma and Mendocino Counties, California. USGS Water Supply Paper 1548.

DWR (2014) CALIFORNIA CODE OF REGULATIONS. TITLE 23. WATERS. DIVISION 2. DEPARTMENT OF WATER RESOURCES CHAPTER 1.5. GROUNDWATER MANAGEMENT. SUBCHAPTER 2. GROUNDWATER SUSTAINABILITY PLANS.

California Code of Regulations (2016) FINDING OF EMERGENCY. (Gov. Code, § 11346.1, subd. (b); Cal. Code Regs., tit.1, § 50.)

DWR (2004). Ukiah Valley Groundwater Basin. California's Groundwater Bulletin 118.

Farrar. C.D. (1986) Ground-water Resources in Mendocino County, California. United States Geological Survey (USGS).

ISRP. (2016) Conceptual Model of Watershed Hydrology, Surface Water and Groundwater Interactions and Stream Ecology for the Russian River Watershed, Russian River Independent Science Review Panel. http://www.russianriverisrp.org/Downloads/ISRP_FINAL_REPORT.pdf

LACO Associates (2017) Preliminary Water Budget Study. Prepared for the Mendocino County Water Agency.

Marquez, M.F., Solis, S.S., and Gomez, R.D. (2017) Characterization of the Ukiah Valley Groundwater Basin. Water Management Lab, UC Davis. Prepared for the City of Ukiah.

Mendocino County Water Agency (2010) Water Supply Assessment for the Ukiah Valley Area Plan.

SWRCB (State Water Resources Control Board) (2017a) Geotracker – T0604500280.

SWRCB (State Water Resources Control Board) (2017b) Geotracker – T0604593587.

USGS (2003) "Heat as a tool for studying the movement of ground water near streams." U.S. Department of the Interior. U.S. Geological Survey.

APPENDIX 1

SGMA – Subarticle 3: Sustainable Management Criteria

§ 354.22. Introduction to Sustainable Management Criteria

This Subarticle describes criteria by which an Agency defines conditions in its Plan that constitute sustainable groundwater management for the basin, including the process by which the Agency shall characterize undesirable results, and establish minimum thresholds and measurable objectives for each applicable sustainability indicator.

Note: Authority cited: Section 10733.2, Water Code.
Reference: Section 10733.2, Water Code.

§ 354.24 Sustainability Goal

Each Agency shall establish in its Plan a sustainability goal for the basin that culminates in the absence of undesirable results within 20 years of the applicable statutory deadline. The Plan shall include a description of the sustainability goal, including information from the basin setting used to establish the sustainability goal, a discussion of the measures that will be implemented to ensure that the basin will be operated within its sustainable yield, and an explanation of how the sustainability goal is likely to be achieved within 20 years of Plan implementation and is likely to be maintained through the planning and implementation horizon.

Note: Authority cited: Section 10733.2, Water Code.
Reference: Sections 10721, 10727, 10727.2, 10733.2, and 10733.8, Water Code.

§ 354.26. Undesirable Results

(a) Each Agency shall describe in its Plan the processes and criteria relied upon to define undesirable results applicable to the basin. Undesirable results occur when significant and unreasonable effects for any of the sustainability indicators are caused by groundwater conditions occurring throughout the basin.

(b) The description of undesirable results shall include the following:

(1) The cause of groundwater conditions occurring throughout the basin that would lead to or has led to undesirable results based on information described in the basin setting, and other data or models as appropriate.

(2) The criteria used to define when and where the effects of the groundwater conditions cause undesirable results for each applicable sustainability indicator. The criteria shall be based on a quantitative description of the combination of minimum threshold exceedances that cause significant and unreasonable effects in the basin.

(3) 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.

(c) The Agency may need to evaluate multiple minimum thresholds to determine whether an undesirable result is occurring in the basin. The determination that undesirable results are occurring may depend upon measurements from multiple monitoring sites, rather than a single monitoring site.

(d) An Agency that is able to demonstrate that undesirable results related to one or more sustainability indicators are not present and are not likely to occur in a basin shall not be required to establish criteria for undesirable results related to those sustainability indicators.

Note: Authority cited: Section 10733.2, Water Code.
Reference: Sections 10721, 10723.2, 10727.2, 10733.2, and 10733.8, Water Code.

§ 354.28. Minimum Thresholds

(a) Each Agency in its Plan shall establish minimum thresholds that quantify groundwater conditions for each applicable sustainability indicator at each monitoring site or representative monitoring site established pursuant to Section 354.36. The numeric value used to define minimum thresholds shall

represent a point in the basin that, if exceeded, may cause undesirable results as described in Section 354.26.

(b) The description of minimum thresholds shall include the following:

(1) The information and criteria relied upon to establish and justify the minimum thresholds for each sustainability indicator. The justification for the minimum threshold shall be supported by information provided in the basin setting, and other data or models as appropriate, and qualified by uncertainty in the understanding of the basin setting.

(2) 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.

(3) How minimum thresholds have been selected to avoid causing undesirable results in adjacent basins or affecting the ability of adjacent basins to achieve sustainability goals.

(4) How minimum thresholds may affect the interests of beneficial uses and users of groundwater or land uses and property interests.

(5) 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 basis for the difference.

(6) How each minimum threshold will be quantitatively measured, consistent with the monitoring network requirements described in Subarticle 4.

(c) Minimum thresholds for each sustainability indicator shall be defined as follows:

(1) Chronic Lowering of Groundwater Levels. The minimum threshold for chronic lowering of groundwater levels shall be the groundwater elevation indicating a depletion of supply at a given location that may lead to undesirable results. Minimum thresholds for chronic lowering of groundwater levels shall be supported by the following:

(A) The rate of groundwater elevation decline based on historical trends, water year type, and projected water use in the basin.

(B) Potential effects on other sustainability indicators.

(2) Reduction of Groundwater Storage. The minimum threshold for reduction of groundwater storage shall be a total volume of groundwater that can be withdrawn from the basin without causing conditions that may lead to undesirable results. Minimum thresholds for reduction of groundwater storage shall be supported by the sustainable yield of the basin, calculated based on historical trends, water year type, and projected water use in the basin.

(3) Seawater Intrusion. The minimum threshold for seawater intrusion shall be defined by a chloride concentration isocontour for each principal aquifer where seawater intrusion may lead to undesirable results. Minimum thresholds for seawater intrusion shall be supported by the following:

(A) Maps and cross-sections of the chloride concentration isocontour that defines the minimum threshold and measurable objective for each principal aquifer.

(B) A description of how the seawater intrusion minimum threshold considers the effects of current and projected sea levels.

(4) Degraded Water Quality. The minimum threshold for degraded water quality shall be the degradation of water quality, including the migration of contaminant plumes that impair water supplies or other indicator of water quality as determined by the Agency that may lead to undesirable results. The minimum threshold shall be based on the number of supply wells, a volume of water, or a location of an isocontour that exceeds concentrations of constituents determined by the Agency to be of concern for the basin. In setting minimum thresholds for degraded water

quality, the Agency shall consider local, state, and federal water quality standards applicable to the basin.

(5) Land Subsidence. The minimum threshold for land subsidence shall be the rate and extent of subsidence that substantially interferes with surface land uses and may lead to undesirable results. Minimum thresholds for land subsidence shall be supported by the following:

(A) Identification of land uses and property interests that have been affected or are likely to be affected by land subsidence in the basin, including an explanation of how the Agency has determined and considered those uses and interests, and the Agency's rationale for establishing minimum thresholds in light of those effects.

(B) Maps and graphs showing the extent and rate of land subsidence in the basin that defines the minimum threshold and measurable objectives.

(6) Depletions of Interconnected Surface Water. The minimum threshold for depletions of interconnected surface water shall be the 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 minimum threshold established for depletions of interconnected surface water shall be supported by the following:

(A) The location, quantity, and timing of depletions of interconnected surface water.

(B) A description of the groundwater and surface water model used to quantify surface water depletion. If a numerical groundwater and surface water model is not used to quantify surface water depletion, the Plan shall identify and describe an equally effective method, tool, or analytical model to accomplish the requirements of this Paragraph.

(d) An Agency may establish a representative minimum threshold for groundwater elevation to serve as the value for multiple sustainability indicators, where the Agency can demonstrate that the representative value is a reasonable proxy for multiple individual minimum thresholds as supported by adequate evidence.

(e) An Agency that has demonstrated that undesirable results related to one or more sustainability indicators are not present and are not likely to occur in a basin, as described in Section 354.26, shall not be required to establish minimum thresholds related to those sustainability indicators.

Note: Authority cited: Section 10733.2, Water Code.
Reference: Sections 10723.2, 10727.2, 10733, 10733.2, and 10733.8, Water Code.

§ 354.30. Measurable Objectives

(a) Each Agency shall establish measurable objectives, including interim milestones in increments of five years, to achieve the sustainability goal for the basin within 20 years of Plan implementation and to continue to sustainably manage the groundwater basin over the planning and implementation horizon.

(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.

(c) Measurable objectives shall provide a reasonable margin of operational flexibility under adverse conditions which shall take into consideration components such as historical water budgets, seasonal and long-term trends, and periods of drought, and be commensurate with levels of uncertainty.

(d) An Agency may establish a representative measurable objective for groundwater elevation to serve as the value for multiple sustainability indicators where the Agency can demonstrate that the representative value is a reasonable proxy for multiple individual measurable objectives as supported by adequate evidence.

(e) Each Plan shall describe a reasonable path to achieve the sustainability goal for the basin within 20 years of Plan implementation, including a description of interim milestones for each relevant sustainability

indicator, using the same metric as the measurable objective, in increments of five years. The description shall explain how the Plan is likely to maintain sustainable groundwater management over the planning and implementation horizon.

(f) Each Plan may include measurable objectives and interim milestones for additional Plan elements described in Water Code Section 10727.4 where the Agency determines such measures are appropriate for sustainable groundwater management in the basin.

(g) An Agency may 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.

Note: Authority cited: Section 10733.2, Water Code.
Reference: Sections 10727.2, 10727.4, and 10733.2, Water Code.