Big Valley Groundwater Basin Advisory Committee (BVAC)

Unapproved Meeting Minutes

BVAC Members:
Lassen County BVAC – Aaron Albaugh, Board Representative; Jeff Hemphill, Alt. Board Representative; Kevin Mitchell, Public Representative; Duane Conner, Public Representative
Modoc County BVAC – Geri Byrne, Board Representative; Ned Coe, Alt. Board Representative; Jimmy Nunn, Public Representative; John Ohm, Public Representative

Wednesday, February 3, 2021	4:00 PM	Adin Community Center 605 Highway 299 Adin, CA 96006

BVAC Convene in Special Session.

Present: Committee Members: Albaugh, Byrne, Mitchell, Conner, Ohm, and Nunn.
Absent:

Also in attendance: BVAC Secretary Maurice Anderson
BVAC staff Gaylon Norwood
BVAC staff Tiffany Martinez
BVAC Recorder Brooke Suarez
Lassen County Supervisor Gary Bridges

BVAC Chairman Albaugh called the meeting to order at 4:09 p.m.

Flag Salute: Chairman Albaugh requested Representative Jimmy Nunn lead the Pledge of Allegiance.

General Update by Secretary: There has been no response to the GSP extension request letter sent to Governor Gavin Newsom. Staff has talked to RCRC and they said they would help work on trying to get the extension. After the election of the new Chairman and Vice-Chairman, T. Martinez will address the Advisory Committee.

Election of a Chairman and a Vice-Chairman:

A motion was made by Representative Ohm to elect Representative Byrne as Chairman of the Big Valley Groundwater Basin Advisory Committee. The motion was seconded by Representative Albaugh. The motion was carried by the following vote:

Aye: 6 - Albaugh, Byrne, Mitchell, Conner, Olm, and Nunn

A motion was made by Chairman Byrne to elect Representative Albaugh as Vice-Chairman of the Big Valley Groundwater Basin Advisory Committee. The motion was seconded by Representative Nunn. The motion was carried by the following vote:

Aye: 6 - Albaugh, Byrne, Mitchell, Conner, Olm, and Nunn

Matters Initiated by Committee Members: None

Correspondence (unrelated to a specific agenda item): None

Approval of Minutes (December 2, 2020) –

A motion was made by Representative Mitchell to approve BVAC meeting minutes from December 2, 2020 with changes. The motion was seconded by Representative Albaugh. The motion was carried by the following vote:

Aye: 6 - Albaugh, Byrne, Mitchell, Conner, Olm, and Nunn

Tiffany Martinez addressed the committee regarding the GSP schedule. The chapters coming up are the ones which will require high impact from the stakeholders. Ground rules for the Big Valley Advisory Committee meeting were reviewed. She suggested that the representatives stay focused on the agenda and went over decision making procedures.

Vice-Chair Albaugh commented that based on the coloring on the schedule which denotes stakeholder input, it appears that stakeholders have very little in put into the GSP. He also questioned if DWR has to go by the same rules that T. Martinez reiterated as DWR has not in the past.

SUBJECT #1:
Continued discussion on Revised Draft Chapter 6 (*Water Budget*) of the Groundwater Sustainability Plan (GSP).

ACTION REQUESTED:

1. Receive report from the BVAC Secretary, Staff, and/or Consultant.
2. Receive public comment.
3. Accept and "set aside" Revised Draft Chapter 6 for future inclusion into the Draft GSP.

Gaylon Norwood stated that updates to Chapter 6 have been done. This was the third review of this chapter. The updated Big Valley GSP Comment Matrix (Exhibit A) was handed out. The hydrologic cycle of Big Valley was difficult to express in words, but the best input would be from consultants. There are many uncertainties that exist in this chapter due to variances which

occur year to year. The committee has twenty years to bring the water budget into balance. Comments can still be made on this chapter and will be reviewed again in the draft GSP. G. Norwood suggested the committee needs to "set aside" this chapter and move ahead to the next chapters.

Vice-Chairman Albaugh brought up additional changes he would like to see made. Representative Nunn noted that with the hypothetical water deficit, that he can't expand his business with this assumption. Does the GSP address this issue?

A motion was made by Vice-Chairman Albaugh to "set aside" Chapter 6 with changes and come back to it in the future. The motion was seconded by Representative Mitchell. The motion was carried by the following vote:

Aye: 6 - Albaugh, Byrne, Mitchell, Conner, Olm, and Nunn

Public Comment: Gary Monchamp questioned how will it be determined where thresholds are set and D. Fairman stated that GEI Consultants are there to help guide the committee.

Other questions and comments from unidentified call in listeners: None

SUBJECT #2:
Introduction of text for Public Draft Chapter 7 (*Sustainable Management Criteria*) of the Groundwater Sustainability Plant (GSP) and presentation by Thomas Harter on examples of Sustainable Management Criteria in other groundwater basins.

ACTION REQUESTED:

1. Receive report from the BVAC Secretary, Staff, and/or Consultant.
2. Receive public comment.

Dr. Thomas Harter did a presentation of sustainable management criteria. He is working on a groundwater sustainability plans for three other valleys in Northern California. He spoke in detail about undesirable results, minimum thresholds and triggers that should be established so water levels do not reach those minimum thresholds. The committee asked questions regarding various issues that Dr. Harter may have had in creating the GSPs he is working on.

Public Comment: None

Other questions and comments from unidentified call in listeners: None

BREAK: 5:56 to 6:13

SUBJECT #3
Discussion on the sustainable management criteria in relation to the monitoring network, in preparation of Draft chapter 8 (*Monitoring Networks)* of the Groundwater Sustainability Plant (GSP).

ACTION REQUESTED:

1. Receive report and recommendation from the BVAC Secretary, Staff, and/or Consultant.
2. Receive public comment.

GEI consultant David Fairman led the discussion on the sustainable management criteria in relation to the monitoring network. He displayed data that has been established and prompted the committee to be thinking of various ways the established data could be used in the GSP. He stated that GEI, in this portion of the GSP where stakeholders supply the input, is there to make sure the committee meets the requirements of the GSP and to serve as a guide. The committee is to use the information that GEI has been collecting in this development process.

The first step is to create a Sustainability Goal which covers all five sustainability measurements. He gave examples of other GSPs' goals. The examples went from a very broad statement to one that was more explicit. He explained that the committee's goal should tie into all of the five sustainability measurements.

The second step is to define sustainability measurements with DWR requirements in mind. For example, the committee needs to make a decision regarding the number of wells that will be used, but the wells used for monitoring must be representative for the basin. DWR would not allow just one well to be representative of the whole basin. The committee would then need to decide on the thresholds of the wells. They could either have all the same threshold or each well could have a different threshold.

Due to time constraints, the committee decided to create ad hoc committees to prepare the sustainability goal, management criteria, thresholds, and to address issues to present back to the advisory committee. The assignments were as follows:

Sustainability goal	Geri Byrne Aaron Albaugh John Ohm
Subsidence	Kevin Mitchell Duane Conner
Water quality	Geri Byrne Aaron Albaugh

Mapping	Jimmy Nunn Duane Conner
Lowering of water levels and storage	Duane Conner Aaron Albaugh
Boundary modification	Aaron Albaugh Kevin Mitchell
Interconnected Surface Water	Jimmy Nunn Geri Byrne John Ohm

Public Comment: None

Other questions and comments from unidentified call in listeners: Julie commented that Adin residents have already had well issues so please take that into consideration when establishing thresholds. She also has a well inventory and wanted to know who to send it to.

Matters Initiated by the General Public (regarding subjects not on the agenda**):** None

Establish next meeting date: March 3, 2021 at 4:00 pm. in Adin.

Adjournment: There being no further business, Chairman Byrne adjourned the meeting at 7:30 pm.

GEI Consultants

February 26, 2021

Geotechnical
Environmental
Water Resources
Ecological

Big Valley Advisory Committee
Lassen and Modoc Groundwater Sustainability Agencies

Lassen County Department of Planning and Building Services
707 Nevada Street, Suite 5
Susanville, California 96130

Modoc County
203 W. 4th Street
Alturas, California 96101

Re: BVAC ad hoc committee notes and recommendations

To the Big Valley Advisory Committee and Groundwater Sustainability Agency Staff:

GEI Consultants, Inc. (GEI) is providing this letter to document the notes and discussions from the ad hoc committee meetings held in February 2021, provided to GEI by Groundwater Sustainability Agency (GSA) staff. The ad hoc committees were established at the February 3, 2021 Big Valley Advisory Committee (BVAC) meeting to study a number of topics related to the Big Valley Groundwater Sustainability Plan (GSP or Plan), and provide information, feedback, and direction to the BVAC, GSA staff, and consultants (GEI). The BVAC is an advising body for the two GSAs in the Big Valley Groundwater Basin (BVGB or Basin). The BVAC is comprised of a member of the Board of Supervisors from each GSA and residents from each GSA, appointed in accordance with the memorandum of understanding (MOU) between the two counties (who are also the GSAs). The GSAs are responsible for developing a GSP for the BVGB. The following ad hoc committees were established:

- Sustainability goal and potential projects
- Groundwater levels and storage
- Surface water depletions
- Water quality
- Subsidence
- Mapping
- Basin boundary modification

GEI Consultants, Inc.
2868 Prospect Park Drive, Suite 400, Rancho Cordova, CA 95670
916.631.4500 fax 916.634.4501

The ad hoc committee topics are generally related to Chapters 7 and 8, Sustainable Management Criteria (SMCs) and Monitoring Networks, respectively. GEI staff did not attend all ad hoc committee meetings but were provided with the following notes and recommendations by GSA staff. The notes and recommendations below are supplemented with responses and clarification from GEI. GEI's comments are *written in italics*.

Sustainability Goal and Potential Projects Ad Hoc Committee:

The following text was recommended for the Sustainability Goal:

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

The ad hoc committee recommends that the following verbiage be included in the narrative for the sustainability goal. There will likely be additional verbiage the committee, BVAC or GSA staff will recommend in the future:

> **"The above sustainability goal will be achieved through Groundwater recharge opportunities and infrastructure projects for water storage will be a crucial component of augmenting water supplies."**

The following list of project types was generated by the committee:

- Timber management on federal lands
- Juniper and pine reduction
- Drainage recharge
- Winter recharge – pasture, reservoirs
- Pond and plug or recharge ponds
- Dam construction
- Reservoir expansion
- Injection wells (aquifer storage and recovery or ASR)
- Pumping from Pit River to Roberts Reservoir

These types of supply augmentation projects will need to be described in Chapter 9 with as much detail as possible, including the average annual volume (in acre-feet per year or AFY) of benefit they would provide. The regulations require the plan to describe the mitigation of overdraft (which was estimated at about 5,000 AFY in the water budget) through projects and management actions (PMAs). In other words, for DWR to deem the plan adequate, it must describe PMAs where:

(AFY of increased supply from PMAs) + (AFY of demand reduction from PMAs) >= 5,000 AFY

Groundwater Levels and Storage Ad Hoc Committee:

Summary of key points:

- The ad hoc committee recommended that a total of 12 wells be monitored. Five of these are the newly established monitoring clusters. Tentatively, the remaining wells that were selected include (by alternate name):
    - 13K2
    - 01A1 – subject to verification
    - O8F1
    - 16D1
    - 20B6
    - 26E1 - also used to monitor surface water interaction
    - ACWA-3 - also used to monitor surface water interaction

For further discussion of the BVAC at its next meeting, GEI will determine the numerical threshold values for these wells based on ad hoc committee guidance detailed here and provide a map of the wells, symbolized by their intended purpose (i.e. storage, water levels or surface water/groundwater), and labeled with threshold values.

- All the wells are subject to verification and confirmation of their suitability. Also, long term (at least 10 year) monitoring commitments will have to be secured for each well. The wells were selected based on their geographic dispersal. Some were selected based on surface/groundwater interaction and to provide enough wells for averaging (in the case of groundwater storage). Other factors include longevity of data available, monitoring or non-pumping status of wells, depth variation, and representation of the basin as a whole.

- The “measurable objective” is proposed to be set at the 2015 baseline (all measurements will be based on the fall level).

- The “minimum threshold” is recommended to be 150 feet below the 2015 baseline (150 feet below the measurable objective).

- The ad hoc committee discussed the possible inclusion of “action levels” in the GSP. These “action levels” could be used to initiate projects and management actions. A possible definition of said “action levels” could be when ground water levels in 4 of the identified wells (1/3 of the total) drop whichever is greater of the following for 5 consecutive years:

  - More than 3 times the trend shown in the Chapter 7 analytics (Appendix 7B); or
    More than 5 feet in a year

- Potential actions initiated by the above "action levels" could include:

  - Recharge projects (discussed more thoroughly as part of the sustainability goal and projects ad hoc committee). The GSP should include language that any recharge projects subject to the availability of state and federal funding.
  - Additional analysis to determine why these wells are dropping (e.g. long-term drought, additional pumping/irrigated acres, data errors, etc.)

These "action levels" are not required by SGMA or the GSP Regulations but may be useful to have in the GSP. If these "action levels" are used in the GSP they should be defined and established clearly in the GSP text.

- The transition of groundwater from measurable objective to action level and then to minimum threshold and lower can be visualized as follows: green (no issues identified) down to the point where the "action level" is triggered, yellow (warning) from the point when the above "action level" is triggered down to the minimum threshold (150 feet below the 2015 baseline) and red (trouble) when levels fall below the minimum threshold.

- Ad hoc committee members expressed interest in a shallow well mitigation program to protect other beneficial uses (such as residential). However, to qualify, groundwater levels must drop lower than the 2015 baseline. That is, affected wells would potentially be eligible if water levels fell below the 2015 baseline down to 150 feet below the 2015 baseline (e.g. the minimum threshold…). The GSP should include language that any well mitigation program is subject to the availability of state and federal funding.

- Substandard (e.g. shallow hand dug) wells that are no longer viable, and would not qualify for the above mitigation program, should be "decommissioned" (removed from the analysis) so that these wells do not affect future ranking and analysis in the basin.

- Consider "good neighbor" practices already demonstrated in the basin (e.g. voluntarily helping owners whose wells have gone dry).

In summary, the groundwater levels and storage ad hoc committee considered the focus and fundamental importance of agriculture recommended by the sustainability goal ad hoc committee. The draft sustainability goal was a key factor in the development of the recommended measurable objective and minimum threshold. Without agriculture, it is likely that the community will no longer be able to function (or certainly, the size of the community would be drastically decreased). The thought is that if levels get below the above minimum threshold, agriculture will no longer be economically viable due to the energy costs to pump. This focus on agriculture is the fundamental justification for setting the minimum threshold 150 feet below the 2015 baseline.

Water Quality Ad Hoc Committee:

- Committee discussed that generally any constituents that show elevated levels are naturally occurring
- Ad hoc committee members recommend setting thresholds for only electrical conductivity (EC) as a measure of the water quality health of the Basin
- Committee recommends monitoring at 2-3 of the newly constructed monitoring wells using transducers that measure both water levels EC

If three of the new wells are monitored for EC, BVMW 1-1 (Adin Airport), BVMW 4-1 (Lookout Cemetery), and BVMW 5-1 (Bieber)would be good candidates. These three wells are spread around the basin and produced good amounts of water (higher hydraulic conductivity), which likely makes them representative of the producing aquifer. BVMW 2-1 and 3-1 were low producers (lower hydraulic conductivity), indicating that the groundwater is older, more stagnant, and poorer quality (these wells have higher total dissolved solids, iron, and manganese concentrations than the other monitoring wells). This is a natural condition and those two wells don't properly represent conditions in the conductive portions of the aquifer that are generally being used for beneficial uses.

- Committee discussed that the two public water systems in Big Valley perform water quality sampling and submit to the state.

Water quality data from the two public systems could be used for representative monitoring (logistically) because they are already monitored every few years for reporting to the state Division of Drinking Water (DDW). However, since these systems only measure once every few years, a single measurement exceeding the minimum threshold could be problematic because it wouldn't be sampled again for another few years. The GSAs wouldn't know if that measurement was a temporary condition. Using continuous EC in the monitoring wells would allow the GSAs to determine if a threshold exceedance is a long-term condition. BVMW 1-1 and 5-1 are located near the two public systems. The DDW water quality results should be evaluated by the GSAs during the GSP 5-year updates even if they aren't used for representative monitoring network.

- The committee discussed the fact that there are various state programs that regulate water quality and the counties have very little role.

The other source of regular water quality measurements in Big Valley are sites regulated through other State Water Resources Control Board (SWRCB) programs, such as leaking underground storage tank sites and landfills.

Further discussion by the BVAC and ad hoc committee should include recommendations for minimum thresholds and measurable objectives based on thresholds for when the water becomes unsuitable for beneficial uses.

Subsidence Ad Hoc Committee:

- 3 times the natural rate shown in the state's satellite imagery could be considered as the minimum threshold.
- 0-1.5 inches seems to be the natural subsidence for 4 years. Minimum threshold 6 inches/year using the satellite imaging. Investigate areas with over 3 inches per year and make sure they are not agricultural practice related and watch for visual evidence of infrastructure damage due to subsidence, roads buckling, irrigation canals cracking etc.

Depletion of Interconnected Surface water Ad Hoc Committee:

- Comfortable with suggested monitoring wells from groundwater level Ad Hoc Committee including specific surface water connected wells
- There is currently no data that suggests a negative relationship between interconnected surface water and groundwater. Due to this point, we will continue to monitoring and fill data gaps but will not designate a specific threshold for interconnected surface and groundwater. (historic data from wells near surface water, and stream gauge data)
- Groundwater levels will already be monitored and a threshold set in the groundwater level ad hoc committee
- Additional data collection is already being planned on major streams in the basin as well as continued groundwater level monitoring

Basin Boundary Modification Ad hoc Committee:

The ad hoc committee recommended adding a section to chapter 3 to detail the 2016 application and the underlying premise of a planned future basin boundary modification request.

Mapping Ad Hoc Committee:

This committee did not meet.

If you have any questions, please contact David Fairman at (916) 631-4528 or by e-mail at dfairman@geiconsultants.com.

Sincerely,

David Fairman, C.Hg.
Senior Hydrogeologist, GEI

County of Lassen
Department of Planning and Building Services

• Planning • Building Permits • Code Enforcement • Surveyor • Surface Mining

Maurice L. Anderson, *Director*
707 Nevada Street, Suite 5
Susanville, CA 96130-3912
Phone: 530 251-8269
Fax: 530 251-8373
email: landuse@co.lassen.ca.us
website: www.co.lassen.ca.us

Zoning & Building
Inspection Requests
Phone: 530 257-5263

February 5, 2021

TO: Big Valley Groundwater Basin Advisory Committee

FROM: Maurice L. Anderson, Secretary
Big Valley Groundwater Basin Advisory Committee

SUBJECT: Ad hoc committees created at the February 3, 2021, meeting of the Big Valley Groundwater Basin Advisory Committee

This memorandum will list the ad hoc committees that were created by the Big Valley Groundwater Basin Advisory Committee (BVAC) at its February 3, 2021, meeting, as well as the BVAC representatives assigned to each. Information will also be provided regarding staff's recommendations as to how the individual ad hoc committee meetings can be conducted. Lastly, information will be provided regarding Brown Act requirements of said ad hoc committees and the BVAC in general.

More specific information will be provided for each ad hoc committee. Ad hoc meetings will be scheduled by staff in the near future. Recommendations from the ad hoc committees will be presented at the March 3, 2021, BVAC meeting. At that time, there will be an opportunity for the public to participate in the ad hoc committees' recommendations to the full BVAC.

Ad Hoc Committee Function and Purpose:
Staff's understanding is that the purpose of the ad hoc committees is to provide direction to staff and a recommendation to the full BVAC regarding the assigned topic. The topics primarily relate to Chapter 7 (Sustainable Management Criteria) of the Groundwater Sustainability Plan (GSP). Specifically, sustainability indicators must be developed as part of the GSP. The February 3, 2021, BVAC packet contains more information on this topic and should be referred to regarding the requirements.

In total, six ad hoc committees were created (see description below). A recommendation is needed from each committee by February 22, 2021, so that our consultant can update Chapter 7 (Sustainable Management Criterial) in time for the March 3, 2021, BVAC meeting. Staff will work with our consultant (GEI) to develop any recommendations the ad hoc committees may make. Again, in order to develop the March 3, 2021, BVAC agenda and packet, GEI will need initial recommendations and direction by February 22, 2021. Obviously, this is not a lot of time and the ad hoc committees, staff and GEI will have to move quickly.

At the March 3, 2021, meeting, the recommendations of each ad hoc committee will be explained regarding its assigned topic. The BVAC will discuss the content with staff and GEI, and get input from the public. Ad hoc committee recommendations will serve as a starting point for this public discussion. After the March 3, 2021, BVAC meeting, staff and the consultant (and perhaps the ad hoc committees, depending on BVAC direction) will then update the content of Chapter 7, and hopefully, have a fairly detailed and developed Chapter 7 to present at the April 7, 2021, BVAC meeting.

It is necessary to divide staff responsibility for each ad hoc committee between the two counties. While a specific county has been assigned to provide staff for each ad hoc committee (see list below) and primary responsibility rests with the assigned jurisdiction, staff from the other jurisdiction may listen in to some or all meetings. Regardless of county assignments, staff will be working together, and with GEI, to present the overall ad hoc committee recommendations to the entire BVAC at its March 3, 2020, meeting.

Ad Hoc Committee Assignments:
What follows is a list of the ad hoc committees that were created by the BVAC on February 3, 2021. The BVAC representatives assigned to each ad hoc committee and the county that will provide staff for each ad hoc committee are also listed:

Ad Hoc Committee	**BVAC Members**	**County Providing Staff Support**
Sustainability goal and potential projects	Geri Byrne Aaron Albaugh John Ohm	Modoc County
Subsidence	Kevin Mitchell Duane Conner	Lassen County
Water quality	Geri Byrne Aaron Albaugh	Modoc County
Mapping	Jimmy Nunn Duane Conner	Modoc County
Groundwater levels and storage	Duane Conner Aaron Albaugh	Lassen County
Basin boundary modification	Aaron Albaugh Kevin Mitchell	Lassen County

Staff from the assigned county will contact each of you individually, regarding your assigned ad hoc committee. At that time, you will be provided with information as to how your specific ad hoc committee meetings will be conducted. This will likely happen through a combination of Zoom (internet), telephone, and in-person meetings.

Any information needed for a discussion on the assigned topic will be provided before each ad hoc meeting. Staff has already begun meeting with GEI to devise the best way to conduct each meeting. It is anticipated that the first meeting of each ad hoc committee will be with staff only (GEI will not be present). Subsequent meetings may include GEI for technical guidance. However, the topic assigned to each ad hoc committee is unique and may not be addressed in the same fashion. The ad hoc committee structure inherently provides some flexibility.

The BVAC roster, which includes contact information, is attached for reference and use by the ad hoc committees. **However, please note that contact between any BVAC members must be guided by the Brown Act, as discussed in the next section of this memorandum. The Brown Act specifically limits contact between BVAC members as it relates to discussion involving the tasks assigned to the BVAC through the Memorandum of Understanding (MOU) between Lassen County and Modoc County (the MOU can be found in the initial binder provided at the first meeting).**

Brown Act:
Chapter 9 (meetings) of the Brown Act was provided to the BVAC at the initial (February 3, 2020) meeting and includes sections 54950 through 54963 of the California Government Code. The BVAC is subject to the Brown Act because it was formed by the MOU between the Board of Supervisors from each County for a public function. It is imperative that BVAC members understand the limitations and requirements imposed upon them through the Brown Act as it relates to their appointment to the BVAC. Questions should be addressed to senior staff, assigned counsel, or myself (as the BVAC secretary).

In the near future, likely at the March 3, 2021, BVAC meeting, staff will provide additional information regarding Brown Act requirements. The availability of an appropriate online Brown Act class is also being investigated. In the interim, a summary by the law firm Best Best & Krieger can be found online at the following URL:

https://www.bbklaw.com/bbk/media/library/pdf/major-provisions-and-requirements-of-the-brown-act.pdf

That said, the ad hoc committees described above are not subject to the Brown Act because each includes less than a quorum of the total number of representatives on the BVAC. That is, an ad hoc committee of the BVAC can be comprised of no more than three members. Four members represents a quorum and is subject to the Brown Act. As such, you are each prohibited by the

Brown Act from discussing a specific topic under the purview of the BVAC with any other three members outside of an official BVAC meeting. This limitation applies even if you speak to the other three members separately (in serial fashion) about a topic related to your appointment to the BVAC.

If you discuss the content assigned to each ad hoc committee with members of that ad hoc committee only, you are not subject to the Brown Act. Again, discussion must be limited to the assigned topic and to the assigned BVAC members.

Formation of the above ad hoc committees is intended to facilitate less formal discussion and in-depth research between ad hoc members, staff, and our consultant, regarding the assigned topic. This cannot be effectively accomplished at a full meeting of the BVAC, as the content is complicated and more thorough discussion of each topic is needed. Again, the results of the ad hoc committee meetings will be reported and discussed at the March 3, 2021, meeting of the BVAC and comment can be provided by the public at that time.

If there are any immediate questions regarding this memorandum, please contact myself, Assistant Director Gaylon Norwood for Lassen County, or Clerk of the Board/Assistant County Administrative Officer Tiffany Martinez for Modoc County. Otherwise, staff will contact you in the near future to discuss a meeting.

MLA:gfn
Enclosure

cc: Counsel for the BVAC
March 3, 2021, Big Valley Groundwater Advisory Committee packet

x/pla/admin/files/1200/52/01/04/03/"memo post meeting As hoc committees created 2-3-21"

COMMITTEES & COMMISSIONS

NAME: Big Valley Advisory Committee
ADDRESS: c/o Lassen Co. Planning and Building Services

707 Nevada St., Susanville CA 96130
QUALIFICATIONS
HOW APPOINTED:
One (1) Member of Lassen Co. Board of Supervisors appointed by said Board
One (1) Alternate Member of Lassen Co. Board of Supervisors appointed by said Board
One (1) Member of Modoc Co. Board of Supervisors appointed by said Board
One (1) Alternate Member of Modoc Co. Board of Supervisors appointed by said Board
Two (2) Public Members appointed by Lassen Board of Supervisors (must reside or own property within Lassen portion of BVGB)
Two (2) Public Members appointed by Modoc Board of Supervisors (must reside or own property within Modoc portion of BVGB)

ENABLING ACT: MOU between Modoc and Lassen Counties to form the BVAC to advise the Groundwater Sustainability Agencies during development of the BV Groundwater Sustainability Plan

*UPDATED: 1/29/20
NUMBER OF MEMBERS: 6 (2 alternates)
PHONE NUMBER:

LENGTH OF TERM: four year terms starting day appointment is made; must reapply to serve beyond a four year term through the GSA's application process.

Chair and vice-chair from different GSA's and serve one (1) year term. No chair or vice-chair shall serve more than two (2) consecutive terms.

A quorum is defined as having at least four BVAC Members present at every meeting.

Secretary: Lassen Co. Planning Director
Counsel: Modoc Co. Counsel

ORDER/ENACTMENT DATE: June 11, 2019

***DENOTES CHANGES - NOTIFY COUNTY CLERK AND CITY CLERK OF EVERY UPDATE**

NAME & ADDRESS PHONE NUMBER	DATE OF APPOINTMENT	REAPPT/REELECT DATES	TERM EXPIRES	OFFICERS/ CHANGES	Preferred Method of Communication
LASSEN CO. BOARD MEMBER Supervisor Aaron Albaugh PO Box 241 Adin CA 96006 (530) 708-1761	9/24/19		Sept. 2023	Four-year term	Calls: Cell phone Packets: Mail or pick up from Admin box
MODOC CO. BOARD MEMBER Supervisor Geri Byrne 3701 County Road 114 Tulelake CA 96134 geribyrne@co.modoc.ca.us (541) 891-7518	9/24/19		Sept. 2023	Four-year term	Calls: Cell phone or call Tiffany Martinez Packets: Email Only
LASSEN PUBLIC MEMBER #1 Kevin Mitchell Box 378 659-200 Iverson Lane Bieber CA 96009 ktmitchell@pacbell.net (530) 515-2067	9/24/19		Sept. 2023	Four-year term	Calls: Cell phone Packets:
LASSEN PUBLIC MEMBER #2 Duane Conner 25110 Hwy 299 Canby CA 96015 connerswelldrilling@yahoo.com (530) 640-0521			Sept. 2023	Four-year term	Calls: Cell phone Packets:
MODOC PUBLIC MEMBER #1 Jimmy Nunn PO Box 91 Lookout CA 96054 nbetter@aol.com (707) 338-7556	9/24/19		Sept. 2023	Four-year term	Calls: Cell Phone Packets: Mail hard copy to him and Email

MODOC PUBLIC MEMBER #2 John Ohm PO Box 88 Lookout CA 96054 Jsohm48@yahoo.com (530) 524-9967	11/12/19		Nov. 2023	Four-year term	Calls: Cell phone Packets:

ALTERNATE APPOINTMENTS

NAME & ADDRESS PHONE NUMBER	DATE OF APPOINTMENT	REAPPT/REELECT DATES	TERM EXPIRES	OFFICERS/ CHANGES	Preferred Method of Communication
LASSEN CO. BOARD ALTERNATE MEMBER Supervisor Jeff Hemphill PO Box 116 Janesville CA 96114 (530) 260-6328 (cell)	9/24/19		Sept. 2023	Four-year term	Calls: Cell phone Packet: In Admin box or email
MODOC CO. BOARD ALTERNATE MEMBER Supervisor Ned Coe 6325 Co. Road 58 Alturas CA 96101 (530) 949-7018 nedcoe@co.modoc.ca.us			Month/2023	Four-year term	Calls: Cell phone Packets: Email

Additional information outlined in the MOU:

STAFF FOR BIG VALLEY GROUNDWATER BASIN ADVISORY COMMITTEE:
Lassen Co. Dept. of Planning and Building Services
Director (Maurice Anderson)
707 Nevada St., Suite 5
Susanville CA 96130
530 251-8269
530 251-8373 fax

BVAC SECRETARY: Dept. Director (or designee). May comment on any item but does not have a vote. P&BS staff shall:

- Coordinate noticing in accordance with the Brown Act
- Prepare and disseminate agendas and packets
- Serve as staff and be the repository of all associated committee records, with a copy of all records sent to the Modoc County Clerk of the Board.

LASSEN COUNTY GROUNDWATER SUSTAINABILITY AGENCY:
LASSEN COUNTY BOARD OF SUPERVISORS
Lassen County Clerk (Julie Bustamante)
220 So. Lassen
Susanville, CA 96130
530 251-8216
jbustamante@co.lassen.ca.us

MODOC COUNTY GROUNDWATER SUSTAINABILITY AGENCY:
MODOC COUNTY BOARD OF SUPERVISORS
Clerk of the Board (Tiffany Martinez)
204 S. Court Street
Alturas, CA 96101
530 233-6201
tiffanymartinez@co.modoc.ca.us

The designated Modoc County GSA groundwater staff member may comment on any item but does not have a vote.

BVAC COUNTY COUNSEL:

Margaret Long, Modoc County Counsel
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1252.01.04.02/BVAC Roster April 2020

GEI Consultants

Geotechnical
Environmental
Water Resources
Ecological

February 11, 2021

Gaylon Norwood
Lassen County Department of Planning and Building Services
707 Nevada Street, Suite 5
Susanville, California 96130

Tiffany Martinez
Modoc County
203 W. 4th Street
Alturas, California 96101

Re: Sustainability Goal and Projects ad hoc committee supporting information

Dear Mr. Norwood and Ms. Martinez:

GEI Consultants, Inc. (GEI) is providing this letter and attached documentation to support discussions and decision making of the Big Valley Advisory Committee (BVAC) "sustainability goal and potential projects" ad hoc committee that was established at the February 3, 2021 BVAC meeting. The BVAC is an advising body for the two Groundwater Sustainability Agencies (GSAs) in the Big Valley Groundwater Basin (BVGB or Basin). The GSAs are responsible for developing a Groundwater Sustainability Plan (GSP or Plan) for the BVGB. Over the last two years, GEI has supported the GSAs by providing the technical information required for the Basin Setting of the GSP. Now GEI's role is to assist the GSAs, the BVAC, and other stakeholders to understand how the information in the Basin Setting can be used to make decisions about the Sustainable Management Criteria (SMCs) and Projects and Management Actions (PMAs) portions of the GSP. Once the GSAs have received sufficient input from the BVAC and stakeholders on their priorities and preferences for the SMCs, GEI (in collaboration with GSA staff) will provide specific chapter text that can then be presented at the March 3, 2021 BVAC meeting and opened for public review.

The GSA staff intend to meet with the ad hoc committee to have initial discussions, then bring in GEI and others as needed to advise, guide, and/or provide additional information that may be needed. GEI is willing to take part in any manner that GSA staff see fit. Note however, that GEI's participation would likely be remote, through internet (e.g. Zoom) communication.

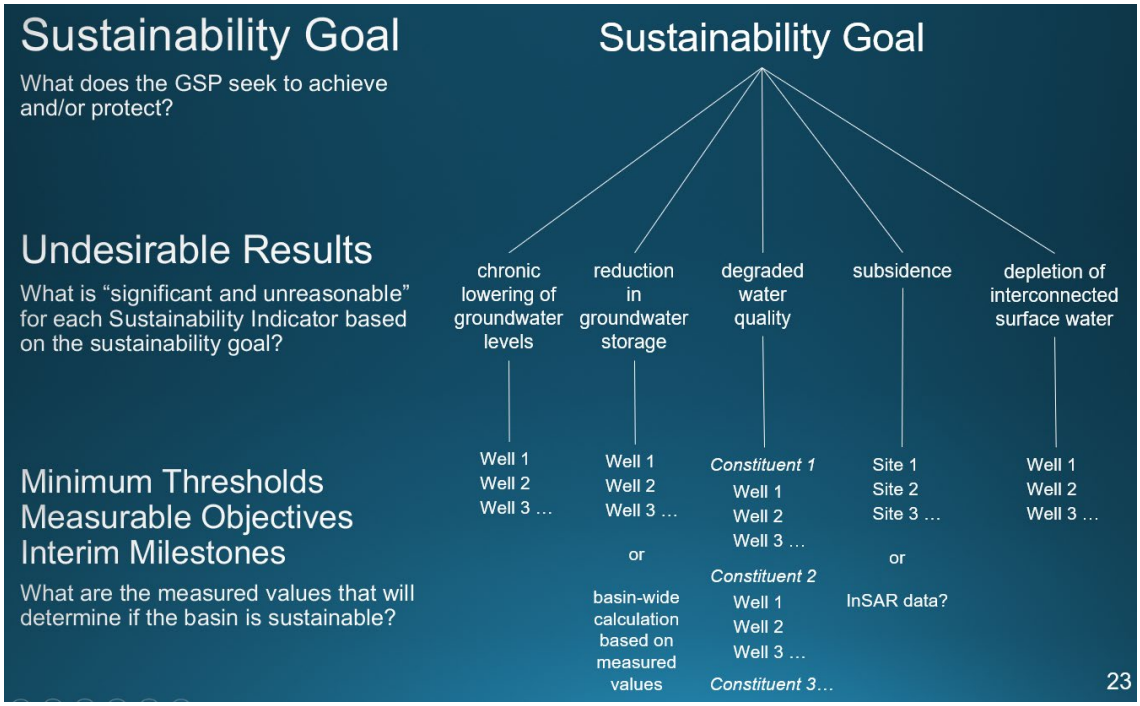
GEI Consultants, Inc.
2868 Prospect Park Drive, Suite 400, Rancho Cordova, CA 95670
916.631.4500 fax 916.634.4501

This letter provides information relevant to the committee's task to provide guidance to the GSAs and their consultants on two topics: the sustainability goal, and potential water supply enhancement projects.

Sustainability Goal

The Sustainability Goal is one piece of the SMC requirements. It is an overarching statement about what the Plan seeks to achieve and/or protect. **Figure 1** illustrates how the Sustainability Goal fits in with the other SMC requirements: Undesirable Results, Minimum Thresholds (MTs), Measurable Objectives (MOs), and Interim Milestones (IMs). Undesirable Results are more specific than the Sustainability Goal and describe what constitutes "significant and unreasonable" for each of the five categories shown in **Figure 1**. The Undesirable Results narrative must be written in a way that "significant and unreasonable" can be defined through measurements. MTs, MOs, and IMs are the specific measurements at specific sites (or by calculation) that determine whether the Basin is sustainable (avoiding undesirable results). Further information about these terms and the GSP requirements can be found in the current text of Chapter 7 of the GSP (available here) and in the SMC Best Management Practices document developed by DWR (available here). The SMC section (Subarticle 3) of the GSP Regulations is included in **Attachment A**.

Figure 1



This ad hoc committee will provide the GSAs with guidance on what Big Valley beneficial uses and users would like to be included in the sustainability goal of the GSP, including preferred wording and/or descriptions of concepts that the GSAs should emphasize in writing the sustainability goal.

The required content of the sustainability goal is described in §354.24 of the GSP Regulations (see **Attachment A**), which read (in part):

> *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 goal can be very broad or more specific, but the generally understood expectation is that the goal of the Plan should be to protect current and future beneficial uses and users, which in the case of the BVGB are agricultural, municipal and domestic, habitat, and minor industrial as described in Chapter 3 (Available here). While the goal should be protective of all uses and users, it can call out the importance of specific uses and may describe other factors such as economic considerations, effects on communities, or effects on the environment.

Recommended committee process:

1. Review guidance and background information

- review the pertinent part(s) of the regulations (**Attachment A**, §354. 24)

2. Gather and brainstorm ideas

- read through some examples of sustainability goals developed for other basins in the state (several provided in Chapter 7 Appendix 7A, with additional examples available at the DWR SGMA Portal)
- brainstorm a list of important concepts to reflect in the goal statement. A suggestion to generate this thinking is to consider the perspective of each of the user groups. For example:
    - "As a farmer, what would I want to see in the goal?"
    - "As a domestic well owner, what would I want to see in the goal?"
    - "As a fish and wildlife staff charged with maintaining habitat on behalf of the people of Big Valley and California, what would I want to see in the goal?"
    - If I was a member of a tribe, what would I want to see in the goal?"
    - Etc.

3. Refine recommendation(s) and document them

- Note that the GSAs and consultants are looking for guidance from this ad hoc committee on the portions of the Regulations (**Attachment A**) highlighted in green. Based on that input, the GSAs and consultants can supplement with text addressing the parts in yellow.

- Gather consensus on what the committee recommends. For ideas or wording that the members can agree upon, write the recommendation(s). If there are ideas or portions that the committee can't agree upon, that should also be documented so that staff, consultants, the BVAC, and the public can do further research and discuss the matter(s) at future meetings.
- The committee members should consider the following to test the appropriateness and completeness of their recommendation:
    - Will the goal meet the regulations and culminate "in the absence of undesirable results within 20 years"?
    - Does the sustainability goal reflect the generally accepted values of Big Valley residents and landowners?
    - Would the recommended sustainability goal protect the interests of all Big Valley residents, landowners, and stakeholders (including tribes)?

Potential Projects

Presumably the purpose of this ad hoc committee addressing potential projects is to get a head start on the Projects and Management Actions (PMAs) section of the GSP (Chapter 9). Ultimately the success of the GSP from a stakeholder perspective (aside from complying with the state law) will be measured on the successful implementation of projects that enhance water supplies in the BVGB. If these projects are successful, negative management actions such as reductions in pumping may potentially be avoided.

Some projects have already been discussed by the BVAC, including the Allen Camp Dam which was proposed decades ago on the Pit River upstream of Big Valley. A summary of the Dam's feasibility report was presented to the BVAC in 2020, with the conclusion that it was not economically feasible at the time and likely is still not economically feasible.

Other types of projects have been discussed in passing during the BVAC meetings and during side discussions. Potential project types could include (but are not limited to):

- Juniper thinning
- Winter recharge (flooding) of available lands (e.g. agricultural fields)
- Aquifer storage and recovery (injection of water into aquifers through wells and later recovery of that water)
- Dry well installation to allow recharge water to get past shallow hardpan layers
- Off-stream storage of high storm flows for future recharge of groundwater aquifers
- Riparian and wetland habitat enhancement (e.g. "pond and plug") that could result in increased groundwater recharge
- Import of supplies from outside of the BVGB

Through a grant awarded to the North Cal-Neva Resource Conservation and Development Council, the University of California Cooperative Extension (UCCE) has been studying the potential for any and all feasible water supply enhancement projects for Big Valley. The involvement of UCCE staff in the discussions on this topic is recommended.

Recommended committee process:

1. Review guidance and background information

- Re-visit Chapter 4: Hydrogeologic Conceptual Model to identify physical properties of the Basin that may have bearing on potential projects, particularly Figure 4-10 (Hydrologic Soils Group) and Section 4.8 (Groundwater Recharge and Discharge Areas)
- review the pertinent part(s) of the regulations (**Attachment B**, §354. 44). The text in green is what the committee should produce. Note that GSA staff and consultants will need to generate the other required content. The yellow text highlights some of the critical information that will be needed and perhaps should be discussed by the committee to determine the feasibility of each project.

2. Gather and brainstorm ideas

- Solicit input from UCCE on the recharge projects that they have been considering in their study (Laura Snell and/or David Lile).
- Discuss the feasibility of the UCCE projects
- Brainstorm the logistics of where and how to implement UCCE projects
- Brainstorm any and all projects (such as the types listed above) that could enhance water supplies in the BVGB. (Note that maps such as Figure 4-10 or Google Earth may be good references for this discussion.)

3. Refine recommendation(s) and document them

- Gather consensus on what the committee recommends. This can be documented in a list of projects and should include as many specifics as possible (location, timing, volumes, land ownership and cooperation needed, water rights, potential environmental (CEQA) concerns, relative level of cost, etc) so that the GSAs and UCCE can describe them in their studies and in the Projects and Management Actions section of the GSP. The more specific and thorough the project descriptions are the higher the chance that:
    - DWR will accept them as reasonable options to achieve sustainability, and thus approve the GSP
    - Grant programs will fund the projects
    - The projects will be implemented and water supply will be enhanced

If you have any questions, please contact David Fairman at (916) 631-4528 or by e-mail at dfairman@geiconsultants.com.

Sincerely,

David Fairman, C.Hg.
Senior Hydrogeologist, GEI

Enclosure:

Attachment A: Groundwater Sustainability Plan Emergency Regulations, Subarticle 3: Sustainable Management Criteria

Attachment B: Groundwater Sustainability Plan Emergency Regulations, Subarticle 5: Projects and Management Actions

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.

SUBARTICLE 5. Projects and Management Actions

§ 354.42. Introduction to Projects and Management Actions

This Subarticle describes the criteria for projects and management actions to be included in a Plan to meet the sustainability goal for the basin in a manner that can be maintained over the planning and implementation horizon.

Note: Authority cited: Section 10733.2, Water Code.

Reference: Section 10733.2, Water Code.

§ 354.44. Projects and Management Actions

(a) Each Plan shall include a description of the projects and management actions the Agency has determined will achieve the sustainability goal for the basin, including projects and management actions to respond to changing conditions in the basin.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(1) A list of projects and management actions proposed in the Plan with a description of the measurable objective that is expected to benefit from the project or management action. The list shall include projects and management actions that may be utilized to meet interim milestones, the exceedance of minimum thresholds, or where undesirable results have occurred or are imminent. The Plan shall include the following:

(A) A description of the circumstances under which projects or management actions shall be implemented, the criteria that would trigger implementation and termination of projects or management actions, and the process by which the Agency shall determine that conditions requiring the implementation of particular projects or management actions have occurred.

(B) The process by which the Agency shall provide notice to the public and other agencies that the implementation of projects or management actions is being considered or has been implemented, including a description of the actions to be taken.

(2) If overdraft conditions are identified through the analysis required by Section 354.18, the Plan shall describe projects or management actions, including a quantification of demand reduction or other methods, for the mitigation of overdraft.

(3) A summary of the permitting and regulatory process required for each project and management action.

(4) The status of each project and management action, including a time-table for expected initiation and completion, and the accrual of expected benefits.

(5) An explanation of the benefits that are expected to be realized from the project or management action, and how those benefits will be evaluated.

(6) An explanation of how the project or management action will be accomplished. If the projects or management actions rely on water from outside the jurisdiction of the Agency, an explanation of the source and reliability of that water shall be included.

(7) A description of the legal authority required for each project and management action, and the basis for that authority within the Agency.

(8) A description of the estimated cost for each project and management action and a description of how the Agency plans to meet those costs.

(9) A description of the management of groundwater extractions and recharge to ensure that chronic lowering of groundwater levels or depletion of supply during periods of drought is offset by increases in groundwater levels or storage during other periods.

(c) Projects and management actions shall be supported by best available information and best available science.

(d) An Agency shall take into account the level of uncertainty associated with the basin setting when developing projects or management actions.

Note: Authority cited: Section 10733.2, Water Code.

Reference: Sections 10727.2, 10727.4, and 10733.2, Water Code.

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Lassen County Department of Planning and Building Services
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Tiffany Martinez
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203 W. 4th Street
Alturas, California 96101

Re: Groundwater Levels and Storage ad hoc committee supporting information

Dear Mr. Norwood and Ms. Martinez:

GEI Consultants, Inc. (GEI) is providing this letter and attached documentation to support discussions and decision making of the Big Valley Advisory Committee (BVAC) "groundwater levels and storage" ad hoc committee that was established at the February 3, 2021 BVAC meeting. The BVAC is an advising body for the two Groundwater Sustainability Agencies (GSAs) in the Big Valley Groundwater Basin (BVGB or Basin). The GSAs are responsible for developing a Groundwater Sustainability Plan (GSP or Plan) for the BVGB. Over the last two years, GEI has supported the GSAs by providing the technical information required for the Basin Setting of the GSP. Now GEI's role is to assist the GSAs, the BVAC, and other stakeholders to understand how the information in the Basin Setting can be used to make decisions about the Sustainable Management Criteria (SMCs) and Projects and Management Actions (PMAs) portions of the GSP. Once the GSAs have received sufficient input from the BVAC and stakeholders on their priorities and preferences for the SMCs, GEI (in collaboration with GSA staff) will provide specific chapter text that can then be presented at the March 3, 2021 BVAC meeting and opened for public review.

The GSA staff intend to meet with the ad hoc committee to have initial discussions, then bring in GEI and others as needed to advise, guide, and/or provide additional information that may be needed. GEI is willing to take part in any manner that GSA staff see fit. Note however, that GEI's participation would likely be remote, through internet (e.g. Zoom) communication.

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Undesirable results (URs) are one piece of the SMC requirements and connect the Sustainability Goal with measurements that indicate whether the Basin is sustainable. **Figure 1** shows the different parts that constitute SMCs under SGMA. The Sustainability Goal is an overarching statement about what the Plan seeks to achieve and/or protect. Undesirable Results are more specific statements about what constitutes "significant and unreasonable" and must be specific and written in a way that "significant and unreasonable" can be defined through measurements. MTs, MOs, and IMs are the measurement levels at specific sites (or by calculation) that determine whether the Basin is sustainable (avoiding undesirable results). MTs, MOs, and IMs are illustrated in **Figure 2**. More detail on these concepts can be found in Section 7.2.1 of Chapter 7 or in DWR's SMC BMP Document.

This groundwater levels and storage ad hoc committee will provide recommendations to GSA staff on the wording and content of the undesirable results narrative addressing groundwater levels and storage. While DWR considers levels and storage as two separate sustainability indicators, they are directly related to one another and some GSAs in the state have taken the approach of using the same undesirable results, MTs, and MOs for both. In addition, groundwater levels have significant bearing on other sustainability indicators such as subsidence and surface water depletions. While those indicators will have their own definition of undesirable results, this committee should be aware that there may need to be adjustments in the representative monitoring network and MTs to accommodate these other sustainability indicators.

Figure 1

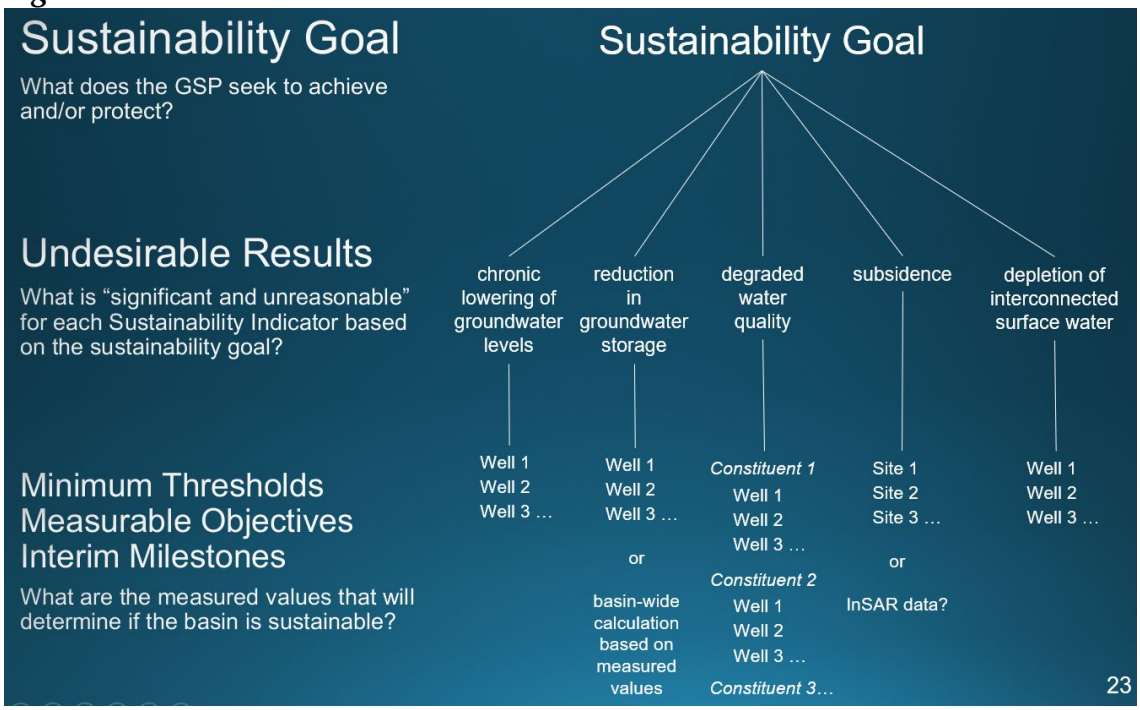
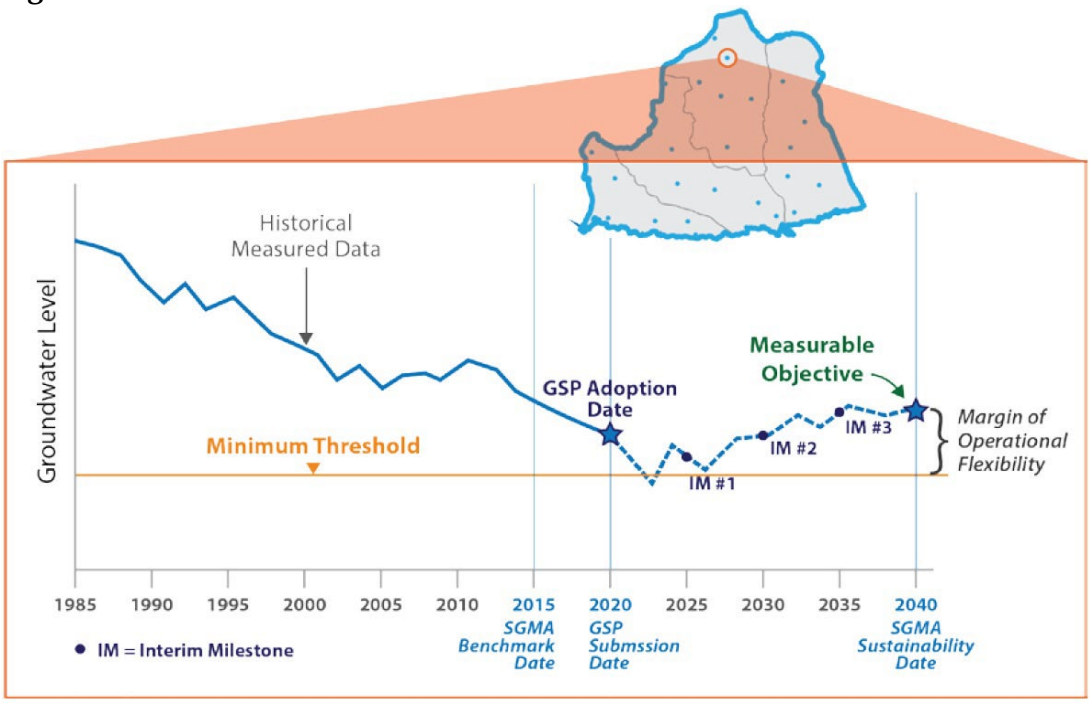


Figure 2



The undesirable results narrative needs to meet three goals:

1. It needs to define what is "significant and unreasonable" with regard to reduction in groundwater levels and groundwater storage
2. It needs to support the sustainability goal
3. It needs to define what measurement(s) will indicate when reduction in groundwater levels and groundwater storage are "significant and unreasonable".

For example, let's say that the committee wants to recommend that one of the criteria for "significant and unreasonable reduction in groundwater levels is when the energy cost of pumping (lifting) the water is uneconomical for agricultural use in the Basin". This statement would appropriately address (1.) above and likely (2.), particularly if the sustainability goal discusses economic concerns. In order to meet (3.) above, the undesirable result narrative would need to be supplemented with additional information about threshold exceedances in the representative monitoring network. Does one MT exceedance mean an undesirable result? Two exceedances? Ten percent of the wells? Thirty percent of the wells? DWR's SMC Best Management Practices document expands on this, saying:

> *"All undesirable results will be based on minimum thresholds exceedances. Undesirable results will be defined by minimum threshold exceedances at a single monitoring site, multiple monitoring sites, a portion of a basin, a management area, or an entire basin. Exceeding a minimum threshold at a single monitoring site is not necessarily an undesirable result, but it could signal the need for modifying one or more management actions, or implementing a project to benefit an area before the issue becomes more widespread throughout the basin. However, the GSP must define when an undesirable result is triggered."*

Note in our example that when the GSAs establish their MTs, they would need information or analysis on pumping energy costs (and their relationship to water levels) and guidance from the agricultural community about what cost is uneconomical in order to determine the MTs.

Recommended committee process:

1. Review guidance and background information

- review the pertinent part(s) of the regulations (**Attachment A**, §354.26 and possibly §354.28)
- review Sections 5.1 and 5.2 of the GSP (Chapter 5: Groundwater Conditions)
- review Figure 7-2 and Appendix 7B (Chapter 7: Sustainable Management Criteria) which contains historic water levels, trends, and other potential SMC considerations (such as well depths)

2. Gather and brainstorm ideas

- review undesirable results examples developed for other basins in the state (several provided in Chapter 7 Appendix 7A, with additional examples available at the DWR SGMA Portal)
- brainstorm a list of important concepts to reflect in the groundwater levels and storage UR description. A suggestion to generate this thinking is to consider the perspective of each of the user groups. For example:
    - "As a farmer, what would be undesirable?"
    - "As a domestic well owner, what would be undesirable?"
    - "As a fish and wildlife staff charged with maintaining habitat on behalf of the people of Big Valley and California, what would be undesirable?"
    - If I was a member of a tribe, what would be undesirable?"
    - Etc.

3. Refine recommendation(s) and document them[1]

- Gather consensus on what the committee recommends. For ideas or wording that the members can agree upon, write the recommendation(s). If there are ideas or portions that the committee can't agree upon, that should also be documented so that staff, consultants, the BVAC, and the public can do further research and discuss the matter(s) at future meetings.
- Document the recommendations in the form of (1) a list of what should be considered "undesirable" for groundwater levels and storage, (2) proposed

[1] Note that the GSAs and consultants are looking for guidance from this ad hoc committee on the portions of the Regulations (**Attachment A**) highlighted in green. Note that the GSAs and consultants can help fill in all the required text if the committee provides general ideas, but as much guidance as possible from this committee on these items of the regulations is appreciated.

wording for the UR narragive, and/or (3) descriptions of concepts that the committee could and couldn't agree on.

- The committee members should consider the following to test the appropriateness and completeness of their recommendation:
    - Will the goal meet the regulations and culminate "in the absence of undesirable results within 20 years"?
    - Does the sustainability goal reflect the generally accepted values of Big Valley residents and landowners?
    - Would the recommended sustainability goal protect the interests of all Big Valley residents, landowners, and stakeholders (including tribes)?

In addition, the committee should provide guidance on the question of when an undesirable result has occurred (e.g. one exceedance, thirty percent of wells, etc) so that GSA staff and consultants can write the appropriate text.

If you have any questions, please contact David Fairman at (916) 631-4528 or by e-mail at dfairman@geiconsultants.com.

Sincerely,

David Fairman, C.Hg.
Senior Hydrogeologist, GEI

Enclosure:

Attachment A: Groundwater Sustainability Plan Emergency Regulations, Subarticle 3: Sustainable Management Criteria

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.

GEI Consultants

Geotechnical
Environmental
Water Resources
Ecological

February 11, 2021

Gaylon Norwood
Lassen County Department of Planning and Building Services
707 Nevada Street, Suite 5
Susanville, California 96130

Tiffany Martinez
Modoc County
203 W. 4th Street
Alturas, California 96101

Re: Surface water depletions ad hoc committee supporting information

Dear Mr. Norwood and Ms. Martinez:

GEI Consultants, Inc. (GEI) is providing this letter and attached documentation to support discussions and decision making of the Big Valley Advisory Committee (BVAC) "surface water depletions" ad hoc committee that was established at the February 3, 2021 BVAC meeting. The BVAC is an advising body for the two Groundwater Sustainability Agencies (GSAs) in the Big Valley Groundwater Basin (BVGB or Basin). The GSAs are responsible for developing a Groundwater Sustainability Plan (GSP or Plan) for the BVGB. Over the last two years, GEI has supported the GSAs by providing the technical information required for the Basin Setting of the GSP. Now GEI's role is to assist the GSAs, the BVAC, and other stakeholders to understand how the information in the Basin Setting can be used to make decisions about the Sustainable Management Criteria (SMCs) and Projects and Management Actions (PMAs) portions of the GSP. Once the GSAs have received sufficient input from the BVAC and stakeholders on their priorities and preferences for the SMCs, GEI (in collaboration with GSA staff) will provide specific chapter text that can then be presented at the March 3, 2021 BVAC meeting and opened for public review.

The GSA staff intend to meet with the ad hoc committee to have initial discussions, then bring in GEI and others as needed to advise, guide, and/or provide additional information that may be needed. GEI is willing to take part in any manner that GSA staff see fit. Note however, that GEI's participation would likely be remote, through internet (e.g. Zoom) communication.

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Undesirable results (URs) are one piece of the SMC requirements and connect the Sustainability Goal with measurements that indicate whether the Basin is sustainable. **Figure 1** shows the different parts that constitute SMCs under SGMA. The Sustainability Goal is an overarching statement about what the Plan seeks to achieve and/or protect. Undesirable Results are more specific statements about what constitutes "significant and unreasonable" and must be specific and written in a way that "significant and unreasonable" can be defined through measurements. MTs, MOs, and IMs are the measurement levels at specific sites (or by calculation) that determine whether the Basin is sustainable (avoiding undesirable results). MTs, MOs, and IMs are illustrated in **Figure 2**. More detail on these concepts can be found in Section 7.2.1 of Chapter 7 or in DWR's SMC BMP Document.

Figure 1

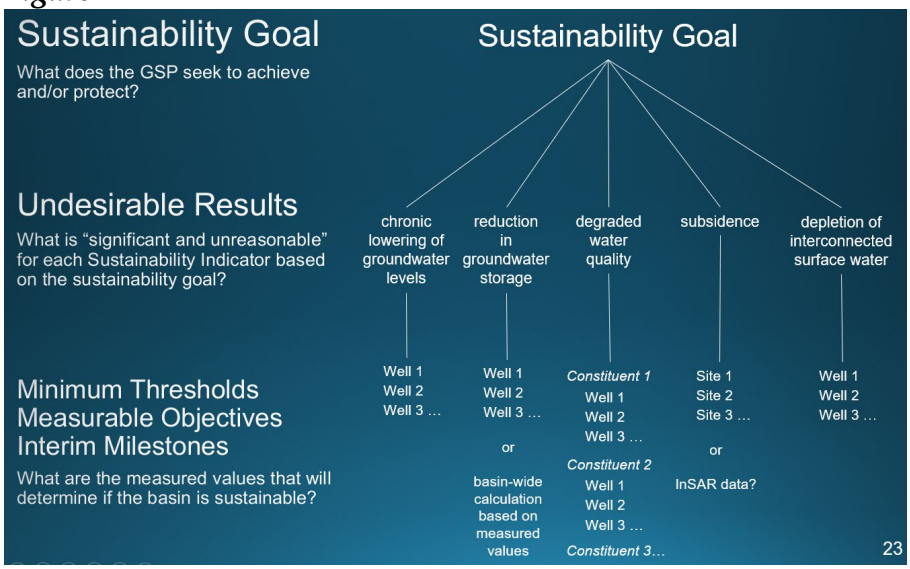
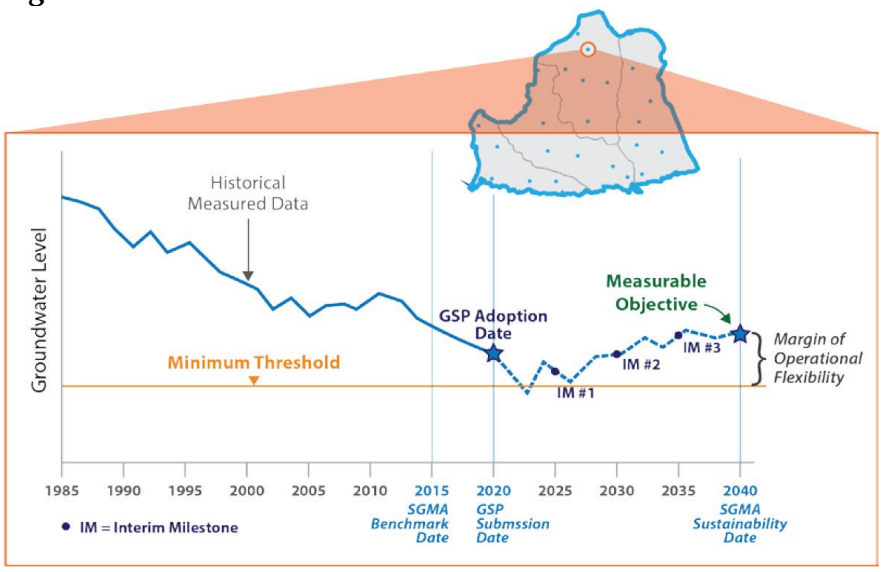


Figure 2



This ad hoc committee will provide recommendations to GSA staff on the wording and content of the undesirable results narrative addressing surface water depletions.

The undesirable results narrative needs to meet three goals:

1. It needs to define what is "significant and unreasonable" with regard to surface water depletions
2. It needs to support the sustainability goal
3. It needs to define what measurement(s) will indicate when surface water depletions are "significant and unreasonable".

For example, let's say that the committee wants to recommend that one of the criteria for "significant and unreasonable surface water depletions is when streams are being depleted more than the largest volume of depletions recorded historically. This statement would appropriately address (1.) above and likely (2.), particularly if the sustainability goal discusses preserving agricultural uses. In order to meet (3.) above, the undesirable result narrative would need to be supplemented with additional information about threshold exceedances in the representative monitoring network. It is generally accepted that the representative monitoring network can use shallow water levels adjacent to surface water bodies as a proxy for surface water depletion. Also, the UR needs to whether one MT exceedance means an undesirable result? Two exceedances? Ten percent of the wells? Thirty percent of the wells? DWR's SMC Best Management Practices document expands on this, saying:

> *"All undesirable results will be based on minimum thresholds exceedances. Undesirable results will be defined by minimum threshold exceedances at a single monitoring site, multiple monitoring sites, a portion of a basin, a management area, or an entire basin. Exceeding a minimum threshold at a single monitoring site is not necessarily an undesirable result, but it could signal the need for modifying one or more management actions, or implementing a project to benefit an area before the issue becomes more widespread throughout the basin. However, the GSP must define when an undesirable result is triggered."*

In the case of our example the MT would be set at the lowest level recorded adjacent to surface water during the historic year of maximum depletion and how many exceedances would constitute an undesirable result. Some resources on the concept and effects of surface water depletion are located here:

- https://groundwaterexchange.org/wp-content/uploads/2020/05/SGMAInsert6SurfaceWaterDepletion.pdf
- https://ca.water.usgs.gov/sustainable-groundwater-management/interconnected-surface-water-depletion.html

Recommended committee process:

1. Review guidance and background information

- review the pertinent part(s) of the regulations (**Attachment A**, §354.26 and possibly §354.28)

- review Sections 5.6 of the GSP (Chapter 5: Groundwater Conditions)

2. Gather and brainstorm ideas

- review undesirable results examples developed for other basins in the state (several provided in Chapter 7 Appendix 7A, with additional examples available at the DWR SGMA Portal)
- brainstorm a list of important concepts to reflect in the surface water depletions UR description. A suggestion to generate this thinking is to consider the perspective of each of the user groups. For example:
    - "As a farmer, what would be undesirable?"
    - "As a domestic well owner, what would be undesirable?"
    - "As a fish and wildlife staff charged with maintaining habitat on behalf of the people of Big Valley and California, what would be undesirable?"
    - If I was a member of a tribe, what would be undesirable?"
    - Etc.

3. Refine recommendation(s) and document them[1]

- Gather consensus on what the committee recommends. For ideas or wording that the members can agree upon, write the recommendation(s). If there are ideas or portions that the committee can't agree upon, that should also be documented so that staff, consultants, the BVAC, and the public can do further research and discuss the matter(s) at future meetings.
- Document the recommendations in the form of a list of what should be considered "undesirable" for surface water depletions, proposed wording for the UR narragive, and/or descriptions of concepts that the committee could and couldn't agree on.
- The committee members should consider the following to test the appropriateness and completeness of their recommendation:
    - Will the goal meet the regulations and culminate "in the absence of undesirable results within 20 years"?
    - Does the sustainability goal reflect the generally accepted values of Big Valley residents and landowners?
    - Would the recommended sustainability goal protect the interests of all Big Valley residents, landowners, and stakeholders (including tribes)?

[1] Note that the GSAs and consultants are looking for guidance from this ad hoc committee on the portions of the Regulations (**Attachment A**) highlighted in green. Note that the GSAs and consultants can help fill in all the required text if the committee provides general ideas, but as much guidance as possible from this committee on these items of the regulations is appreciated.

In addition, the committee should (if possible) provide guidance on the question of when an undesirable result has occurred (e.g. once exceedance, two exceedances, etc) so that GSA staff and consultants can write the appropriate text.

If you have any questions, please contact David Fairman at (916) 631-4528 or by e-mail at dfairman@geiconsultants.com.

Sincerely,

David Fairman, C.Hg.
Senior Hydrogeologist, GEI

Enclosure:

Attachment A: Groundwater Sustainability Plan Emergency Regulations, Subarticle 3: Sustainable Management Criteria

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.

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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.

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Reference: Sections 10727.2, 10727.4, and 10733.2, Water Code.

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February 11, 2021

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707 Nevada Street, Suite 5
Susanville, California 96130

Tiffany Martinez
Modoc County
203 W. 4th Street
Alturas, California 96101

Re: Water quality ad hoc committee supporting information

Dear Mr. Norwood and Ms. Martinez:

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Undesirable results (URs) are one piece of the SMC requirements and connect the Sustainability Goal with measurements that indicate whether the Basin is sustainable. **Figure 1** shows the different parts that constitute SMCs under SGMA. The Sustainability Goal is an overarching statement about what the Plan seeks to achieve and/or protect. Undesirable Results are more specific statements about what constitutes "significant and unreasonable" and must be specific and written in a way that "significant and unreasonable" can be defined through measurements. MTs, MOs, and IMs are the measurement levels at specific sites (or by calculation) that determine whether the Basin is sustainable (avoiding undesirable results). MTs, MOs, and IMs are illustrated in **Figure 2**. More detail on these concepts can be found in Section 7.2.1 of Chapter 7 or in DWR's SMC BMP Document.

Figure 1

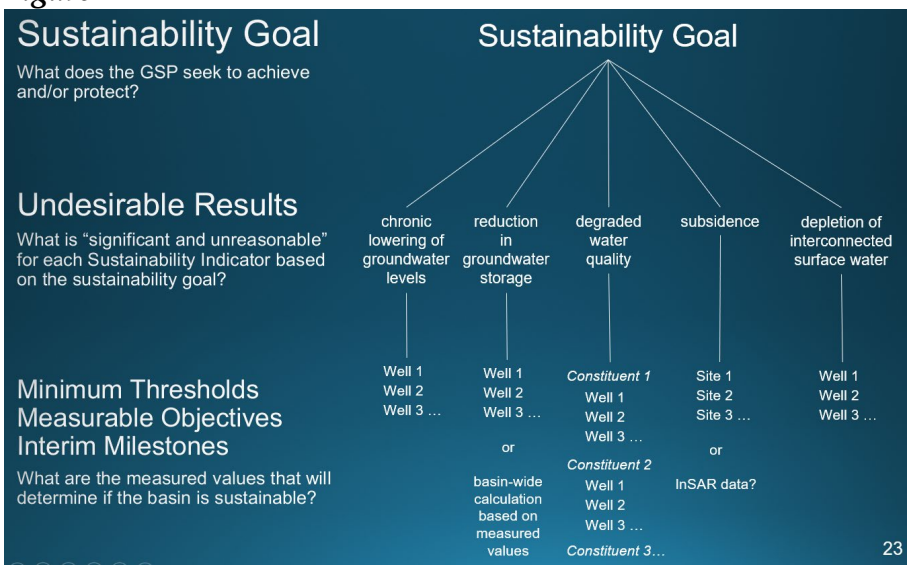
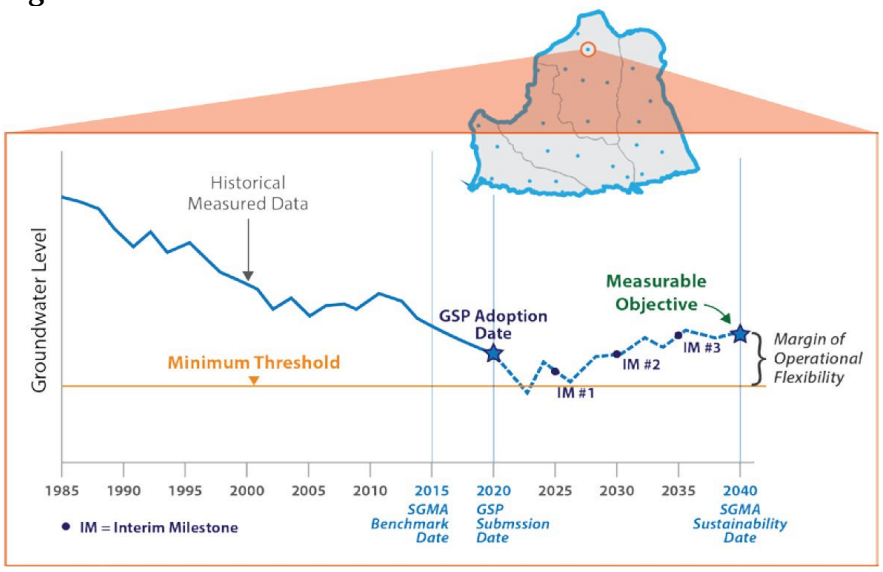


Figure 2



This ad hoc committee will provide recommendations to GSA staff on the wording and content of the undesirable results narrative addressing water quality.

The undesirable results narrative needs to meet three goals:

1. It needs to define what is "significant and unreasonable" with regard to water quality
2. It needs to support the sustainability goal
3. It needs to define what measurement(s) will indicate when water quality is "significant and unreasonable".

For example, let's say that the committee wants to recommend that one of the criteria for "significant and unreasonable water quality degradation is when total dissolved solids (TDS) concentrations are unsuitable for agricultural use". This statement would appropriately address (1.) above and likely (2.), particularly if the sustainability goal discusses preserving agricultural uses. In order to meet (3.) above, the undesirable result narrative would need to be supplemented with additional information about threshold exceedances in the representative monitoring network. Does one MT exceedance mean an undesirable result? Two exceedances? Ten percent of the wells? Thirty percent of the wells? DWR's SMC Best Management Practices document expands on this, saying:

> *"All undesirable results will be based on minimum thresholds exceedances. Undesirable results will be defined by minimum threshold exceedances at a single monitoring site, multiple monitoring sites, a portion of a basin, a management area, or an entire basin. Exceeding a minimum threshold at a single monitoring site is not necessarily an undesirable result, but it could signal the need for modifying one or more management actions, or implementing a project to benefit an area before the issue becomes more widespread throughout the basin. However, the GSP must define when an undesirable result is triggered."*

Note in our example that when the GSAs establish their MTs, they would need information or analysis about what TDS concentrations would make water unsuitable for agricultural uses and how many exceedances would constitute an undesirable result. Here are two sources that may be helpful:

- California Maximum Contaminant Levels for Drinking Water
- Water Quality for Agriculture

Recommended committee process:

1. Review guidance and background information

- review the pertinent part(s) of the regulations (**Attachment A**, §354.26 and possibly §354.28)
- review Sections 5.4 of the GSP (Chapter 5: Groundwater Conditions)

2. Gather and brainstorm ideas

- review undesirable results examples developed for other basins in the state (several provided in Chapter 7 Appendix 7A, with additional examples available at the DWR SGMA Portal)
- discuss what constituents (e.g. TDS, arsenic, iron, etc. See Table 5-3) users in the Basin may be concerned about
- discuss what potential thresholds may consist of (e.g. drinking water standards, agricultural standards)
- brainstorm a list of important concepts to reflect in the water quality UR description. A suggestion to generate this thinking is to consider the perspective of each of the user groups. For example:
    - "As a farmer, what would be undesirable?"
    - "As a domestic well owner, what would be undesirable?"
    - "As a fish and wildlife staff charged with maintaining habitat on behalf of the people of Big Valley and California, what would be undesirable?"
    - If I was a member of a tribe, what would be undesirable?"
    - Etc.

3. Refine recommendation(s) and document them[1]

- Gather consensus on what the committee recommends. For ideas or wording that the members can agree upon, write the recommendation(s). If there are ideas or portions that the committee can't agree upon, that should also be documented so that staff, consultants, the BVAC, and the public can do further research and discuss the matter(s) at future meetings. The GSAs and consultants need guidance on two topics:
    - What constituent(s) are of concern in Big Valley
    - What thresholds should be used (e.g. drinking water, agricultural suitability, etc)
- Document the recommendations in the form of a list of what should be considered "undesirable" for water quality, proposed wording for the UR narrative, and/or descriptions of concepts that the committee could and couldn't agree on.
- The committee members should consider the following to test the appropriateness and completeness of their recommendation:
    - Will the goal meet the regulations and culminate "in the absence of undesirable results within 20 years"?

[1] Note that the GSAs and consultants are looking for guidance from this ad hoc committee on the portions of the Regulations (**Attachment A**) highlighted in green. Note that the GSAs and consultants can help fill in all the required text if the committee provides general ideas, but as much guidance as possible from this committee on these items of the regulations is appreciated.

- Does the sustainability goal reflect the generally accepted values of Big Valley residents and landowners?
- Would the recommended sustainability goal protect the interests of all Big Valley residents, landowners, and stakeholders (including tribes)?

In addition, the committee should (if possible) provide guidance on the question of when an undesirable result has occurred (e.g. once exceedance, two exceedances, etc) so that GSA staff and consultants can write the appropriate text.

If you have any questions, please contact David Fairman at (916) 631-4528 or by e-mail at dfairman@geiconsultants.com.

Sincerely,

David Fairman, C.Hg.
Senior Hydrogeologist, GEI

Enclosure:

Attachment A: Groundwater Sustainability Plan Emergency Regulations, Subarticle 3: Sustainable Management Criteria

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.

GEI Consultants

Geotechnical
Environmental
Water Resources
Ecological

February 11, 2021

Gaylon Norwood
Lassen County Department of Planning and Building Services
707 Nevada Street, Suite 5
Susanville, California 96130

Tiffany Martinez
Modoc County
203 W. 4th Street
Alturas, California 96101

Re: Subsidence ad hoc committee supporting information

Dear Mr. Norwood and Ms. Martinez:

GEI Consultants, Inc. (GEI) is providing this letter and attached documentation to support discussions and decision making of the Big Valley Advisory Committee (BVAC) "subsidence" ad hoc committee that was established at the February 3, 2021 BVAC meeting. The BVAC is an advising body for the two Groundwater Sustainability Agencies (GSAs) in the Big Valley Groundwater Basin (BVGB or Basin). The GSAs are responsible for developing a Groundwater Sustainability Plan (GSP or Plan) for the BVGB. Over the last two years, GEI has supported the GSAs by providing the technical information required for the Basin Setting of the GSP. Now GEI's role is to assist the GSAs, the BVAC, and other stakeholders to understand how the information in the Basin Setting can be used to make decisions about the Sustainable Management Criteria (SMCs) and Projects and Management Actions (PMAs) portions of the GSP. Once the GSAs have received sufficient input from the BVAC and stakeholders on their priorities and preferences for the SMCs, GEI (in collaboration with GSA staff) will provide specific chapter text that can then be presented at the March 3, 2021 BVAC meeting and opened for public review.

The GSA staff intend to meet with the ad hoc committee to have initial discussions, then bring in GEI and others as needed to advise, guide, and/or provide additional information that may be needed. GEI is willing to take part in any manner that GSA staff see fit. Note however, that GEI's participation would likely be remote, through internet (e.g. Zoom) communication.

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Undesirable results (URs) are one piece of the SMC requirements and connect the Sustainability Goal with measurements that indicate whether the Basin is sustainable. **Figure 1** shows the different parts that constitute SMCs under SGMA. The Sustainability Goal is an overarching statement about what the Plan seeks to achieve and/or protect. Undesirable Results are more specific statements about what constitutes "significant and unreasonable" and must be specific and written in a way that "significant and unreasonable" can be defined through measurements. MTs, MOs, and IMs are the measurement levels at specific sites (or by calculation) that determine whether the Basin is sustainable (avoiding undesirable results). MTs, MOs, and IMs are illustrated in **Figure 2**. More detail on these concepts can be found in Section 7.2.1 of Chapter 7 or in DWR's SMC BMP Document.

Figure 1

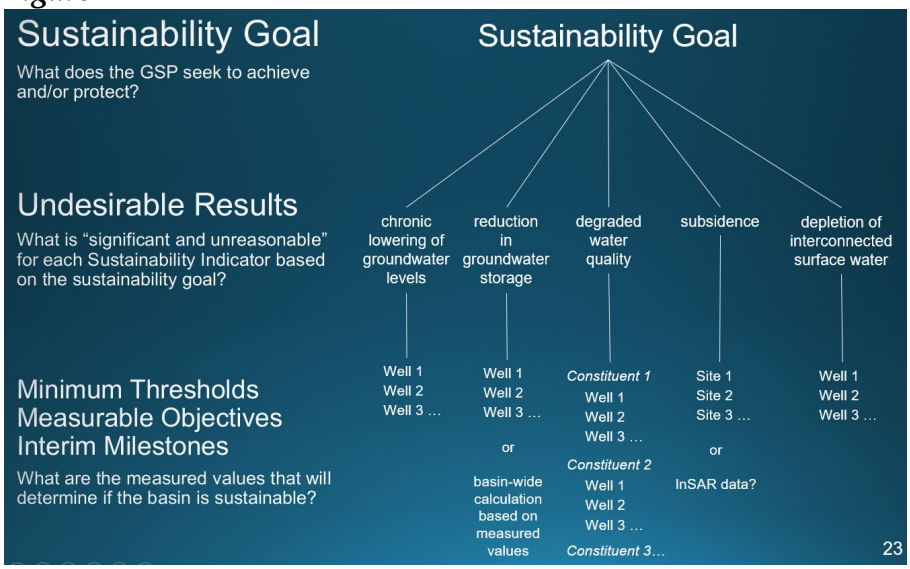
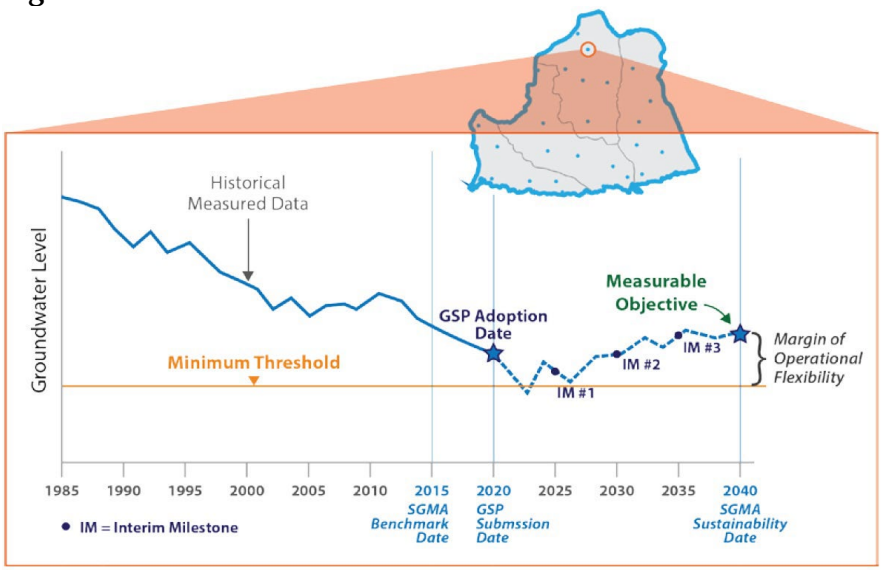


Figure 2



This ad hoc committee will provide recommendations to GSA staff on the wording and content of the undesirable results narrative addressing subsidence.

The undesirable results narrative needs to meet three goals:

1. It needs to define what is "significant and unreasonable" with regard to subsidence
2. It needs to support the sustainability goal
3. It needs to define what measurement(s) will indicate when subsidence is "significant and unreasonable".

For example, let's say that the committee wants to recommend that one of the criteria for "significant and unreasonable subsidence is when the subsidence causes roads to need repair". This statement would appropriately address (1.) above and likely (2.), particularly if the sustainability goal discusses economic impacts. In order to meet (3.) above, the undesirable result narrative would need to be supplemented with additional information about threshold exceedances in the representative monitoring network. One of the likely datasets that will be used to monitor subsidence is the InSAR data shown in Figure 5-17 (Chapter 5: Groundwater Conditions). Should the GSAs have the same MT throughout the Basin? Are there some parts of the Basin that should have lower MTs (e.g. where there is infrastructure that may be affected or where subsidence could cause increased flood risk)? Does an MT exceedance in one portion of the Basin mean an undesirable result? Two portions? DWR's SMC Best Management Practices document expands on this, saying:

> *"All undesirable results will be based on minimum thresholds exceedances. Undesirable results will be defined by minimum threshold exceedances at a single monitoring site, multiple monitoring sites, a portion of a basin, a management area, or an entire basin. Exceeding a minimum threshold at a single monitoring site is not necessarily an undesirable result, but it could signal the need for modifying one or more management actions, or implementing a project to benefit an area before the issue becomes more widespread throughout the basin. However, the GSP must define when an undesirable result is triggered."*

Note in this example that when the GSAs establish their MTs, they would need information or analysis about what amount of subsidence would cause roads to require repair and how many exceedances would constitute and undesirable result.

Recommended committee process:

1. Review guidance and background information

- review the pertinent part(s) of the regulations (**Attachment A**, §354.26 and possibly §354.28)
- review Sections 5.5 of the GSP (Chapter 5: Groundwater Conditions)

2. Gather and brainstorm ideas

- review undesirable results examples developed for other basins in the state (several provided in Chapter 7 Appendix 7A, with additional examples available at the DWR SGMA Portal)
- brainstorm a list of important concepts to reflect in the subsidence UR description (infrastructure repair, unreasonable increase in flood risk). A suggestion to generate this thinking is to consider the perspective of each of the user groups. For example:
    - "As a farmer, what would be undesirable?"
    - "As a domestic well owner, what would be undesirable?"
    - "As a fish and wildlife staff charged with maintaining habitat on behalf of the people of Big Valley and California, what would be undesirable?"
    - If I was a member of a tribe, what would be undesirable?"
    - Etc.

3. Refine recommendation(s) and document them[1]

- Gather consensus on what the committee recommends. For ideas or wording that the members can agree upon, write the recommendation(s). If there are ideas or portions that the committee can't agree upon, that should also be documented so that staff, consultants, the BVAC, and the public can do further research and discuss the matter(s) at future meetings.
- Document the recommendations in the form of a list of what should be considered "undesirable" for subsidence, proposed wording for the UR narragive, and/or descriptions of concepts that the committee could and couldn't agree on.
- The committee members should consider the following to test the appropriateness and completeness of their recommendation:
    - Will the goal meet the regulations and culminate "in the absence of undesirable results within 20 years"?
    - Does the sustainability goal reflect the generally accepted values of Big Valley residents and landowners?
    - Would the recommended sustainability goal protect the interests of all Big Valley residents, landowners, and stakeholders (including tribes)?

In addition, the committee should (if possible) provide guidance on the question of when an undesirable result has occurred (e.g. an exceedance in one portion of the Basin, two portions, etc) so that GSA staff and consultants can write the appropriate text.

[1] Note that the GSAs and consultants are looking for guidance from this ad hoc committee on the portions of the Regulations (**Attachment A**) highlighted in green. Note that the GSAs and consultants can help fill in all the required text if the committee provides general ideas, but as much guidance as possible from this committee on these items of the regulations is appreciated.

If you have any questions, please contact David Fairman at (916) 631-4528 or by e-mail at dfairman@geiconsultants.com.

Sincerely,

David Fairman, C.Hg.
Senior Hydrogeologist, GEI

Enclosure:

Attachment A: Groundwater Sustainability Plan Emergency Regulations, Subarticle 3: Sustainable Management Criteria

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.

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February 11, 2021

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Tiffany Martinez
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Re: Basin boundary modification ad hoc committee supporting information

Dear Mr. Norwood and Ms. Martinez:

GEI Consultants, Inc. (GEI) is providing this letter to support discussions and decision making of the Big Valley Advisory Committee (BVAC) "Basin boundary modification" ad hoc committee that was established at the February 3, 2021 BVAC meeting. The BVAC is an advising body for the two Groundwater Sustainability Agencies (GSAs) in the Big Valley Groundwater Basin (BVGB or Basin). The GSAs are responsible for developing a Groundwater Sustainability Plan (GSP or Plan) for the BVGB. BVAC members and the public have made numerous comments about places where the BVGB boundary may be grossly inaccurate and the BVAC created this ad hoc committee to research the basin boundary modification process and explore the feasibility of submitting a modification request in the future.

A Basin Boundary Modification Request (BBMR) was made by Lassen County to DWR in 2016 to extend the groundwater basin boundary to the watershed boundary. DWR denied the request based on lack of scientific evidence, primarily that there was no geologic basis for the boundary. The text below discusses concepts that DWR looks for in determining whether a boundary qualifies as a groundwater basin boundary.

This ad hoc committee will provide GSA staff with guidance on a potential future basin boundary modification request (BBMR). While a modification request is not within the scope of work for the GSP Development grant, much information has been gathered in the process of developing the GSP that may be useful if the GSAs choose to submit a modification request. According to the DWR website, the next Basin Boundary Modification Request period has not been scheduled, and "is not expected before 2022."

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Based on the fact that DWR is scheduled to update Bulletin 118 (which defines California's groundwater basins) in 2025, a modification request period could potentially be expected prior, perhaps in 2023 or 2024.

A BBMR is guided under DWR Basin Boundary Modification Regulations (BBM Regs, available here). Because the BVGB is not divided into subbasins, a modification to the BVGB boundary would be considered an "external" boundary modification. All external basin boundary modifications require scientific justification under the BBM Regs. The information required for such a BBMR is detailed here.

DWR defines groundwater basins in California is detailed in California Water Code (Title 23, Division 2, Chapter 1.5, Subchapter 1, Article 2, Section 341(g)(1)):

> *"The term "basin" shall refer to an area specifically defined as a basin or "groundwater basin" in Bulletin 118, and shall refer generally to 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, as further defined or characterized in Bulletin 118."*

Further, Bulletin 118 discusses groundwater basins as:

> *"A groundwater basin is defined as an alluvial aquifer or a stacked series of alluvial aquifers with reasonably well-defined boundaries in a lateral direction and a definable bottom. Lateral boundaries are features that significantly impede groundwater flow, such as rock or sediments with very low permeability or a geologic structure such as a fault."*

The term aquifer is defined in water code as:

> *"… a three-dimensional body of porous and permeable sediment or sedimentary rock that contains sufficient saturated material to yield significant quantities of groundwater to wells and springs, as further defined or characterized in Bulletin 118."*

Bulletin 118 discusses aquifers as:

> *"An aquifer is a body of rock or sediment that yields significant amounts of groundwater to wells or springs. In many definitions, the word "significant" is replaced by "economic." Of course, either term is a matter of perspective, which has led to disagreement about what constitutes an aquifer. As discussed previously, coarse-grained sediments such as sands and gravels deposited in alluvial or marine environments tend to function as the primary aquifers in California. These alluvial aquifers are the focus of this report. Other aquifers, such as those found in volcanics, igneous intrusive rocks, and carbonate rocks are described briefly in the section Groundwater Source Areas."*

Most basins are defined by the contact between the alluvial basin sediments and the surrounding bedrock. However, in the case of Big Valley, where porous volcanic formations can provide significant quantities of water to wells. GEI has heard (but not verified) that DWR may consider volcanic and other types of non-alluvial formations as aquifers if it can be shown that there is "radial" flow. In other words, not just groundwater flow along joints and fractures, but in all directions.

Given all this background, DWR is likely to accept a BBMR that uses a "qualified" geologic map that defines the boundary between alluvial and bedrock materials. There are three known geologic maps of the BVGB area that show such contacts.

- California Geological Survey – 100k Alturas Sheet 1958 Note that this is the map that was used to define the current BVGB boundary.
- GeothermEx – Geology of the Big Valley Geothermal Prospect 1975
- DWR – Northeast Counties Ground Water Investigation 1963

DWR may be agreeable to a BBMR that uses the boundaries drawn based on one of these maps. Basin boundaries that differ from one of these or other "qualified" maps would likely need professional analysis that justifies such a boundary as being the border between materials that yield significant quantities of groundwater to wells and materials that impede such flow. If the professional analysis were to show the flow in the proposed aquifer is "radial", that might increase the likelihood that DWR will accept the BBMR.

A successful BBMR was submitted in the Shasta Valley Groundwater Basin that included fundamentally volcanic deposits. The details of their BBMR can be found here.

Recommended committee process:

1. Review guidance and background information

- Review the required documentation for submitting a BBMR located here.
- Review the three geologic maps for the BVGB (links above) to see if they appear to accurately reflect the boundary between materials that produce significant quantities of water to wells and materials that impede such flow.

2. Gather ideas and discuss

- Review the elements of the successful Shasta Valley BBMR located here.
- If desired, the committee could reach out to Siskiyou County GSA staff to inquire about how they developed their successful BBMR.
- Discuss the approach to a potential BBMR.
    - What options are there for justifying a revised basin boundary?
    - What basin boundary would be most accurate and advantageous to the Big Valley users?
    - What is the potential level of effort and cost of submitting such a BBMR?
    - How would a potential new basin boundary affect the GSP?
    - What would be the level of effort and cost of modifying the GSP to the new boundary?

3. Refine recommendation(s) and document them

- Document recommendations to GSA staff on whether and how to proceed with a future BBMR

If you have any questions, please contact David Fairman at (916) 631-4528 or by e-mail at dfairman@geiconsultants.com.

Sincerely,

David Fairman, C.Hg.
Senior Hydrogeologist, GEI

GEI Consultants

Geotechnical
Environmental
Water Resources
Ecological

February 11, 2021

Gaylon Norwood
Lassen County Department of Planning and Building Services
707 Nevada Street, Suite 5
Susanville, California 96130

Tiffany Martinez
Modoc County
203 W. 4th Street
Alturas, California 96101

Re: Mapping ad hoc committee supporting information

Dear Mr. Norwood and Ms. Martinez:

GEI Consultants, Inc. (GEI) is providing this letter to support discussions and decision making of the Big Valley Advisory Committee (BVAC) "mapping" ad hoc committee that was established at the February 3, 2021 BVAC meeting. The BVAC is an advising body for the two Groundwater Sustainability Agencies (GSAs) in the Big Valley Groundwater Basin (BVGB or Basin). The GSAs are responsible for developing a Groundwater Sustainability Plan (GSP or Plan) for the BVGB. Over the last two years, GEI has supported the GSAs by providing the technical information required for the Basin Setting of the GSP. The water budget was developed for Chapter 6 of the GSP and while the GSP regulations don't require actions based solely on the water budget, the budget is an important tool to understand how water flows into and out of the basin and the volume of sustainable yield and historic average annual overdraft. Many of the components of the water budget were only roughly estimated and this ad hoc committee is tasked with giving the GSA staff and consultants recommendations and support in how to improve some of the key water budget components through a mapping project.

The GSA staff intend to meet with the ad hoc committee to have initial discussions, then bring in GEI and others as needed to advise, guide, and/or provide additional information that may be needed. The recommendations of this committee will be presented to the BVAC, GSA staff and consultants, and public at the March 3, 2021 BVAC meeting. GEI is willing to take part in any manner that GSA staff see fit. Note however, that GEI's participation would likely be remote, through internet (e.g. Zoom) communication.

GEI Consultants, Inc.
2868 Prospect Park Drive, Suite 400, Rancho Cordova, CA 95670
916.631.4500 fax 916.634.4501

This ad hoc committee will provide the GSAs with guidance on improvement of the GSP content related to the water budget. One of the largest components of the water budget is evapotranspiration, representing about 150,000 acre-feet out of about 500,000 acre-feet that enter and leave the Basin annually. Water usage by agricultural users makes up much of the evapotranspiration and the estimates in Chapter 6 are based on remote sensing data provided by DWR and estimates of applied water made from assumptions about irrigation efficiency. From the applied water estimate, groundwater pumping is calculated from estimates of how much applied water comes from surface water vs groundwater.

Clearly the numerous estimates described above result in low accuracy and precision. These components of the water budget can be improved greatly with on-the-ground information about:

- the amount of irrigated land and crop type (including agricultural land and wetlands)
- irrigation methods (flood, pivot, wheel line, drip, subirrigation) on specific fields and the typical efficiency of each irrigation method
- water source (amount of applied water that comes from surface water vs groundwater for each field)

As part of a grant obtained by Modoc County, further field investigation and mapping of irrigated acres, irrigation methods, and water source will be performed. This ad-hoc committee is tasked with guiding GSA staff on how to achieve the goals of the mapping study and provide potential resources (e.g. known information and contacts of willing land owners who would be willing to provide additional information)

Recommended committee process:

1. Review guidance and background information

- review Section 3.3 of the GSP (Chapter 3: Description of Plan Area)
- review Chapter 6: Water Budget with particular emphasis on Figure 6-5

2. Gather and brainstorm ideas

- discuss the approach to improving on the estimates of irrigated acreage, irrigation methods, and water sources (including updating information that committee members may know is inaccurate).

3. Refine recommendation(s) and document them

- Document recommendations to GSA staff on how to proceed with the study (e.g. how to perform land owner durveys and/or how to go about field mapping)

If you have any questions, please contact David Fairman at (916) 631-4528 or by e-mail at dfairman@geiconsultants.com.

Sincerely,

David Fairman, C.Hg.
Senior Hydrogeologist, GEI

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Appendix 7A Sample Sustainability Goals and Undesirable Results
Appendix 7B Sustainability Indicator Analytics for Existing Monitoring Wells

Abbreviations and Acronyms

Basin	Big Valley Groundwater Basin
BVGB	Big Valley Groundwater Basin
BVAC	Big Valley Groundwater Basin Advisory Committee
COC	Constituent of Concern
DWR	Department of Water Resources
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
MCL	Maximum Contaminant Level
SGMA	Sustainable Groundwater Management Act of 2014
SI	Sustainability Indicator (aka Undesirable Result)
SMC	Sustainable Management Criteria
TDS	Total Dissolved Solids

7. Sustainable Management Criteria (§ 354.22-30)

7.1 Sustainability Goal and Introduction

The sustainability goal for the Big Valley Groundwater Basin (BVGB or Basin) will be developed and documented in this Chapter and consists of a broad statement that when implemented will culminate "in the absence of undesirable results within 20 years". (§ 354.22) It generally describes the beneficial uses and users that the Groundwater Sustainability Plan (GSP) seeks to protect. **Appendix 7A** contains examples of sustainability goals from GSPs submitted in January 2020. Below is the text of the GSP Regulation that requires a sustainability goal:

> ***§ 354.22. 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.*

Undesirable Results are when "significant and unreasonable" effects occur relating to:

- Chronic lowering of groundwater *levels*
- Reduction of groundwater *storage*
- *Seawater intrusion* (not applicable to the BVGB)
- Degraded *water quality*
- Land *subsidence*
- Depletion of *interconnected surface water*

These six items are also known as "sustainability indicators" (SIs) in the Groundwater Sustainability Plan (GSP) Regulations. While the sustainability goal is a statement that governs the entire GSP, undesirable results are defined for each SI. In other words, undesirable results define what is "significant and unreasonable" for each SI (in the case of the BVGB this includes levels, storage, water quality, subsidence, and interconnected surface water).

This preliminary (admin) draft of Chapter 7 will not define the sustainability goal or undesirable results but will present examples and key information from which they can be developed. Development of the SMCs will be performed through collaboration between the Groundwater Sustainability Agency (GSA) staff and consultants, the Big Valley Advisory Committee (BVAC), interested parties (stakeholders), and potentially the GSA governing bodies (boards of supervisors) if the staff and BVAC deem that to be appropriate. The development of SMCs should be stakeholder driven and the text and recommendations in this chapter should largely be regarded as more suggestive than prescriptive, outside of where the regulations drive the content.

7.2 Process for Establishing Sustainable Management Criteria

Establishing Sustainable Management Criteria[1] (SMCs) will likely be an iterative process with initial criteria needing adjustment to address effects on an assessment of beneficial uses and users of groundwater, land uses, and property interests. The SMC development process will be performed through BVAC meetings, public review of draft SMCs, and other public outreach forums.

7.2.1 *Minimum Thresholds and Undesirable Results*

A minimum threshold is a numeric value used to help define when conditions have become undesirable. Minimum thresholds are established for representative monitoring sites, which when exceeded may cause undesirable results. Undesirable results will be defined by minimum threshold exceedances and are viewed by the Department of Water Resources (DWR) to determine whether the Basin is sustainable (i.e. in compliance with the Sustainable Groundwater Management Act (SGMA)).

Undesirable results may be defined as a minimum threshold exceedance at a single monitoring site, multiple monitoring sites, or a portion of the Basin. For example, say five wells are chosen as representative monitoring sites for groundwater levels in a basin. Each well needs a minimum threshold, which the GSP establishes as, say 4000, 4200, 4100, 4050, and 4150 feet above mean sea level. A minimum threshold exceedance would be when the water level in a well drops below its corresponding threshold. However, let's say in this example that the GSP defines the undesirable result criteria as "when more than 25% of the wells in the basin exceed their minimum threshold". So, in a particular year, if one well exceeds its threshold that is not an undesirable result (one of five wells would be 20%). If two wells exceed the threshold (two of five wells or 40%), that would be an undesirable result and DWR would have reason to act.

The description of an undesirable result will need to discuss the:

- Cause of the undesirable result
    - For example, groundwater pumping in the case of water levels or perhaps a high density of septic systems in the case of water quality.
- The criteria that defines when and where the effects are significant and unreasonable (i.e. undesirable result)
    - This is the quantitative definition of the combination of minimum threshold exceedances that constitute an undesirable result (e.g. 25% of wells exceed their minimum threshold)
- The potential effects of the undesirable result on beneficial uses and users of groundwater, land uses, and property interests.
    - For example, wells going dry in the case of water levels or water being unsuitable for human consumption in the case of water quality.

[1] SMCs are the minimum thresholds, undesirable results, measurable objectives, and interim milestones.

Appendix 7A contains several examples of undesirable results from GSPs submitted in January 2020.

7.2.2 *Measurable Objectives and Interim Milestones*

Measurable objectives are numeric goals that reflect the basin's desired groundwater conditions. Measurable objectives are set for the same monitoring sites as the minimum thresholds. Ideally, the measurable objective is set substantially above the minimum threshold to give some flexibility for conditions to fluctuate due to seasonal or drought conditions.

Interim milestones are numeric values for every 5 years between the GSP adoption and sustainability (20 years) that describe how the basin will reach the measurable objective. The interim milestones may describe a straight-line path between current conditions and the measurable objective, or the milestones may indicate that the GSAs plan for conditions to decline for 5-10 years and then improve. This could include interim milestones that are below the minimum threshold. The GSP is not required to have interim milestones. **Figure 7-1** gives a hypothetical example that shows the relationship between the SIs and the margin of operational flexibility.

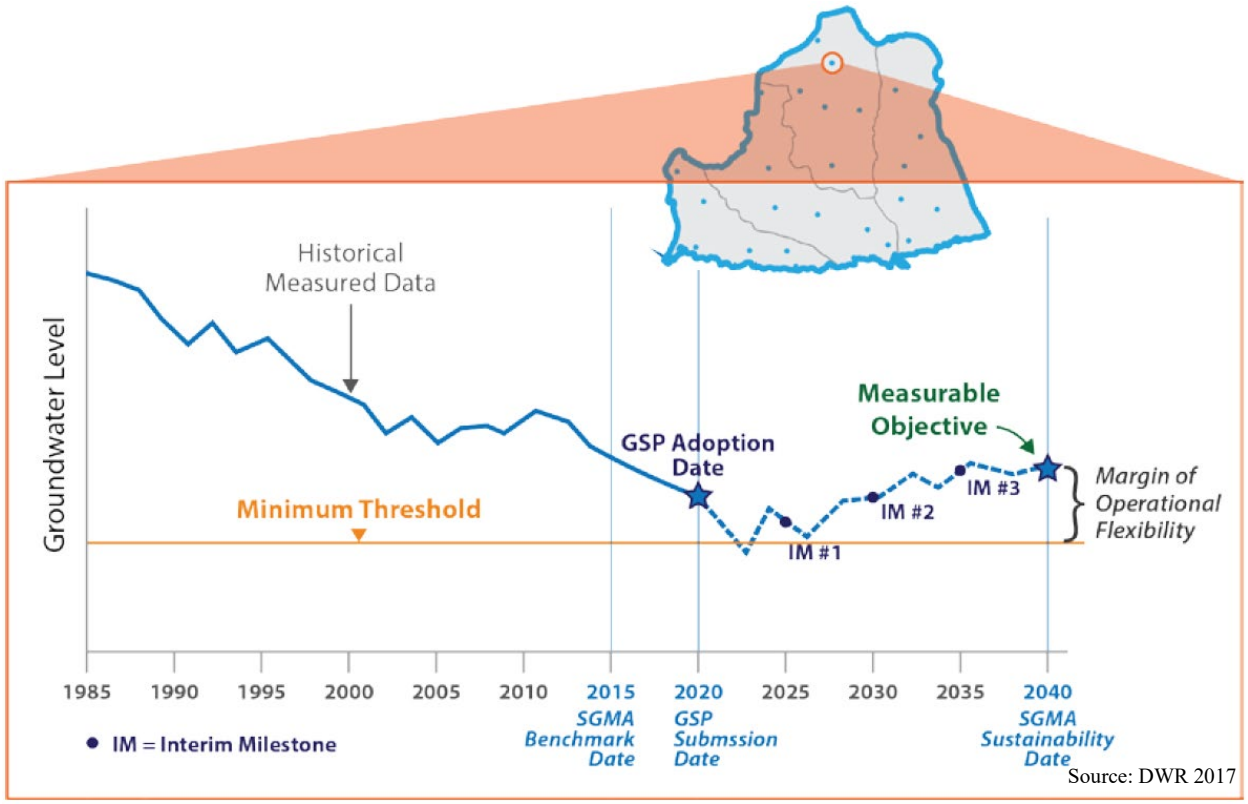


Figure 7-1 Illustration of the relationship among the sustainability indicators

7.2.3 *Information for Establishing Sustainable Management Criteria*

Ideally, the SMCs should reflect the priorities and future vision of the residents and stakeholders in the BVGB. To develop SMCs that meet this goal, there needs to be a common understanding of the Basin's physical conditions, overlying management and legal structures, and the Basin's water supply and demands. Chapters 1-6 of this GSP contain much of this information. The sections below point the reader to the pertinent information from these previous chapters and key figures and tables are repeated here. In addition, a variety of information has been assembled on a single page for each well in the Basin that could be used as part of the monitoring networks. A page for each of the 42 wells is included in **Appendix 7B.**

Again, this preliminary draft stops short of establishing the actual SMCs but provides much of the key information and potential considerations that the GSA staff, BVAC, and interested parties may use to establish them.

7.3 Management Areas

Figure 7-2 shows the locations of the wells, major streams, and groundwater dependent ecosystems (GDEs). In order to develop a representative monitoring network, the Basin was divided into areas that each well could potentially represent (i.e. the various colors). These delineations were made by assigning each 1-mile by 1-mile section to the well that would best represent conditions in that section. These judgments were made considering the distribution of the wells, streams, geology, land use, and other physical characteristics.

This exercise in dividing the basin into representative areas assumes that nearly all the wells would be used as representative sites. In practice, many of the wells are redundant and one well can potentially represent larger areas than shown on the map. For example, wells 18E1 and 18M1 are located very close to one another, are similar depths and their locations aren't separated or distinguishable by any major physical characteristics. Other potential redundancy and consolidation of the representative areas of wells could be performed. There are tradeoffs between having many representative sites vs fewer, which can and should be discussed during a BVAC or other public outreach meeting in establishing the representative monitoring network.

Consolidating areas of the Basin in this way could bring the GSAs to decide that management areas should be defined in the GSP. Management areas are allowed, but not required under SGMA. Management areas require additional documentation in the GSP and, in general, establishing management areas adds a level of complexity that may not be necessary. That said, management areas could be used to clearly delineate different land uses, land owners, water uses, water source, water rights, geology, or political affiliation (e.g. Modoc vs Lassen County). Management areas may have different SMCs than the basin at large, however there is nothing that prevents the GSP from establishing different SMCs at different monitoring sites around the Basin even without management areas.

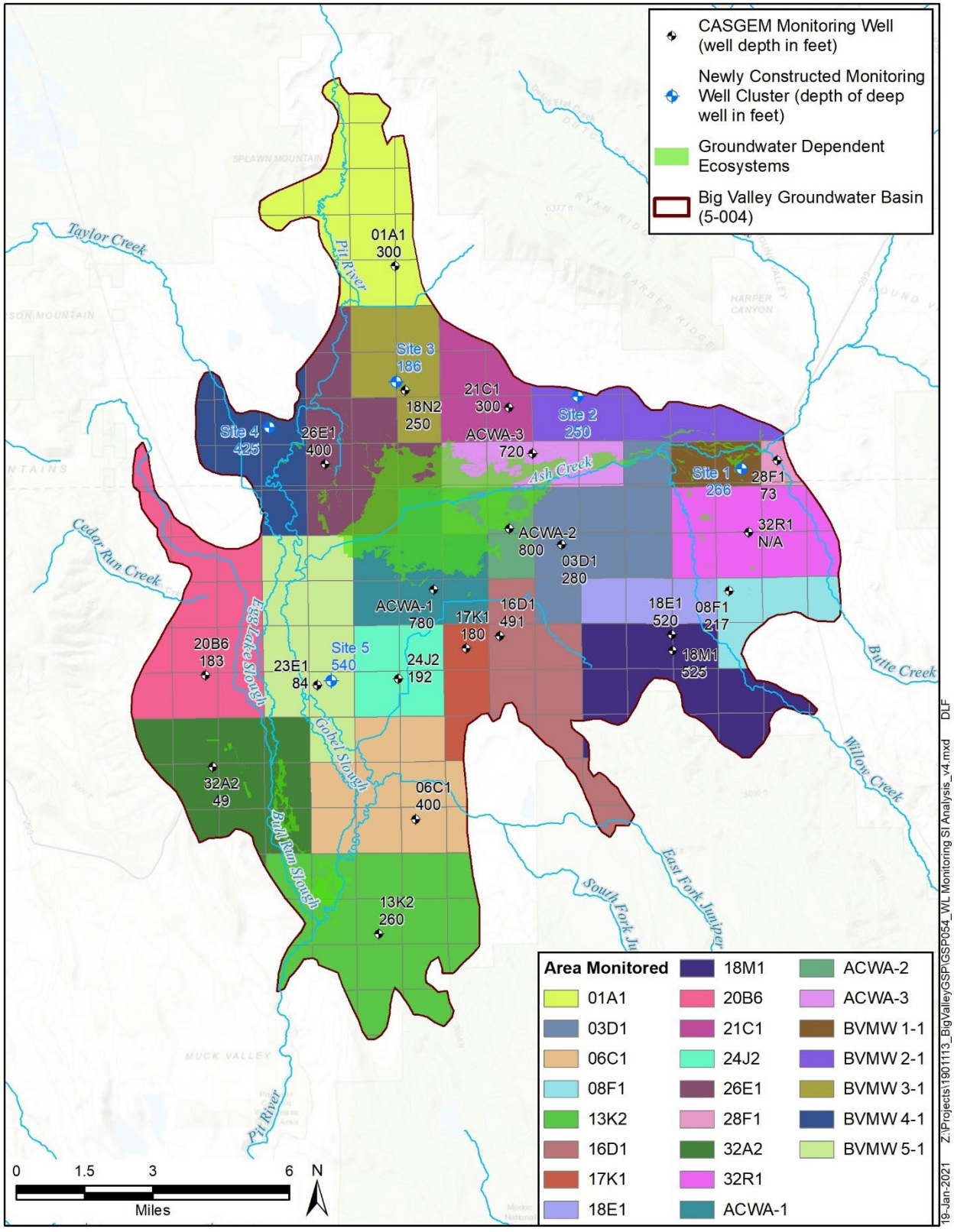


Figure 7-2 Potential monitoring wells and their representative areas

The GSP Regulations §354.20 details the required content for establishing management areas:

(a) Each Agency may define one or more management areas within a basin if the Agency has determined that creation of management areas will facilitate implementation of the Plan. Management areas may define different minimum thresholds and be operated to different measurable objectives than the basin at large, provided that undesirable results are defined consistently throughout the basin.
(b) A basin that includes one or more management areas shall describe the following in the Plan:
(1) The reason for the creation of each management area.
(2) The minimum thresholds and measurable objectives established for each management area, and an explanation of the rationale for selecting those values, if different from the basin at large.
(3) The level of monitoring and analysis appropriate for each management area.
(4) An explanation of how the management area can operate under different minimum thresholds and measurable objectives without causing undesirable results outside the management area, if applicable.
(c) If a Plan includes one or more management areas, the Plan shall include descriptions, maps, and other information required by this Subarticle sufficient to describe conditions in those areas.

7.4 Chronic Lowering of Groundwater Levels Sustainability Indicator

7.4.1 *Locally Defined Undesirable Results*

As described in section 7.2.1 above, the undesirable result for water levels needs to describe the cause of the undesirable result, the criteria that defines when and where the effects are significant and unreasonable, and the effects of the undesirable results.

Causes

The potential causes of chronic lowering of groundwater levels in the BVGB include groundwater pumping for various uses, including agriculture, industrial, domestic, municipal, and environmental enhancement.

Criteria

The GSAs will determine, through outreach, reasonable criteria for determining when chronic lowering of groundwater levels are significant and unreasonable. The criteria will be defined by minimum threshold exceedances at a single monitoring site, multiple monitoring sites, a portion of the basin, a management area, or the entire basin.

Effects

The potential effects of chronic lowering of groundwater levels on groundwater uses and users will need to be defined. Potential considerations include reduced groundwater production, wells going dry, increased energy (pumping) costs, or increased capital costs to install larger pumps in wells. Other effects may be developed when establishing the undesirable result for this SI. Note that effects such as subsidence, poor water quality, and depletion of surface water and GDEs need not be addressed under this SI but will be addressed through the other SIs.

7.4.2 *Minimum Thresholds and Measurable Objectives*

Minimum thresholds and measurable objectives will be developed for each well chosen for the representative monitoring network. Determining a reasonable groundwater elevation (above mean sea level) for each well should consider information such as depth and screen intervals of other nearby wells, historic and current water levels, and water level trends (seasonal fluctuations and response to wet and dry periods). **Appendix 7C** is a compilation of much of this information for each potential representative monitoring well. **Figure 7-3** shows and example of a well with lowering groundwater levels. Minimum thresholds could be set at criteria such as the lowest historic level, the level of the shallowest wells in the area, the projected 2042 water level, or other criteria developed through collaboration with the BVAC. Measurable objectives could be set at levels such as the 2015 water level, current water level, or some other criteria that gives an appropriate margin of operational flexibility.

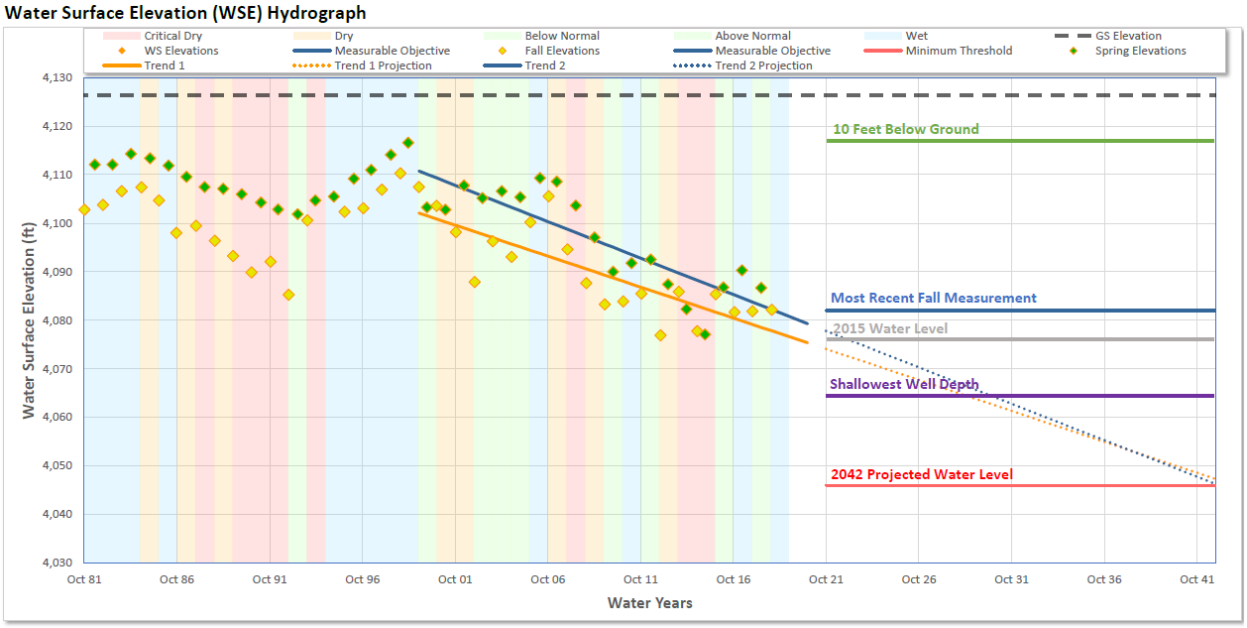


Figure 7-3 Sample Hydrograph with Plots of Potential SMC Rationale

7.5 Reduction in Groundwater Storage Sustainability Indicator

7.5.1 *Locally Defined Undesirable Results*

The definition of undesirable results for groundwater storage can largely be the same as for water levels, as the two both depend directly on groundwater levels. This applies to both the causes and effects of reduced storage. The main difference with this sustainability indicator is that the criteria for an undesirable result in the case of storage is best defined by the amount of groundwater storage calculated from contouring the water levels in the Basin. These contours were developed for historic data and presented in Section 5.2 and Appendix 5B. For contouring and calculating the groundwater in storage, a larger groundwater monitoring network than the

water level representative wells. The wells used to contour the historic data would be appropriate.

7.5.2 *Minimum Thresholds and Measurable Objectives*

Establishing a minimum threshold and measurable objective for groundwater storage would be best performed by an analysis of the historic storage fluctuations as shown in **Figure 7-4** (same as Figure 5-7). In addition, groundwater storage was projected into the future in Chapter 6, Water Budget. This projection is included as **Figure 7-5** (same as Figure 6-11).

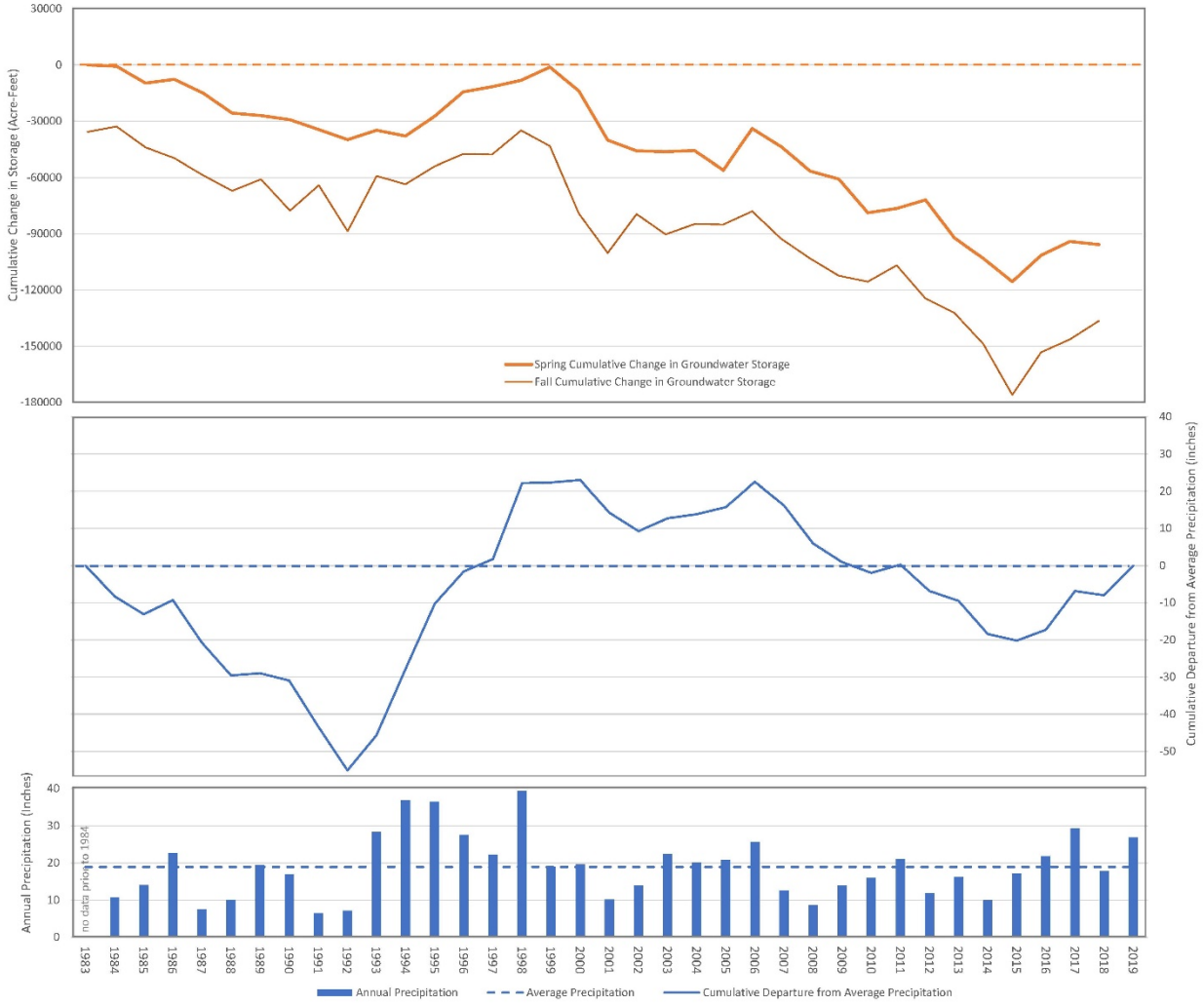


Figure 7-4 Historic Groundwater Storage from Contours (same as Figure 5-7)

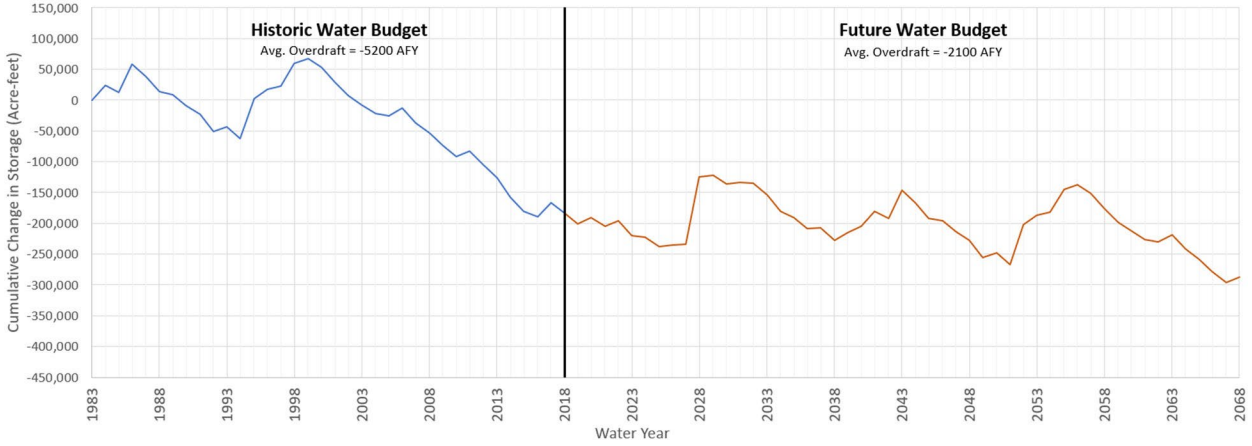


Figure 7-5 Future Groundwater Storage from Water Budget (same as Figure 6-11)

7.6 Seawater Intrusion Sustainability Indicator

The BVGB is not located near any ocean, bay, delta, or inlet. Therefore, seawater intrusion does not exist and could not occur in the Basin and is therefore not an applicable sustainability indicator.

7.7 Degraded Water Quality Sustainability Indicator

Sections 4.7 and 5.4 describe in detail water quality conditions, which are generally good to excellent. However, unlike seawater intrusion which cannot occur in the Basin, degradation of water quality is certainly possible and is an applicable sustainability indicator in the BVGB. Therefore, undesirable results must be defined along with thresholds and therefore water quality monitoring will be needed. The potential monitoring network will be described in more detail in Chapter 8.

7.7.1 *Locally Defined Undesirable Results*

The GSP Regulations are not prescriptive about what constituents must be considered for degraded water quality. They leave it to the GSAs to determine the constituents of concern (COCs) for the beneficial uses in the Basin. Section 5.4 presents an analysis of the readily available historic water quality data. **Table 7-1** (same as Table 5-3) shows the results which identify several constituents that have been detected above suitable levels. Discussion will be needed to allow the GSAs determine which of these should be deemed COCs. At a minimum, electrical conductivity and/or Total Dissolved Solids (TDS) are recommended as COCs because they are a measure of the generalized quality of groundwater.

The Regulations do stipulate that migration of contaminant plumes be considered for the degraded water quality SI. **Table 7-2** (same as Table 5-4) describes the known contamination plumes.

283 **Table 7-1 Water Quality Statistics (same as Table 5-3)**

Constituent Name	Suitability Threshold Concentration	Suitability Threshold Type	Total # of Meas	min	max	# Meas Above Threshold	% of Meas Above Threshold	# Wells With Meas	# Wells with Average Above Threshold	% of Wells with Average Above Threshold	# Wells with Most Recent Meas Above Threshold	% of Wells with Most Recent Meas Above Threshold	Comment
Aluminum	200	DW1	41	0	552	2	5%	18	1	6%	0	0%	Low concern due to only two threshold exceedances and zero recent measurements above MCL
Antimony	6	DW1	45	0	36	1	2%	20	1	5%	0	0%	Low concern due to only one threshold exceedance and zero recent measurements above MCL
Arsenic	10	DW1	53	0	12	4	8%	23	3	13%	3	13%	
Barium	1000	DW1	49	0	600	0	0%	23	0	0%	0	0%	
Beryllium	4	DW1	48	0	1	0	0%	23	0	0%	0	0%	
Cadmium	5	DW1	49	0	1	0	0%	23	0	0%	0	0%	
Chromium (Total)	50	DW1	36	0	20	0	0%	13	0	0%	0	0%	
Chromium (Hexavalent)	10	DW1*	13	0.05	3.29	0	0%	13	0	0%	0	0%	
Copper	1300	DW1	34	0	190	0	0%	21	0	0%	0	0%	
Fluoride	2000	DW1	42	0	500	0	0%	16	0	0%	0	0%	
Lead	15	DW1	28	0	6.2	0	0%	16	0	0%	0	0%	
Mercury	2	DW1	44	0	1	0	0%	19	0	0%	0	0%	
Nickel	100	DW1	46	0	10	0	0%	20	0	0%	0	0%	
Nitrate (as N)	10000	DW1	151	0	4610	0	0%	24	0	0%	0	0%	
Nitrite	1000	DW1	62	0	930	0	0%	20	0	0%	0	0%	
Nitrate + Nitrite (as N)	10000	DW1	2	40	2250	0	0%	2	0	0%	0	0%	
Selenium	50	DW1	49	0	5	0	0%	23	0	0%	0	0%	
Thallium	2	DW1	46	0	1	0	0%	20	0	0%	0	0%	
Chloride	250000	DW2	66	1400	79000	0	0%	43	0	0%	0	0%	
Iron	300	DW2	50	0	11900	26	52%	21	8	38%	9	43%	Low human health concern due to being a secondary MCL for aesthetics
Iron	5000	AG	50	0	11900	2	4%	21	2	10%	2	10%	
Manganese	50	DW2	45	0	807	28	62%	21	12	57%	11	52%	Low human health concern due to being a secondary MCL for aesthetics
Manganese	200	AG	45	0	807	22	49%	21	7	33%	7	33%	
Silver	100	DW2	36	0	20	0	0%	19	0	0%	0	0%	
Specific Conductance	900	DW2	66	125	1220	3	5%	42	1	2%	1	2%	
Sulfate	250000	DW2	60	500	1143000	1	2%	40	0	0%	0	0%	Low concern due to only one threshold exceedance and zero recent measurements above MCL
Total Dissolved Solids (TDS)	500000	DW2	57	131000	492000	0	0%	39	0	0%	0	0%	
Zinc	5000	DW2	34	0	500	0	0%	20	0	0%	0	0%	
Boron	700	AG	40	0	100	0	0%	34	0	0%	0	0%	
Sodium	69000	AG	33	11600	69000	0	0%	21	0	0%	0	0%	

Sources:

GAMA Groundwater Information System, accessed June 5, 2020 (SWRCB 2020)

University of California Cooperative Extension Farm Advisor (UCCE 2020)

Notes:

GAMA data was filtered to remove all measurements before Oct 1, 1982 and all GeoTracker cleanup sites

Constituents listed are all inorganic naturally occurring elements and compounds that have a SWRCB drinking water maximum contaminant limit (MCL), plus Boron, which has a threshold for agricultural use.

All measurements in micrograms per liter, except specific conductance which is measured in microsiemens per centimeter.

Green indicates less than 1%

Yellow indicates between 1% and 10%

Red indicates greater than 10%

Threshold Types:

DW1: Primary drinking water MCL

DW2: Secondary drinking water MCL (for aesthetics such as taste, color, and odor)

AG: Agricultural threshold based on guidelines by the Food and Agricultural Organization of the United Nations (Ayers and Westcot 1985)

284 * Hexavalent chromium was regulated under a primary drinking water MCL until the MCL was invalidated in 2017. The SWRCB is working to re-establish the MCL

285 **Table 7-2 Known Potential Groundwater Contamination Sites (same as Table 5-4)**

GeoTracker ID	Latitude	Longitude	Case Type	Status	Last Regulatory Acitivity	Case Begin Date	Potential Contaminants of Concern	Site Summary
T10000003882	41.12050	-121.14605	LUST Cleanup Site	Open - Assessment & Interim Remedial Action	04/16/20	10/17/11	Benzene, Diesel, Ethylbenzene, Total Petroleum Hydrocarbons (TPH), Xylene	The case was opened following an unauthorized release from an underground storage tank(s). Tank removal and further site assessment, including installation of eight monitoring wells, led to remedial actions. Periodic groundwater monitoring started in October 2013 and has been ongoing though March 2020.
T0603593601	41.13230	-121.13070	LUST Cleanup Site	Open - Remediation	07/29/20	03/22/00	Gasoline	Active gas station with groundwater impacts. Full-scale remediation via groundwater extraction and treatment began in September 2013 and was shut-down in April 2017 because it was determined that it was no longer an effective remedy to treat soil and groundwater. At the time of system shutdown, the influent MTBE concentration was 5,650 ug/L which exceeds the Low-Threat Closure Policy criteria. Additionally, high levels of TPHg and sheen/free product are present. A soil vapor extraction (SVE) system operated for a limited time in 2016/2017 but was not effective. In April 2018, it was determined that active remediation is not a cost-effective path to closure given low permeability of site soils. Staff suggested incorporating institutional controls (IC) and risk-based cleanup objectives instead of active remediation of soil and groundwater. The IC approach was dependent on the submittal of several documents related to soil management, deed restriction, and risk modeling plus annual groundwater sampling. This information has not been provided and the RWQCB sent an Order for this information.
T0603500006	41.12241	-121.14128	LUST Cleanup Site	Completed - Case Closed	01/04/00	06/28/99	Diesel	A 2000-gallon underground storage tank was removed and limited contaminated soil was present in the excavation. Petroleum hydrocarbons were not found in the uppermost groundwater. These findings led to the closure of the case.
L10005078943	41.12941	-121.14169	Land Disposal Site	Open - Closed facility with Monitoring*	06/26/20	06/30/08	Higher levels of Inorganic constituents, organic chemicals (synthetic), per/polyfluoroalkyl substances	Disposal activities at Bieber Landfill occurred from the early 1950s until 1994. The landfill was closed during the early 2000s. While active, the site received residential, commercial, and industrial non-hazardous solid waste. Formerly an unlined burn dump, the site was converted to cut-and-cover landfill operation in 1974. Landfill refuse is estimated to occupy less than 13 acres of the 20-acre site. Wastes are estimated to be approximately 10 to 15 feet thick. The Class III landfill was closed in accordance with Title 27 of the California Code of Regulations. A transfer station was established at the site for the transporation of waste to another landfill. Groundwater levels and quality are monitored twice per year at four wells.
T0603500003	41.12124	-121.14061	LUST Cleanup Site	Completed - Case Closed	09/13/94	07/31/91	Heating Oil / Fuel Oil	A 1000-gallon underground storage tank was removed and contaminated soil was present beneath the tank, which led to installation of nine soils borings and three monitoring wells. Contaminated soil was removed but an adjacent building limited the extent of the excavation so contaminated soil remains under the building. Hydrocarbons were initally found in one well but not in subsequent sampling. The RWQCB concurred with a request to close the investigation.
T10000003101	41.13151	-121.13658	Cleanup Program Site	Open - Assessment & Interim Remedial Action	07/22/20	04/03/07	Benzene, Toluene, Xylene, MTBE / TBA / Other Fuel Oxygenates, Gasoline, Other Petroleum	A diesel leak was found in association with an industrial chipper. Corrective action included excavation of diesel-impacted soil, removing contaminated water, and groundwater monitoring. Results of soil and groundwater sampling indicate low concentrations of TPHg and BTEX and that there is no offsite migration. Staff have determined that the case is ready for closure, pending decommissioning of the site monitoring wells.
SL0603581829	41.09251	-121.17904	Cleanup Program Site	Completed - Case Closed	09/01/05	01/08/05	Petroleum - Diesel fuels, Petroleum - Other	Contaminated soil excavated and transported to Forward Landfill for disposal. Contaminated groundwater (7,000 gallons) extracted with vacuum truck for disposal.
T0603500002	41.12188	-121.13546	LUST Cleanup Site	Completed - Case Closed	07/17/06	10/20/86	Gasoline / diesel	Three underground storage tanks were removed and contaminated soil was present beneath the tank, which led to installation of nine monitoring wells and three remediation wells. Natural attenuation of the hydrocarbon impact was acceptable to the RWQCB due to the limited, well-defined extent of the impact and the limited and declining impact to groundwater. The RWQCB concurred with a request to close the site.
T0603500004	41.12134	-121.13547	LUST Cleanup Site	Completed - Case Closed	03/12/99	06/12/97	Diesel	A 5000-gallon underground storage tank was removed and very low levels of petroluem hydrocarbons were detected in the soil, which was allowed to be spread onsite and the case was closed.
T10000002713	41.11993	-121.14271	Cleanup Program Site	Open - Site Assessment	12/30/16	03/10/10	Other Petroleum	The site is an old bulk plant which was built in the 1930's and handled gasoline and diesel. During a routine inspection in March 2010, evidence of petroleum spills were identified at the loading dock area. A follow-up inspection was conducted in April 2010. The ASTs and loading dock were removed but additional contamination was noted under the removed structures. Furthermore, a shallow excavation contained standing water with a sheen. Due to the potential impacts to shallow groundwater, the Central Valley Water Board became the lead agency in December 2010. Additional information was requested in December 2016. A response is not evident.

*This terminology indicates that the landfill is closed (no new material being disposed), but the site is open with regard to ongoing groundwater monitoring.

286 Source: GeoTracker (SWRCB 2020b)

Causes

Below is a description of potential causes of degradation of water quality. In future versions of this chapter, not all of these must be included, as the GSAs through outreach with the BVAC and stakeholders will determine which sources are of significant concern.

Much of the potential sources of water quality degradation are naturally occurring. Deep parts of the aquifer contain higher TDS. Geothermal areas also have high TDS. Iron, Arsenic, and Manganese are all naturally occurring. Anthropogenic sources include agricultural users if they use nitrate and pesticides, septic tanks, wastewater ponds, and the potential contamination sites listed in **Table 7-2** and shown on **Figure 7-6** (same as Figure 5-15).

Regardless of the original source, groundwater pumping can induce the migration of poor-quality water, both horizontally and vertically.

Criteria

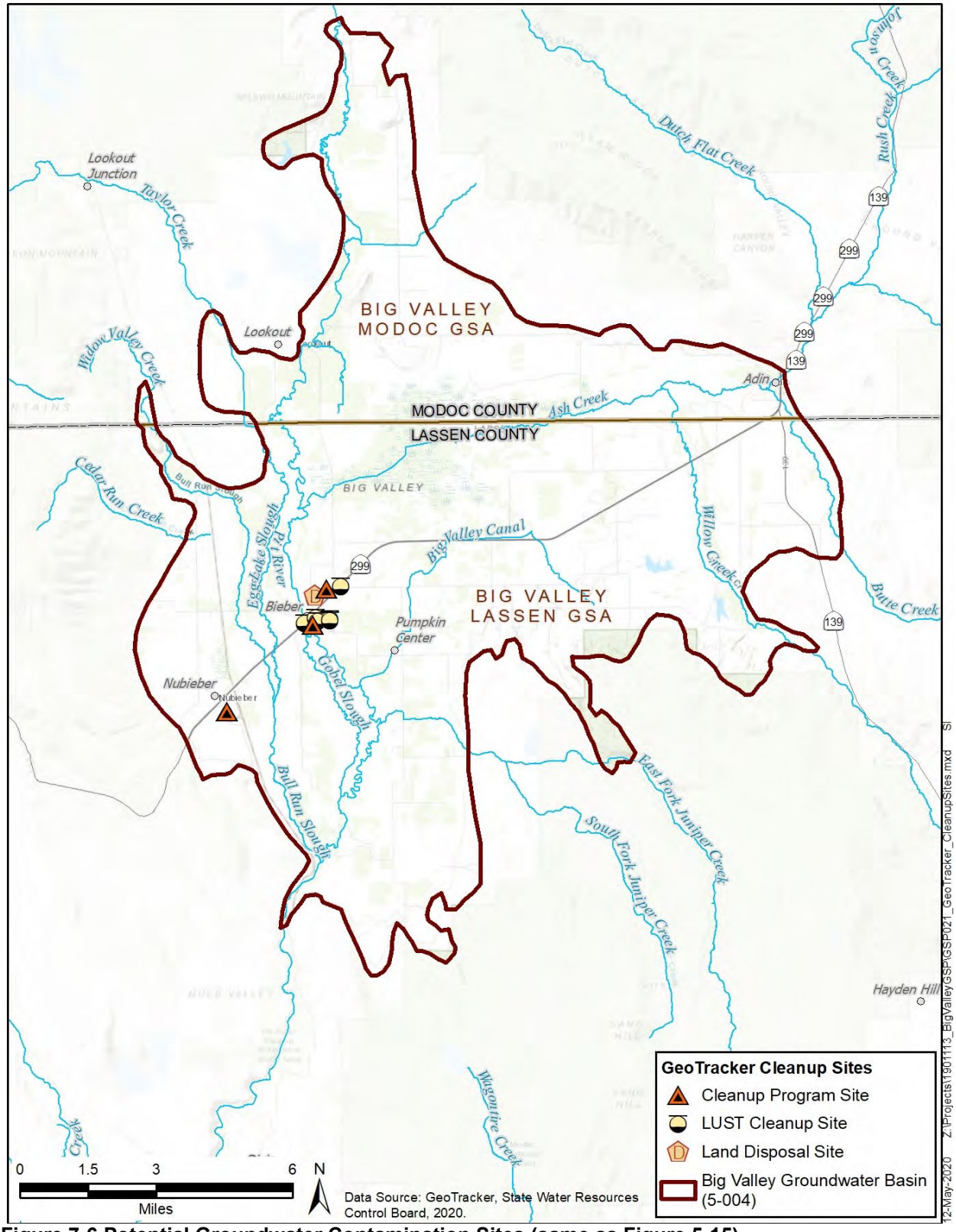
The GSAs will determine, reasonable criteria for determining when degradation of water quality is significant and unreasonable. The criteria will be defined by minimum threshold exceedances at a single monitoring site, multiple monitoring sites, a portion of the basin, a management area, or an entire basin.

Effects

The potential effects of chronic lowering of groundwater levels on groundwater uses and users will need to be defined. Generally the effects of degraded water quality is reduced suitability for beneficial uses.

7.7.2 *Minimum Thresholds and Measurable Objectives*

The GSP Regulations state that the GSAs "shall consider local, state, and federal water quality standards applicable to the basin". (§354.28(c)(4)) The suitability threshold concentrations listed in **Table 7-1** provide a good starting point for defining minimum thresholds and measurable objectives. Other basins in the state have used suitability thresholds (such as drinking water maximum contaminant levels (MCLs)) as the minimum threshold and say 75% of the MCL as the measurable objective. That is to say that the measurable objective is to stay below 75%.



315
316 **Figure 7-6 Potential Groundwater Contamination Sites (same as Figure 5-15)**

317

7.8 Subsidence Sustainability Indicator

7.8.1 *Locally Defined Undesirable Results*

Subsidence conditions in Big Valley were presented in Section 5.5 and indicate minimal subsidence. However, future subsidence is possible and is therefore an applicable SI in the BVGB. The Regulations indicate that undesirable subsidence is that which interferes with surface land uses. Many surface land uses, such as agriculture are not greatly affected by subsidence, unless their conveyances are disturbed.

Causes

The potential causes of land subsidence in the BVGB are groundwater extraction to levels below historic lows causing the compaction of clay layers, oxidation of peat soils, and tectonic (natural) processes.

Criteria

Generally, the GSAs will want to focus their undesirable results on areas with infrastructure that is sensitive to ground level fluctuations such as canals, railroads, and perhaps highways. The criteria will be defined by minimum threshold exceedances (subsidence rate and extent) at a single monitoring site, multiple monitoring sites, a portion of the basin, a management area, or an entire basin. The easiest, least expensive, and most readily available monitoring is through the InSAR datasets provided by DWR and described in Section 5.5.

Effects

The effects of subsidence on land uses and property interests comes generally in the form of infrastructure repair costs to canals, railroads, and perhaps highways. Additionally, widespread subsidence can make areas more susceptible to flooding and affect land uses.

7.8.2 *Minimum Thresholds and Measurable Objectives*

Minimum thresholds for subsidence depend on the type of infrastructure and its sensitivity to ground elevation changes. Canals are particularly sensitive and more conservative thresholds may be needed, while other areas may have more liberal thresholds.

7.9 Depletion of Interconnected Surface Water Sustainability Indicator

7.9.1 *Locally Defined Undesirable Results*

Depletion of interconnected surface water measurement is the volume or rate of depletions that "has adverse impacts on beneficial uses of surface water". (§354.28(c)(6))

Causes

The cause of surface water depletion is the lowering of groundwater levels at or near surface water bodies which induces a higher gradient and more water flows to the groundwater aquifer from streams and surrounding riparian areas.

Criteria

The groundwater contours in **Figure 7-7** (same as Figure 5-5 in Section 5.1.3) demonstrate where surface water depletions occur and the water budget in Chapter 6 gives estimates of the total volume of surface water losses (depletions). DWR allows GSAs to use measurements of water levels as a proxy for depletions, so therefore a monitoring network of wells near surface water bodies would be appropriate for measurement of depletions and may include minimum threshold exceedances at a single monitoring site, multiple monitoring sites, a portion of the basin, a management area, or the entire basin.

Effects

The effects of significant and unreasonable surface water depletions is on beneficial uses of surface water, which could include surface water rights, riparian habitat, and groundwater dependent ecosystems.

7.9.2 *Minimum Thresholds and Measurable Objectives*

Direct measurement of the volume or rate of depletion is difficult, and DWR allows GSAs to use measurements of water levels as a proxy for depletions. The water budget in Chapter 6 gives estimates of surface water losses to groundwater. The process of establishing minimum thresholds and measurable objectives could involve determining the significant and unreasonable volume of depletions and performing an analysis of what water levels in wells adjacent to the streams correlate with these volumes. Some GSAs have settled on the rate of depletions in 2015 (the baseline year for SGMA) as the minimum threshold or measurable objective.

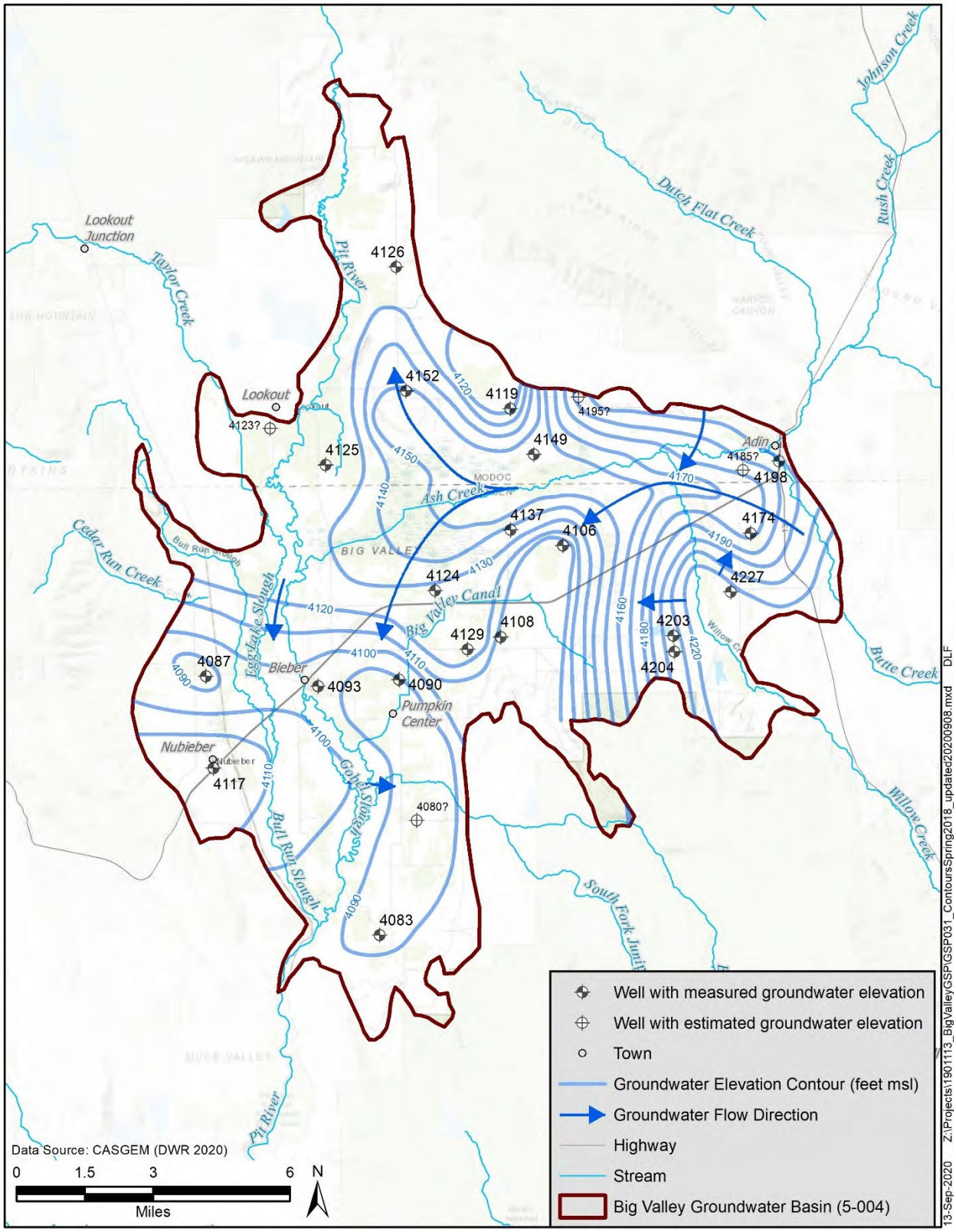


Figure 7-7 Groundwater Elevation Contours and Flow Direction (same as Figure 5-5)

7.10 References

Department of Water Resources (DWR), 2017. Draft Sustainable Management Criteria BMP. Published November 2017. Available at: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/BMP-6-Sustainable-Management-Criteria-DRAFT_ay_19.pdf.

Appendix 7A

Sample Sustainability Goals and Undesirable Results

- Mid Kaweah GSP
- Cuyama GSP
- North Yuba GSP

From the Mid Kaweah GSP

available at: https://sgma.water.ca.gov/portal/gsp/preview/50

Sustainability Goal: (page 3-1)

"The broadly stated Sustainability Goal for the Kaweah Subbasin is for each GSA to manage groundwater resources to preserve the viability of existing agricultural enterprises of the region and the smaller communities that provide much of their job base in the Sub-basin, including the school districts serving these communities. The Goal will also strive to fulfill the water needs of existing and amended county and city general plans that commit to continued economic and population growth within Tulare County."

Undesirable Results for Groundwater Levels:

Causes (page 3-3):

"Undesirable results associated with groundwater level declines are caused by over-pumping or nominal groundwater recharge operations -such that groundwater levels fall and remain below minimum thresholds. Over-pumping and lack of recharge is area specific, and some GSA Management Areas experience greater adverse impacts than others. Overdraft during a period of drought is not sufficient to establish a chronic lowering of groundwater levels if extractions and groundwater 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."

Criteria (page 3-5):

"Groundwater elevations serve as the sustainability indicator and metric for chronic lowering of groundwater levels. With respect to water-level declines, undesirable results occur when one-third of the representative monitoring sites in all three GSA jurisdictions combined exceed their respective minimum threshold water level elevations. Should this occur, a determination shall be made of the then-current GSA water budgets and resulting indications of net reduction in storage. Similar determinations shall be made of adjacent GSA water budgets in neighboring subbasins to ascertain the causes for the occurrence of the undesirable result."

Effects (page 3-8):

"The potential effects of lowered groundwater levels, when approaching or exceeding minimum thresholds and thus becoming an undesirable result, are reduced irrigation water supplies for agriculture and for municipal systems through loss of well capacity, loss or degradation of water supplies for smaller community water systems and domestic wells due to well failures, increased energy consumption due to lowered water levels, and the adverse economic consequences of the aforementioned effects such as increased energy usage to extract groundwater from deeper levels. The same effects occur with reductions in groundwater storage due to the proxy relationship with water levels."

From the Cuyama Valley GSP

available at: https://sgma.water.ca.gov/portal/gsp/preview/32

Sustainability Goal: (page 3-1)

"Sustainability Goal: To maintain a sustainable groundwater resource for beneficial users of the Basin now and into the future consistent with the California Constitution."

Undesirable Results for Surface Water Depletions: (page 3-5)

"Description of Undesirable Results

The Undesirable Result for depletions of interconnected surface water is a result that causes significant and unreasonable reductions in the viability of agriculture or riparian habitat within the Basin over the planning and implementation horizon of this GSP.

Identification of Undesirable Results

This result is considered to occur during GSP implementation when 30 percent of representative monitoring wells (i.e., 18 of 60 wells) fall below their minimum groundwater elevation thresholds for two consecutive years.

Justification of Groundwater Elevations as a Proxy

Use of groundwater elevation as a proxy metric for Undesirable Results is necessary given the difficulty and cost of direct monitoring of depletions of interconnected surface water. The depletion of interconnected surface water is driven by a gradient between water surface elevation in the surface water body and groundwater elevations in the connected, shallow groundwater system. By setting minimum thresholds on shallow groundwater wells near surface water, the CBGSA can to monitor and manage this gradient, and in turn, manage potential changes in depletions of interconnected surface.

Potential Causes of Undesirable Results

Potential causes of future Undesirable Results for depletions of interconnected surface water are likely tied to groundwater production, which could result in lowering of groundwater elevations in shallow aquifers near surface water courses. This could change the hydraulic gradient between the water surface elevation in the surface water course and the groundwater elevation, resulting in an increase in depletion of surface water to groundwater. If depletions of interconnected surface water were to reach Undesirable Results, groundwater dependent ecosystems could be affected."

From the North Yuba GSP

available at: https://sgma.water.ca.gov/portal/gsp/preview/53

Sustainability Goal: (page 4-3)

"The sustainability goal for the Yuba Subbasins is to maintain a locally managed, economically viable, sustainable groundwater resource for existing and future beneficial use in Yuba County by continuing existing management to maintain operation within the sustainable yield or by modification of existing management to address unforeseen future conditions."

Undesirable Results for water quality degradation: (page 4-5)

"Description of Undesirable Results

The undesirable result for degraded water quality is a result stemming from a causal nexus between groundwater related activities, such as groundwater extraction or groundwater recharge, and groundwater quality that causes a significant and unreasonable reduction in the long-term viability of domestic, agricultural, municipal, or environmental uses over the planning and implementation horizon of this GSP. The causal nexus reflects that the undesirable results are water quality issues associated with groundwater pumping and other groundwater-related activities rather than water quality issues resulting from land use practices, naturally occurring water quality issues, or other issues not associated with groundwater pumping and other groundwater-related activities.

Within the Yuba Subbasins, the causal nexus would be related to increased salinity concentrations resulting from pumping-induced upconing of deeper saline groundwater, as discussed later in this section. It should be noted that water quality issues outside of the causal nexus are generally covered by other regulatory frameworks. Contaminated sites are regulated by the RWQCB, Department of Toxic Substances Control, and the USEPA. Drinking water quality is regulated by the SWRCB-DDW. Potential contamination by agricultural practices are regulated through CV-SALTS, ILRP, and DPR.

Potential Causes of Undesirable Results

The Yuba Subbasins have a long history of successful sustainable management. Potential causes of future undesirable results for degraded groundwater quality likely would be tied to significant increases in groundwater production (which are not anticipated) resulting in upconing (upward movement of saline water due to pumping within shallower freshwater aquifers) of deeper saline water, naturally present in the aquifer below the fresh water aquifer accessed for water supply. The potential causes of substantial increases in groundwater production are the same as those previously described in Section 4.3.1. Degraded groundwater quality may potentially also be caused by issues outside of that causal nexus which would not be considered undesirable results under this GSP, such as unforeseen contamination issues within the Yuba Subbasins or changes resulting from salt and nutrient loading.

Potential Effects of Undesirable Results

If groundwater quality were degraded to reach undesirable results levels, the effect could cause a reduction in economically usable supply to groundwater users, with domestic wells being most vulnerable as costs for treatment or access to alternate supplies can be high for small users. High salinity can impact both drinking water uses and agricultural uses, as there are maximum values associated with aesthetics (taste, color, and odor) for drinking water and crop health and yield for agriculture. Water quality degradation could impact GDEs, impact surface water quality and health of aquatic species, cause changes in crops grown, cause adverse effects to property values, and cause other economic effects. Additionally, reaching undesirable results levels for groundwater quality could adversely affect current and projected municipal uses, which could have to install treatment systems or seek alternate supplies.

Identification of Undesirable Results

Two wells in the North Yuba Subbasin and 2 wells in the South Yuba Subbasin were selected for identification of undesirable results to indicate region-wide impacts rather than localized conditions. Therefore, within each individual subbasin, undesirable results are considered to occur during GSP implementation when at least 50% of representative monitoring wells (2 of 4 sites in the North Yuba Subbasin; 2 of 4 sites in the South Yuba Subbasin) exceed the minimum thresholds for water quality for two consecutive measurements (occurring biennially) at each location and where these values can be tied to a causal nexus between groundwater-related activities and water quality. Minimum thresholds are discussed in Section 4.4.4.2."

Appendix 7B

Sustainability Indicator Analytics for Existing Monitoring Wells

20B6 Sustainability Indicator Analysis

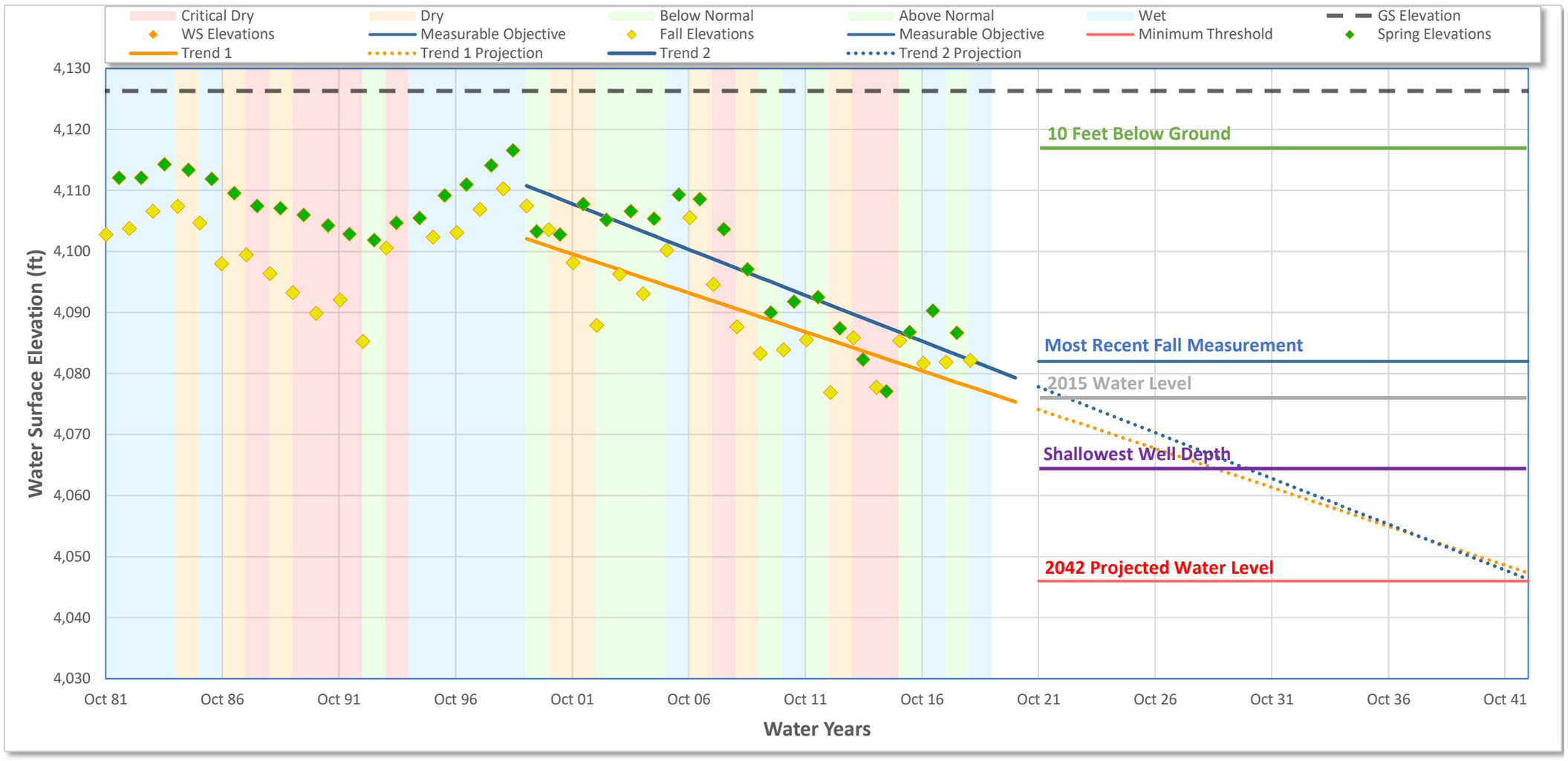
Date: 1/18/2021

Well Information	
Well ID	000002-38N07E20B006M
Alternate Name	20B6
State Number	38N07E20B006M
CASGEM ID	411242N1211866W001
Well Location	
County	Lassen
Basin	BIG VALLEY
Sub-Basin	-
Management Area	-
Proveyor Agency	-
Well Type Information	
Well Type	Unknown
Well Use	Other
Completion Type	Single

Well Coordinates/Geometry		
Location	Lat:	41.1242
	Long:	-121.1866
Well Depth		183 ft
Ground Surface Elevation		4126.30 ft
Ref. Point Elevation		4127.30 ft
Screen Depth Range		41 to 183 ft
Screen Elevation Range		4086 to 3944 ft
Principal Aquifer		-
Well Period of Record		
Period-of-Record		1979..2019
WS Elev-Range	Min:	4076.9 ft
	Max	4116.6 ft

Trend Analysis		
Seasonal Data Method		Apr1/Oct1
Show Trend 1		Fall Data
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	(1.275 ft/yr)
Show Trend 2		Spring Data
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	(1.501 ft/yr)

Water Surface Elevation (WSE) Hydrograph



Sustainability Indicator Considerations

Observed WS Elevations		
Parameter		**Value**
WS Elevation Range	Min:	4077 ft
	Max	4117 ft
2015 WS Elevations	Spring:	4077 ft
	Fall:	4085 ft
Most Recent WS Elev	Spring:	4087 ft
	Fall:	4082 ft

Trend Projections		
Year	**Trend 1-Fall**	**Trend 2-Spring**
2022	4073 ft	4076 ft
2027	4066 ft	4069 ft
2032	4060 ft	4061 ft
2037	4054 ft	4054 ft
2042	4047 ft	4046 ft
2047	4041 ft	4039 ft

Sustainability Indicator Settings

Key	Threshold Type	Effect. Yr.	Value	Description
MT	Minimum Threshold	2022	4,046.0 ft	Projected 2042 water level
MO	Measureable Objective	2022	4,082.0 ft	Most Recent Fall Measurement

Well Depths Within Area

Well Type	Number of Wells	Shallowest Depth (feet bgs)	Shallowest Elevation (feet msl)
Domestic	11	61	4065
Production (Ag)	6	170	3956

Sustainability Indicators to Consider

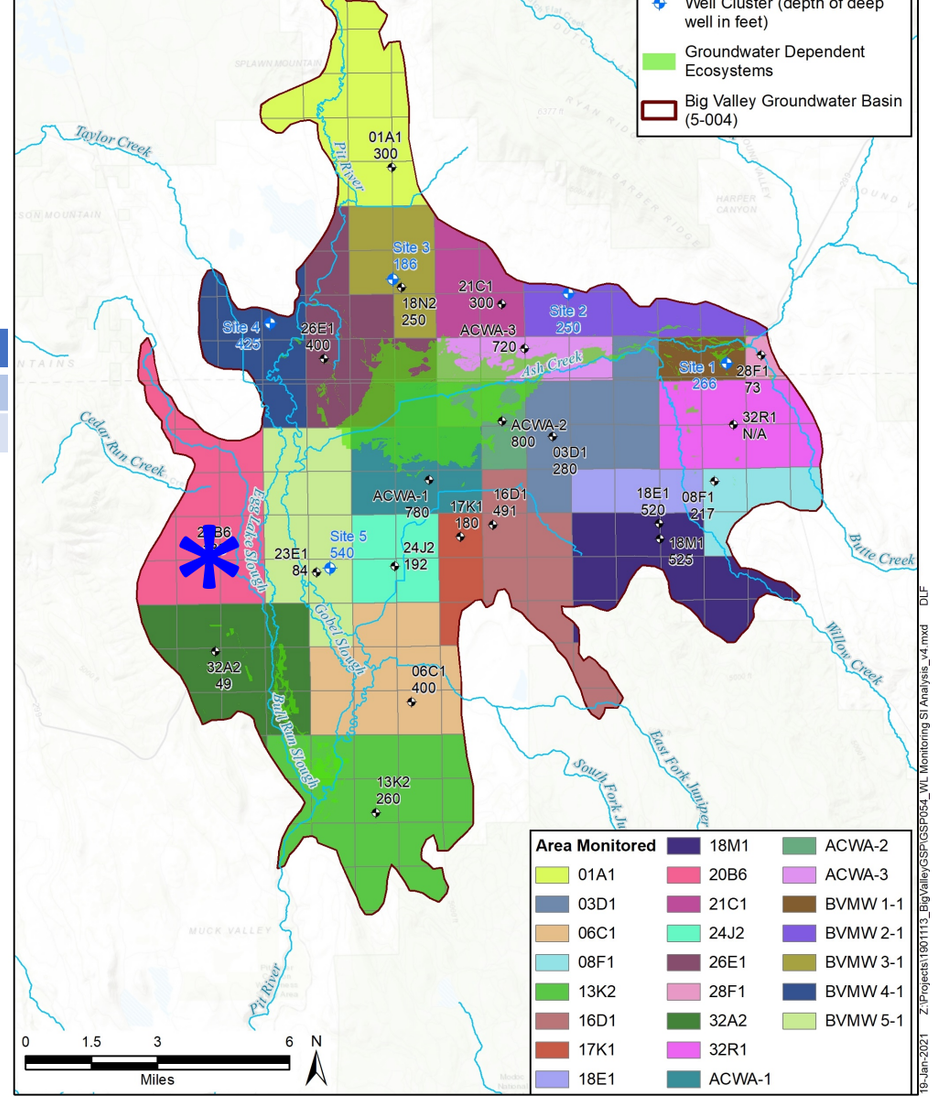
Water Levels	Yes
Groundwater Storage	Yes
Water Quality	No
Subsidence	Maybe
Surface Water Depletions	No

Other Pertinent Information

Distance From Nearest Perennial Stream	2.1 miles
Name of Nearest Perennial Stream	Pit River
Distance From Nearest GDE	1.5 miles
Description of Nearest GDE	Bull Run Slough near Nubieber

Notes:

Located near railway, so water levels could be used here as a proxy for making sure there isn't subsidence on the infrastructure.



23E1 Sustainability Indicator Analysis

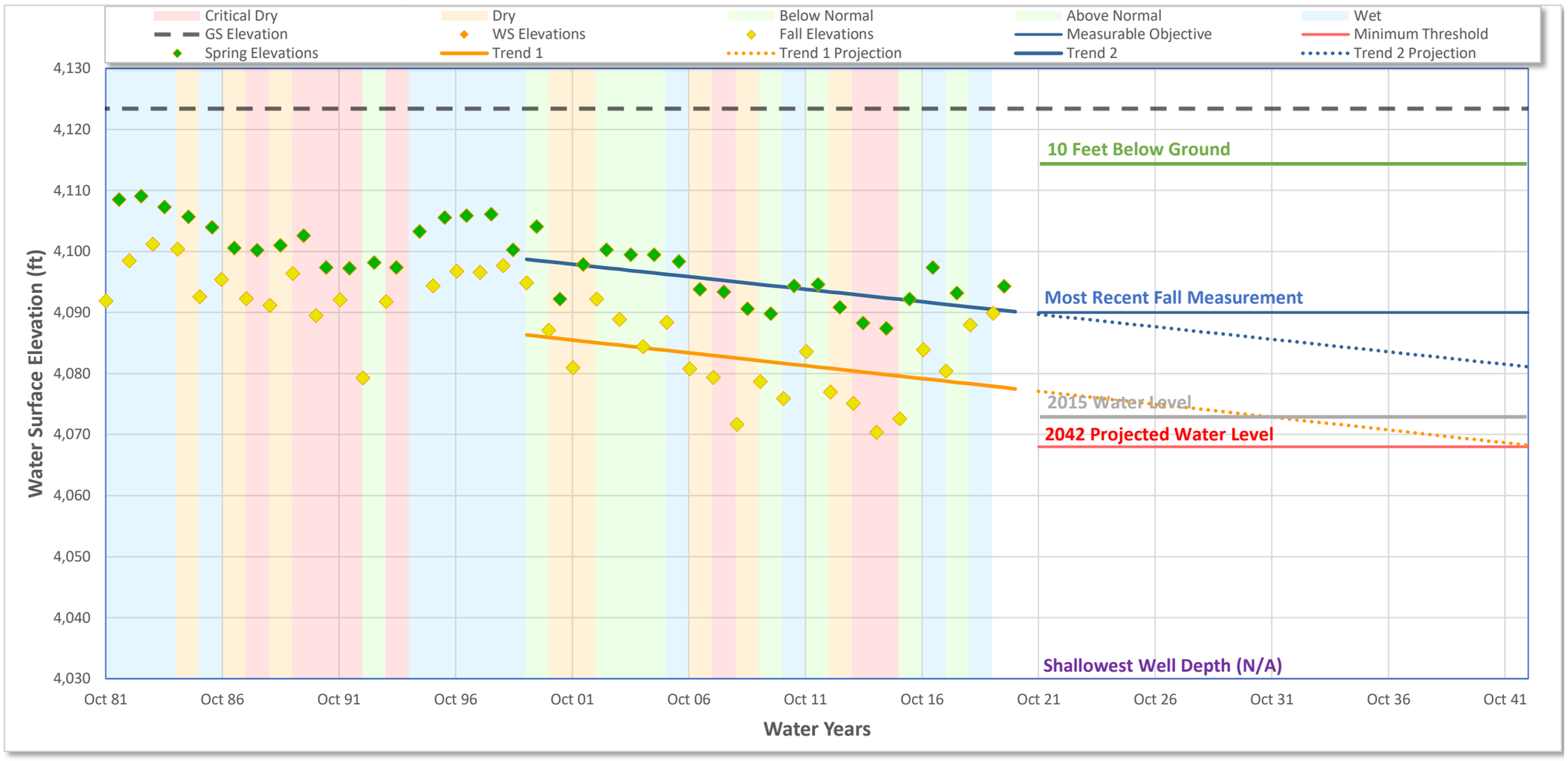
Date: 1/18/2021

Well Information	
Well ID	000004-38N07E23E001M
Alternate Name	23E1
State Number	38N07E23E001M
CASGEM ID	411207N1211395W001
Well Location	
County	Lassen
Basin	BIG VALLEY
Sub-Basin	-
Management Area	-
Proveyor Agency	-
Well Type Information	
Well Type	Unknown
Well Use	Residential
Completion Type	Single

Well Coordinates/Geometry		
Location	Lat:	41.1207
	Long:	-121.1395
Well Depth		84 ft
Ground Surface Elevation		4123.40 ft
Ref. Point Elevation		4123.40 ft
Screen Depth Range		28 to 84 ft
Screen Elevation Range		4095 to 4039 ft
Principal Aquifer		-
Well Period of Record		
Period-of-Record		1979..2020
WS Elev-Range	Min:	4070.4 ft
	Max	4109.1 ft

Trend Analysis		
Seasonal Data Method		Apr1/Oct1
Show Trend 1		Fall Data
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	(0.421 ft/yr)
Show Trend 2		Spring Data
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	(0.410 ft/yr)

Water Surface Elevation (WSE) Hydrograph



Sustainability Indicator Considerations

Observed WS Elevations		
Parameter		**Value**
WS Elevation Range	Min:	4070 ft
	Max	4109 ft
2015 WS Elevations	Spring:	4087 ft
	Fall:	4073 ft
Most Recent WS Elev	Spring:	4094 ft
	Fall:	4090 ft

Trend Projections		
Year	**Trend 1-Fall**	**Trend 2-Spring**
2022	4077 ft	4089 ft
2027	4075 ft	4087 ft
2032	4072 ft	4085 ft
2037	4070 ft	4083 ft
2042	4068 ft	4081 ft
2047	4066 ft	4079 ft

Sustainability Indicator Settings

Key	Threshold Type	Effect. Yr.	Value	Description
MT	Minimum Threshold	2022	4,068.0 ft	2042 projected water level
MO	Measureable Objective	2022	4,090.0 ft	Most recent Fall measurement

Well Depths Within Area

Well Type	Number of Wells	Shallowest Depth (feet bgs)	Shallowest Elevation (feet msl)
Domestic	0	-	-
Production (Ag)	0	-	-

Sustainability Indicators to Consider

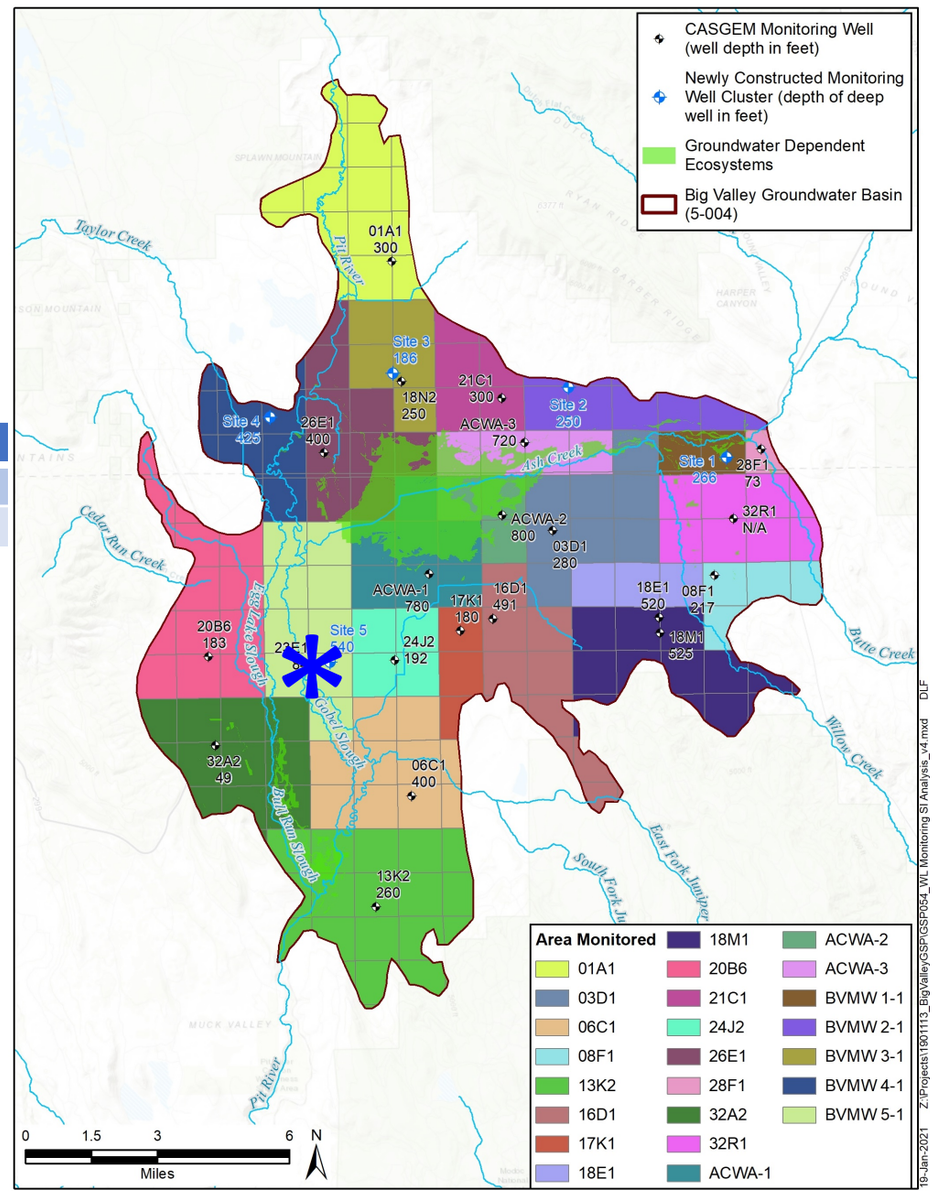
Water Levels	No
Groundwater Storage	No
Water Quality	No
Subsidence	No
Surface Water Depletions	Yes

Other Pertinent Information

Distance From Nearest Perennial Stream	0.3 miles
Name of Nearest Perennial Stream	Pit River
Distance From Nearest GDE	1.8 miles
Description of Nearest GDE	Pit River/Bull Run Slough

Notes:

Located near Site 5 Monitoring Well cluster. Has historic data to inform surface water depletion analysis



24J2 Sustainability Indicator Analysis

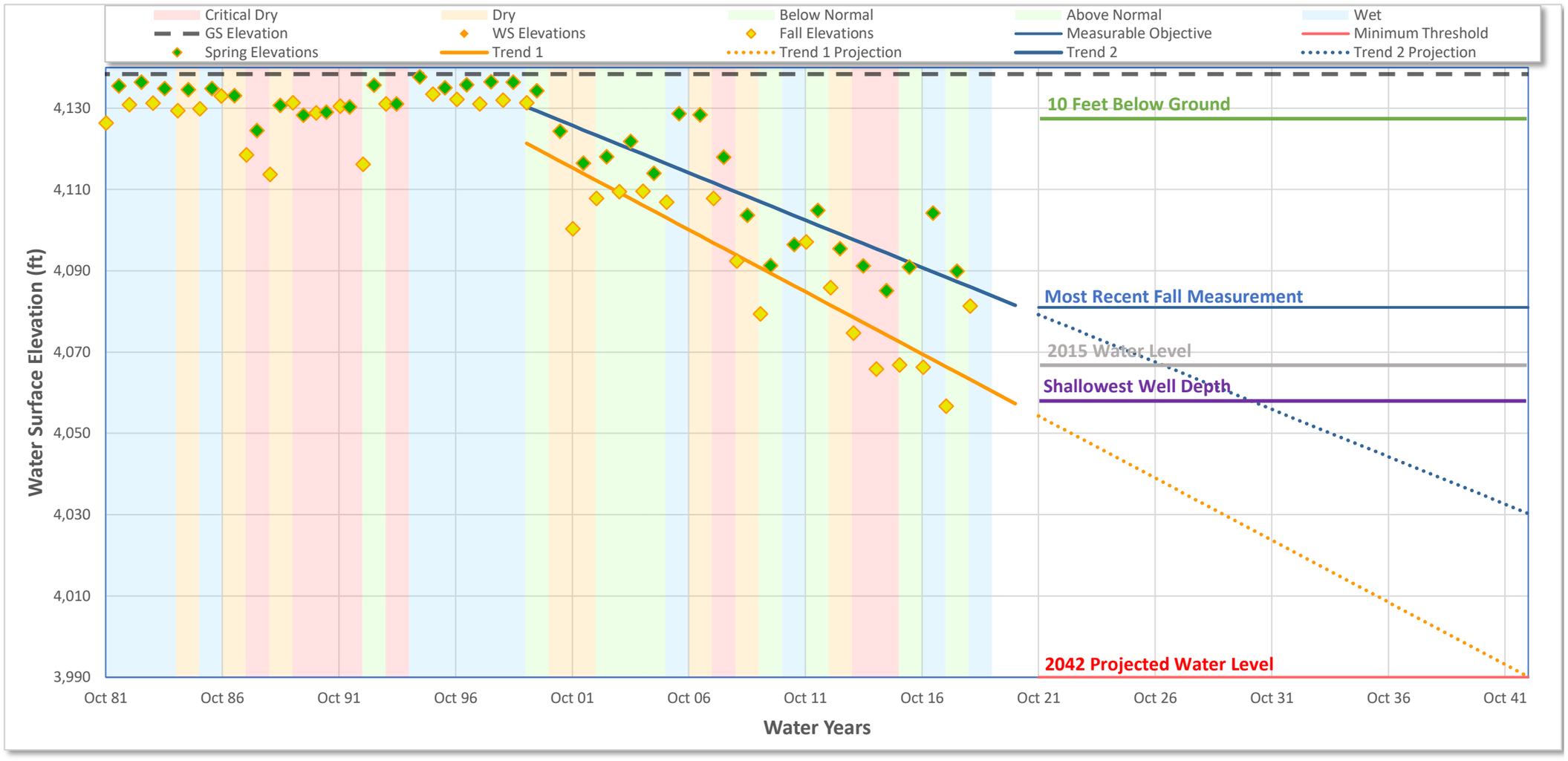
Date: 1/18/2021

Well Information	
Well ID	000005-38N07E24J002M
Alternate Name	24J2
State Number	38N07E24J002M
CASGEM ID	411228N1211054W001
Well Location	
County	Lassen
Basin	BIG VALLEY
Sub-Basin	-
Management Area	-
Proveyor Agency	-
Well Type Information	
Well Type	Unknown
Well Use	Irrigation
Completion Type	Single

Well Coordinates/Geometry		
Location	Lat:	41.1226
	Long:	-121.1054
Well Depth		192 ft
Ground Surface Elevation		4138.40 ft
Ref. Point Elevation		4139.40 ft
Screen Depth Range		1 to 192 ft
Screen Elevation Range		4138 to 3947 ft
Principal Aquifer		-
Well Period of Record		
Period-of-Record		1979..2019
WS Elev-Range	Min:	4056.7 ft
	Max	4137.7 ft

Trend Analysis		
Seasonal Data Method		Apr1/Oct1
Show Trend 1		Fall Data
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	(3.055 ft/yr)
Show Trend 2		Spring Data
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	(2.328 ft/yr)

Water Surface Elevation (WSE) Hydrograph



Sustainability Indicator Considerations

Observed WS Elevations		
Parameter		**Value**
WS Elevation Range	Min:	4057 ft
	Max	4138 ft
2015 WS Elevations	Spring:	4085 ft
	Fall:	4067 ft
Most Recent WS Elev	Spring:	4090 ft
	Fall:	4081 ft

Trend Projections		
Year	**Trend 1-Fall**	**Trend 2-Spring**
2022	4051 ft	4077 ft
2027	4036 ft	4065 ft
2032	4021 ft	4054 ft
2037	4005 ft	4042 ft
2042	3990 ft	4030 ft
2047	3975 ft	4019 ft

Sustainability Indicator Settings

Key	Threshold Type	Effect. Yr.	Value	Description
MT	Minimum Threshold	2022	3,990.0 ft	2042 projected water level
MO	Measureable Objective	2022	4,081.0 ft	Most recent Fall measurement

Well Depths Within Area

Well Type	Number of Wells	Shallowest Depth (feet bgs)	Shallowest Elevation (feet msl)
Domestic	6	80	4058
Production (Ag)	11	105	4033

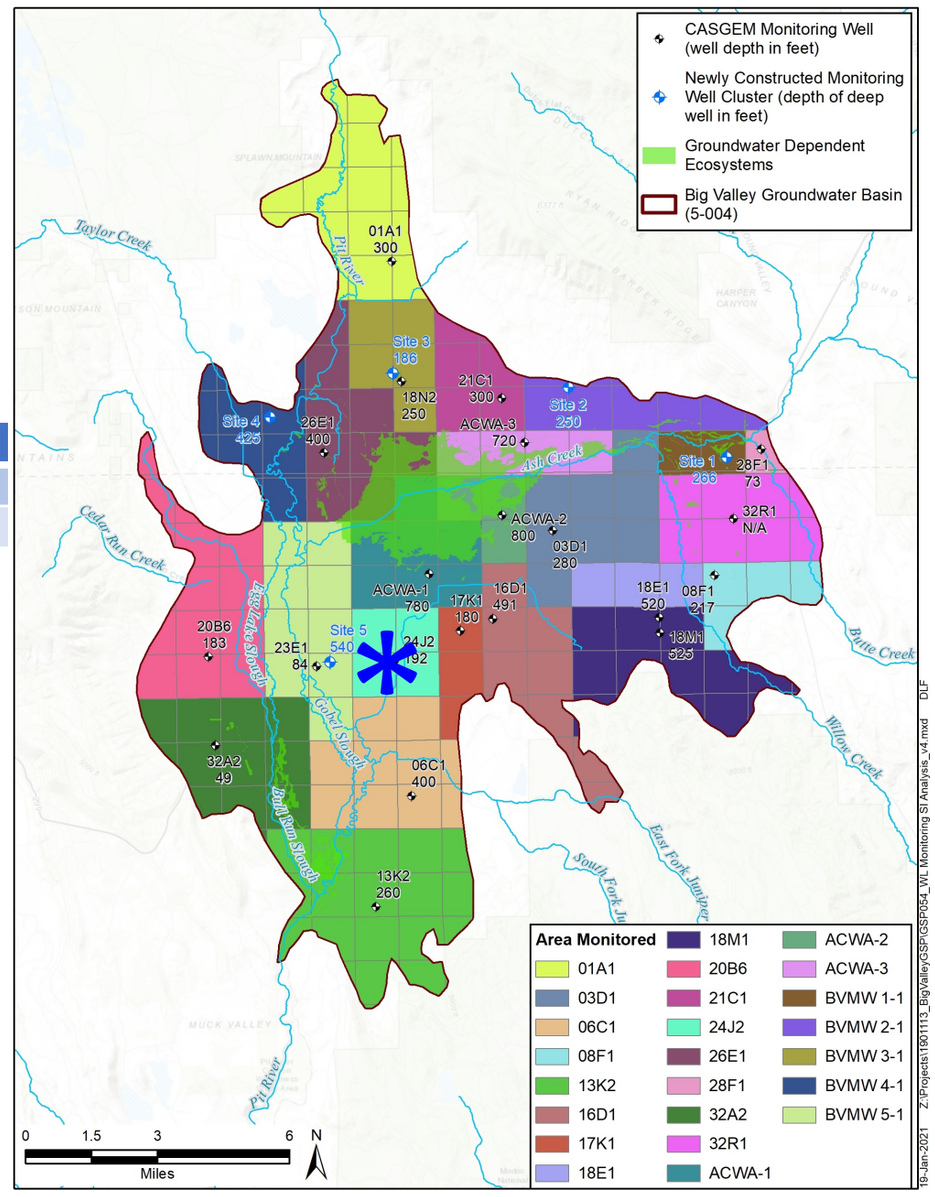
Sustainability Indicators to Consider

Water Levels	Yes
Groundwater Storage	Yes
Water Quality	No
Subsidence	No
Surface Water Depletions	No

Other Pertinent Information

Distance From Nearest Perennial Stream	1.7 miles
Name of Nearest Perennial Stream	Pit River
Distance From Nearest GDE	2.1 miles
Description of Nearest GDE	Ash Creek Wildlife Area

Notes:



32A2 Sustainability Indicator Analysis

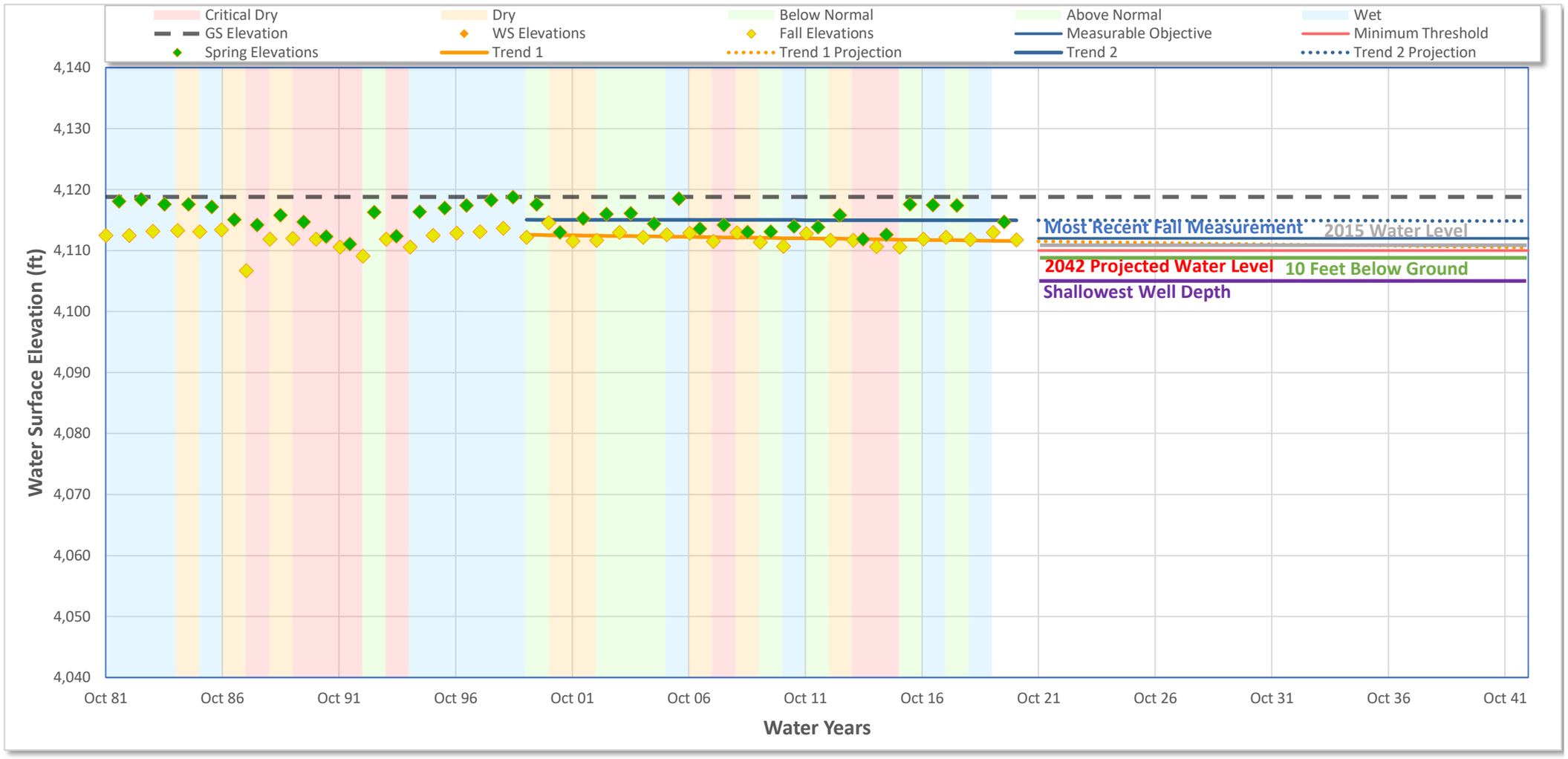
Date: 1/18/2021

Well Information	
Well ID	000006-38N07E32A002M
Alternate Name	32A2
State Number	38N07E32A002M
CASGEM ID	410950N1211839W001
Well Location	
County	Lassen
Basin	BIG VALLEY
Sub-Basin	-
Management Area	-
Proveyor Agency	-
Well Type Information	
Well Type	Unknown
Well Use	Residential
Completion Type	Single

Well Coordinates/Geometry		
Location	Lat:	41.0950
	Long:	-121.1839
Well Depth		49 ft
Ground Surface Elevation		4118.80 ft
Ref. Point Elevation		4119.50 ft
Screen Depth Range		-
Screen Elevation Range		-
Principal Aquifer		-
Well Period of Record		
Period-of-Record		1959..2021
WS Elev-Range	Min:	4106.7 ft
	Max	4118.8 ft

Trend Analysis		
Seasonal Data Method		Apr1/Oct1
Show Trend 1		Fall Data
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	(0.049 ft/yr)
Show Trend 2		Spring Data
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	(0.005 ft/yr)

Water Surface Elevation (WSE) Hydrograph



Sustainability Indicator Considerations

Observed WS Elevations		
Parameter		**Value**
WS Elevation Range	Min:	4107 ft
	Max	4119 ft
2015 WS Elevations	Spring:	4113 ft
	Fall:	4111 ft
Most Recent WS Elev	Spring:	4115 ft
	Fall:	4112 ft

Trend Projections		
Year	**Trend 1-Fall**	**Trend 2-Spring**
2022	4111 ft	4115 ft
2027	4111 ft	4115 ft
2032	4111 ft	4115 ft
2037	4111 ft	4115 ft
2042	4110 ft	4115 ft
2047	4110 ft	4115 ft

Sustainability Indicator Settings

Key	Threshold Type	Effect. Yr.	Value	Description
MT	Minimum Threshold	2022	4,110.0 ft	2042 projected water level
MO	Measureable Objective	2022	4,112.0 ft	Most recent Fall measurement

Well Depths Within Area

Well Type	Number of Wells	Shallowest Depth (feet bgs)	Shallowest Elevation (feet msl)
Domestic	27	14	4105
Production (Ag)	5	380	3739

Sustainability Indicators to Consider

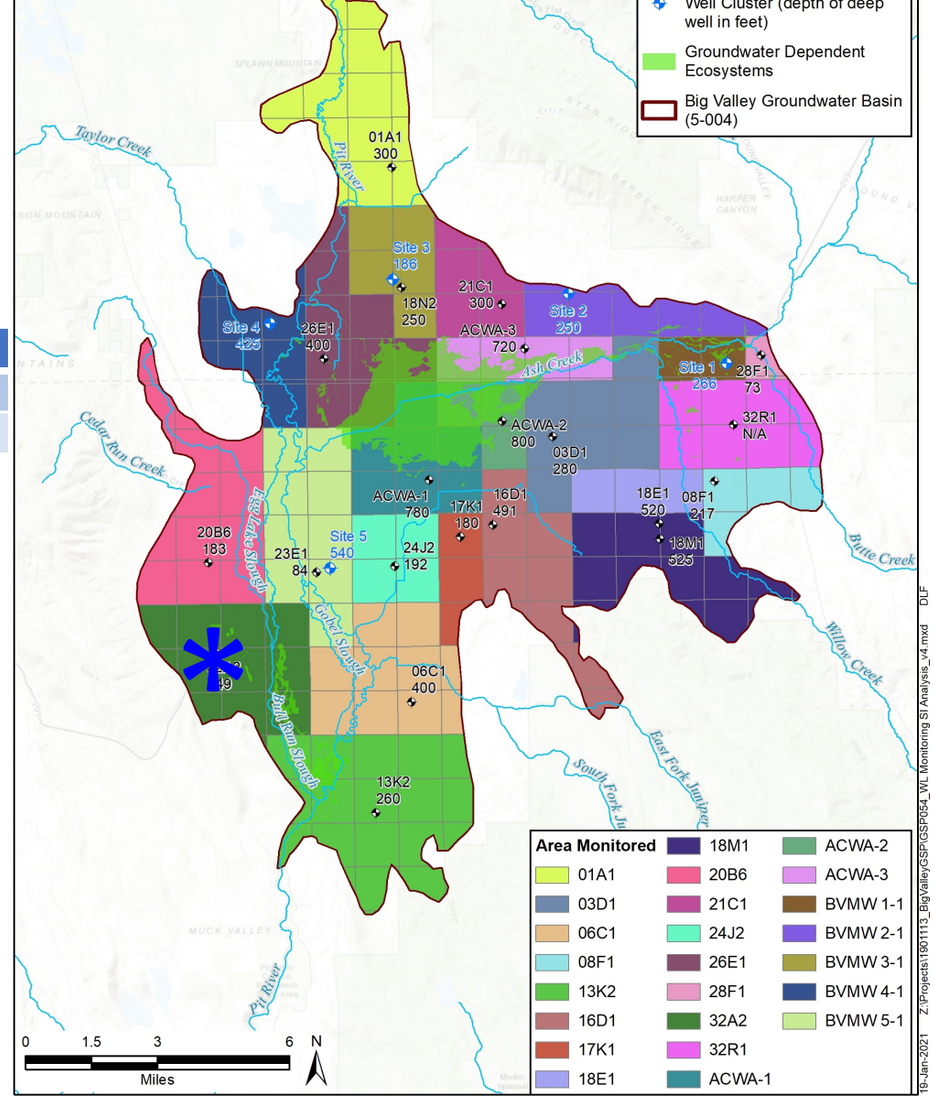
Water Levels	Yes
Groundwater Storage	Yes
Water Quality	No
Subsidence	Maybe
Surface Water Depletions	No

Other Pertinent Information

Distance From Nearest Perennial Stream	2.7 miles
Name of Nearest Perennial Stream	Pit River
Distance From Nearest GDE	0.4 miles
Description of Nearest GDE	Bull Run Slough near Nubieber

Notes:

Located near railway, so water levels could be used here as a proxy for making sure there isn't subsidence on the infrastructure.



03D1 Sustainability Indicator Analysis

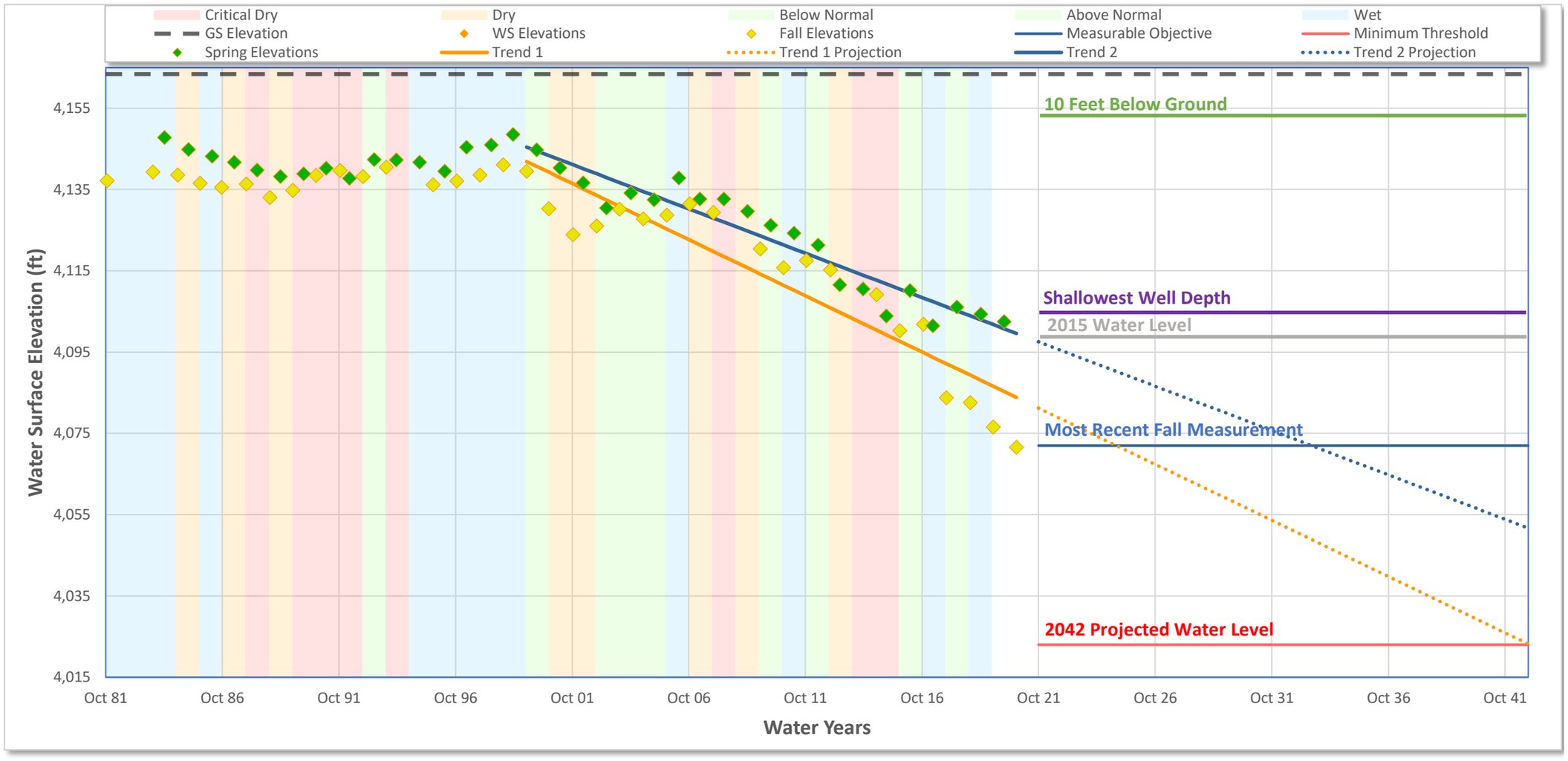
Date: 1/18/2021

Well Information	
Well ID	000007-38N08E03D001M
Alternate Name	03D1
State Number	38N08E03D001M
CASGEM ID	411647N1210358W001
Well Location	
County	Lassen
Basin	BIG VALLEY
Sub-Basin	-
Management Area	-
Proveyor Agency	-
Well Type Information	
Well Type	Unknown
Well Use	Irrigation
Completion Type	Single

Well Coordinates/Geometry		
Location	Lat:	41.1646
	Long:	-121.0360
Well Depth		280 ft
Ground Surface Elevation		4163.40 ft
Ref. Point Elevation		4163.40 ft
Screen Depth Range		50 to 280 ft
Screen Elevation Range		4113 to 3883 ft
Principal Aquifer		-
Well Period of Record		
Period-of-Record		1982..2021
WS Elev-Range	Min:	4071.6 ft
	Max	4148.6 ft

Trend Analysis		
Seasonal Data Method		Apr1/Oct1
Show Trend 1		Fall Data
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	(2.762 ft/yr)
Show Trend 2		Spring Data
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	(2.182 ft/yr)

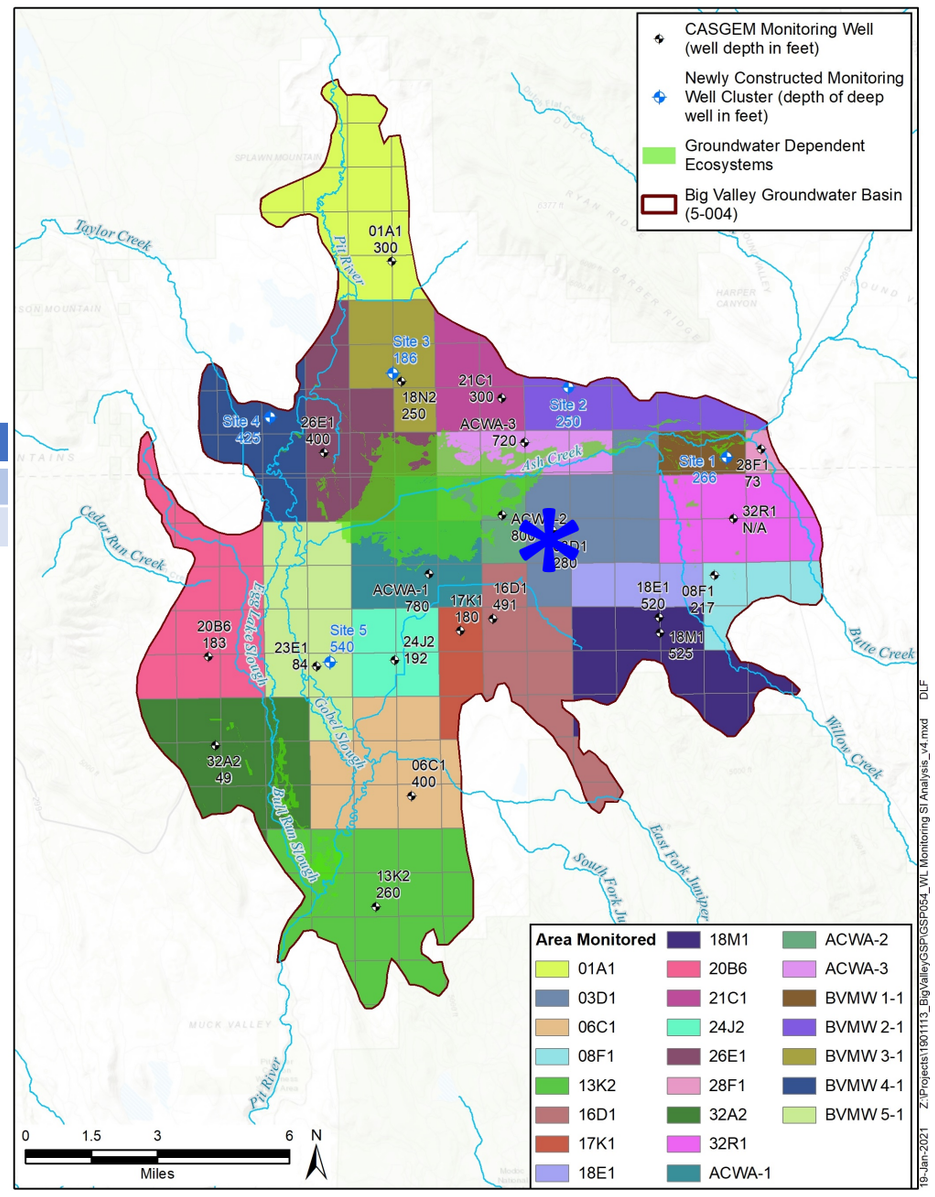
Water Surface Elevation (WSE) Hydrograph



Sustainability Indicator Considerations

Observed WS Elevations		
Parameter		**Value**
WS Elevation Range	Min:	4072 ft
	Max	4149 ft
2015 WS Elevations	Spring:	4104 ft
	Fall:	4100 ft
Most Recent WS Elev	Spring:	4103 ft
	Fall:	4072 ft

Trend Projections		
Year	**Trend 1-Fall**	**Trend 2-Spring**
2022	4078 ft	4095 ft
2027	4065 ft	4084 ft
2032	4051 ft	4074 ft
2037	4037 ft	4063 ft
2042	4023 ft	4052 ft
2047	4009 ft	4041 ft



Sustainability Indicator Settings

Key	Threshold Type	Effect. Yr.	Value	Description
MT	Minimum Threshold	2022	4,023.0 ft	2042 projected water level
MO	Measureable Objective	2022	4,072.0 ft	Most recent Fall measurement

Well Depths Within Area

Well Type	Number of Wells	Shallowest Depth (feet bgs)	Shallowest Elevation (feet msl)
Domestic	9	59	4104
Production (Ag)	29	70	4093

Sustainability Indicators to Consider

Water Levels	Yes
Groundwater Storage	Yes
Water Quality	No
Subsidence	No
Surface Water Depletions	No

Notes:

Other Pertinent Information

Distance From Nearest Perennial Stream	1.3 miles
Name of Nearest Perennial Stream	Ash Creek
Distance From Nearest GDE	0.9 miles
Description of Nearest GDE	Ash Creek Wildlife Area

16D1 Sustainability Indicator Analysis

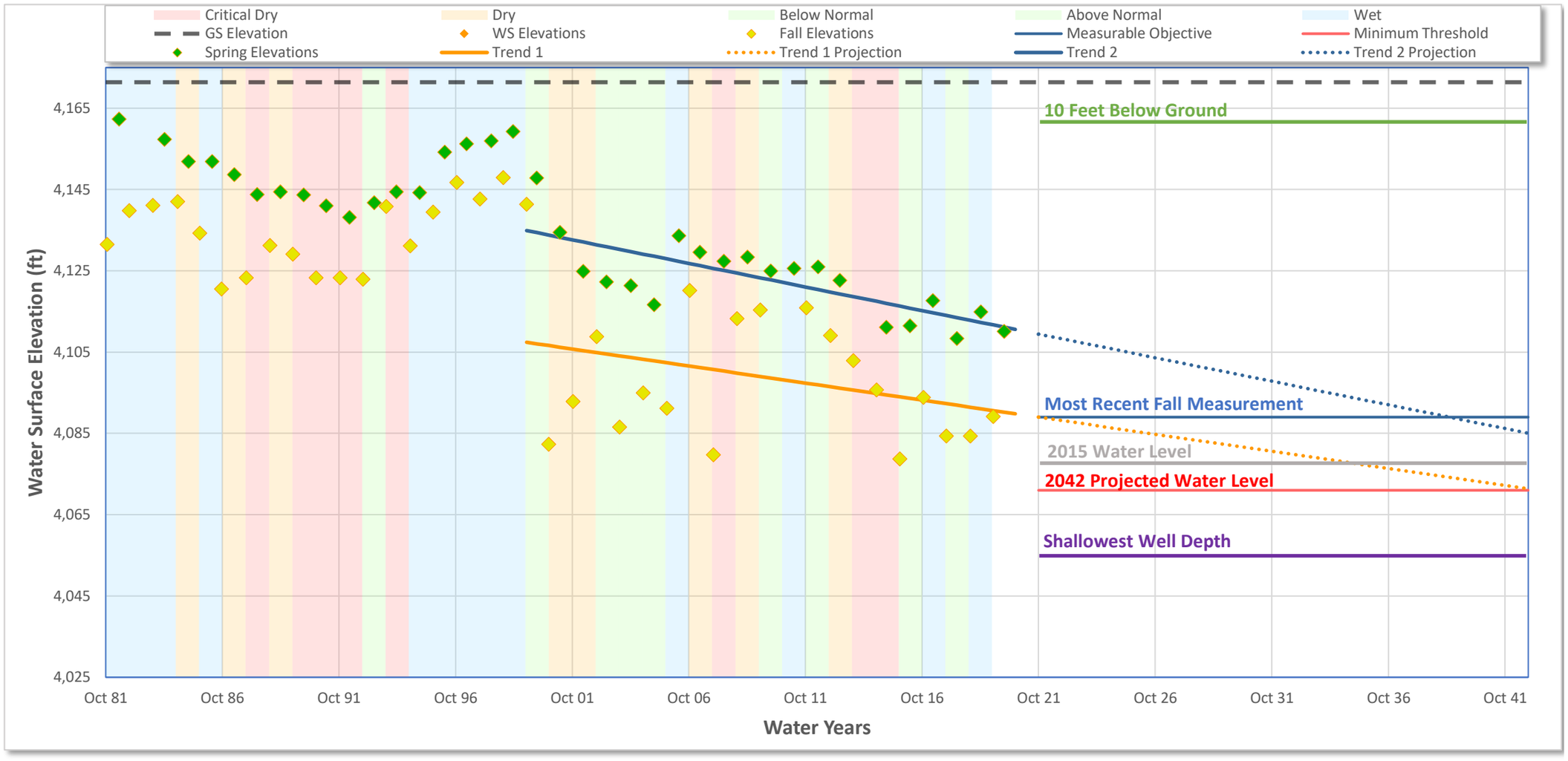
Date: 1/18/2021

Well Information	
Well ID	000008-38N08E16D001M
Alternate Name	16D1
State Number	38N08E16D001M
CASGEM ID	411359N1210625W001
Well Location	
County	Lassen
Basin	BIG VALLEY
Sub-Basin	-
Management Area	-
Proveyor Agency	-
Well Type Information	
Well Type	Unknown
Well Use	Other
Completion Type	Single

Well Coordinates/Geometry		
Location	Lat:	41.1358
	Long:	-121.0625
Well Depth		491 ft
Ground Surface Elevation		4171.40 ft
Ref. Point Elevation		4171.60 ft
Screen Depth Range		250 to 491 ft
Screen Elevation Range		3922 to 3681 ft
Principal Aquifer		-
Well Period of Record		
Period-of-Record		1982..2020
WS Elev-Range	Min:	4078.7 ft
	Max	4162.4 ft

Trend Analysis		
Seasonal Data Method		Apr1/Oct1
Show Trend 1		Fall Data
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	(0.840 ft/yr)
Show Trend 2		Spring Data
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	(1.160 ft/yr)

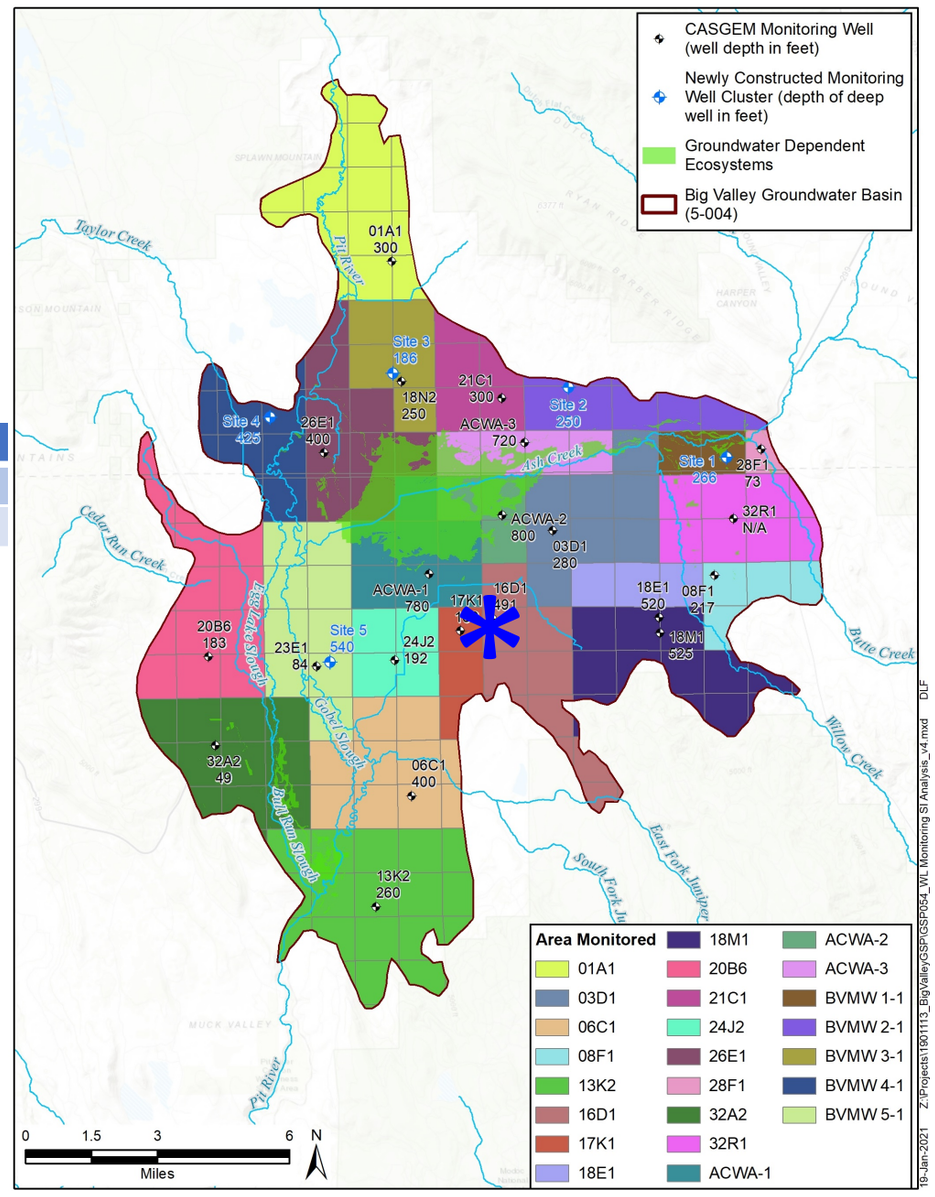
Water Surface Elevation (WSE) Hydrograph



Sustainability Indicator Considerations

Observed WS Elevations		
Parameter		**Value**
WS Elevation Range	Min:	4079 ft
	Max	4162 ft
2015 WS Elevations	Spring:	4111 ft
	Fall:	4079 ft
Most Recent WS Elev	Spring:	4110 ft
	Fall:	4089 ft

Trend Projections		
Year	**Trend 1-Fall**	**Trend 2-Spring**
2022	4088 ft	4108 ft
2027	4084 ft	4102 ft
2032	4080 ft	4097 ft
2037	4076 ft	4091 ft
2042	4071 ft	4085 ft
2047	4067 ft	4079 ft



Sustainability Indicator Settings

Key	Threshold Type	Effect. Yr.	Value	Description
MT	Minimum Threshold	2022	4,071.0 ft	2042 projected water level
MO	Measureable Objective	2022	4,089.0 ft	Most recent Fall measurement

Well Depths Within Area

Well Type	Number of Wells	Shallowest Depth (feet bgs)	Shallowest Elevation (feet msl)
Domestic	5	120	4051
Production (Ag)	13	115	4056

Sustainability Indicators to Consider

Water Levels	Yes
Groundwater Storage	Yes
Water Quality	No
Subsidence	No
Surface Water Depletions	No

Notes:

Other Pertinent Information

Distance From Nearest Perennial Stream	3 miles
Name of Nearest Perennial Stream	Ash Creek
Distance From Nearest GDE	1.4 miles
Description of Nearest GDE	Ash Creek Wildlife Area

17K1 Sustainability Indicator Analysis

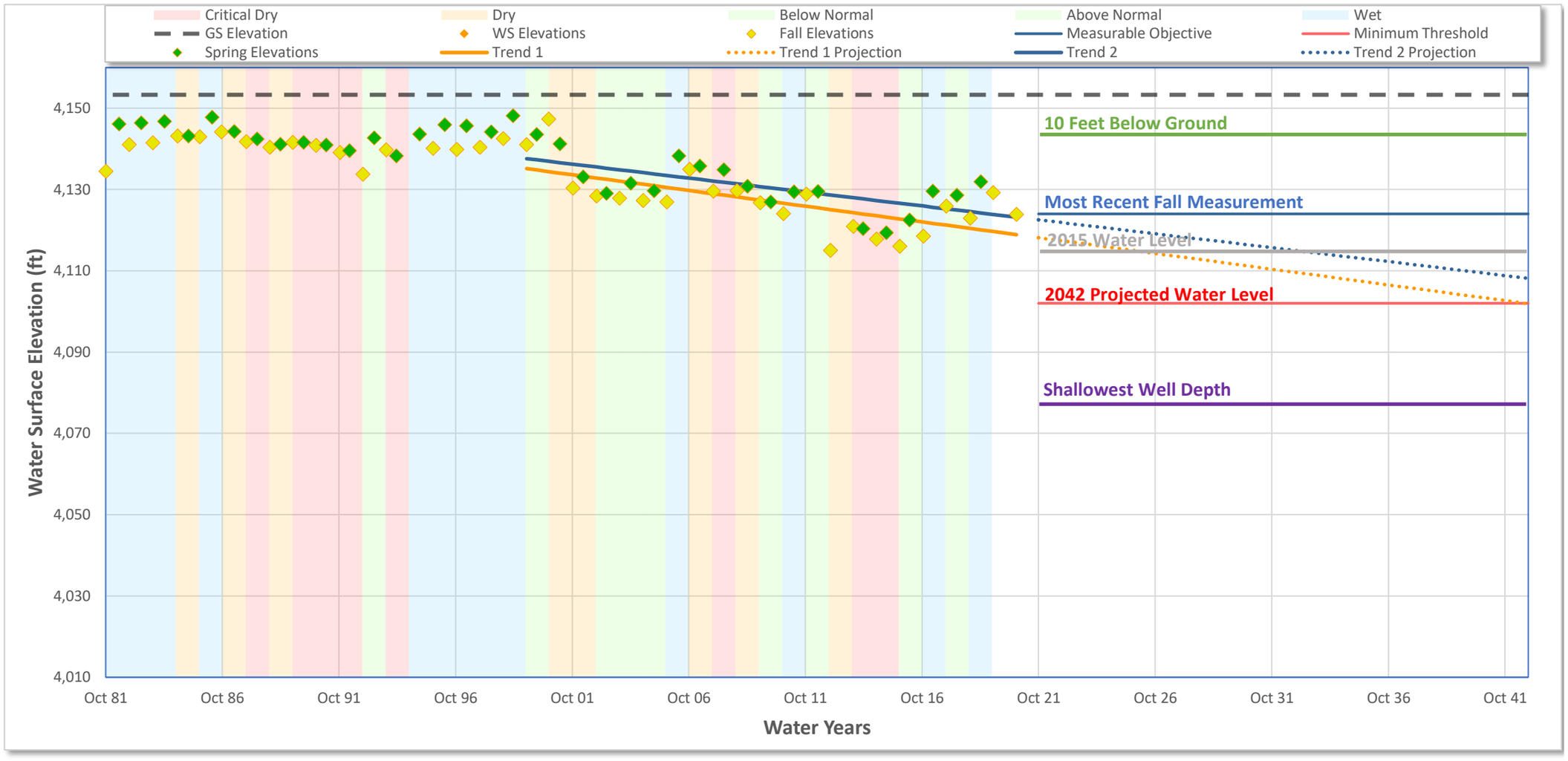
Date: 1/18/2021

Well Information	
Well ID	000009-38N08E17K001M
Alternate Name	17K1
State Number	38N08E17K001M
CASGEM ID	411320N1210766W001
Well Location	
County	Lassen
Basin	BIG VALLEY
Sub-Basin	-
Management Area	-
Proveyor Agency	-
Well Type Information	
Well Type	Unknown
Well Use	Irrigation
Completion Type	Single

Well Coordinates/Geometry		
Location	Lat:	41.1320
	Long:	-121.0766
Well Depth		180 ft
Ground Surface Elevation		4153.30 ft
Ref. Point Elevation		4154.30 ft
Screen Depth Range		30 to 180 ft
Screen Elevation Range		4124 to 3974 ft
Principal Aquifer		-
Well Period of Record		
Period-of-Record		1957..2021
WS Elev-Range	Min:	4115.1 ft
	Max	4150.0 ft

Trend Analysis		
Seasonal Data Method		Apr1/Oct1
Show Trend 1		Fall Data
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	(0.774 ft/yr)
Show Trend 2		Spring Data
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	(0.685 ft/yr)

Water Surface Elevation (WSE) Hydrograph



Sustainability Indicator Considerations

Observed WS Elevations		
Parameter		**Value**
WS Elevation Range	Min:	4115 ft
	Max	4150 ft
2015 WS Elevations	Spring:	4119 ft
	Fall:	4116 ft
Most Recent WS Elev	Spring:	4132 ft
	Fall:	4124 ft

Trend Projections		
Year	**Trend 1-Fall**	**Trend 2-Spring**
2022	4117 ft	4122 ft
2027	4114 ft	4118 ft
2032	4110 ft	4115 ft
2037	4106 ft	4112 ft
2042	4102 ft	4108 ft
2047	4098 ft	4105 ft

Sustainability Indicator Settings

Key	Threshold Type	Effect. Yr.	Value	Description
MT	Minimum Threshold	2022	4,102.0 ft	2042 projected water level
MO	Measureable Objective	2022	4,124.0 ft	Most recent Fall measurement

Well Depths Within Area

Well Type	Number of Wells	Shallowest Depth (feet bgs)	Shallowest Elevation (feet msl)
Domestic	9	76	4077
Production (Ag)	11	211	3942

Sustainability Indicators to Consider

Water Levels	Yes
Groundwater Storage	Yes
Water Quality	No
Subsidence	No
Surface Water Depletions	No

Notes:

Other Pertinent Information

Distance From Nearest Perennial Stream	3.1 miles
Name of Nearest Perennial Stream	Ash Creek
Distance From Nearest GDE	1.5 miles
Description of Nearest GDE	Ash Creek Wildlife Area

08F1 Sustainability Indicator Analysis

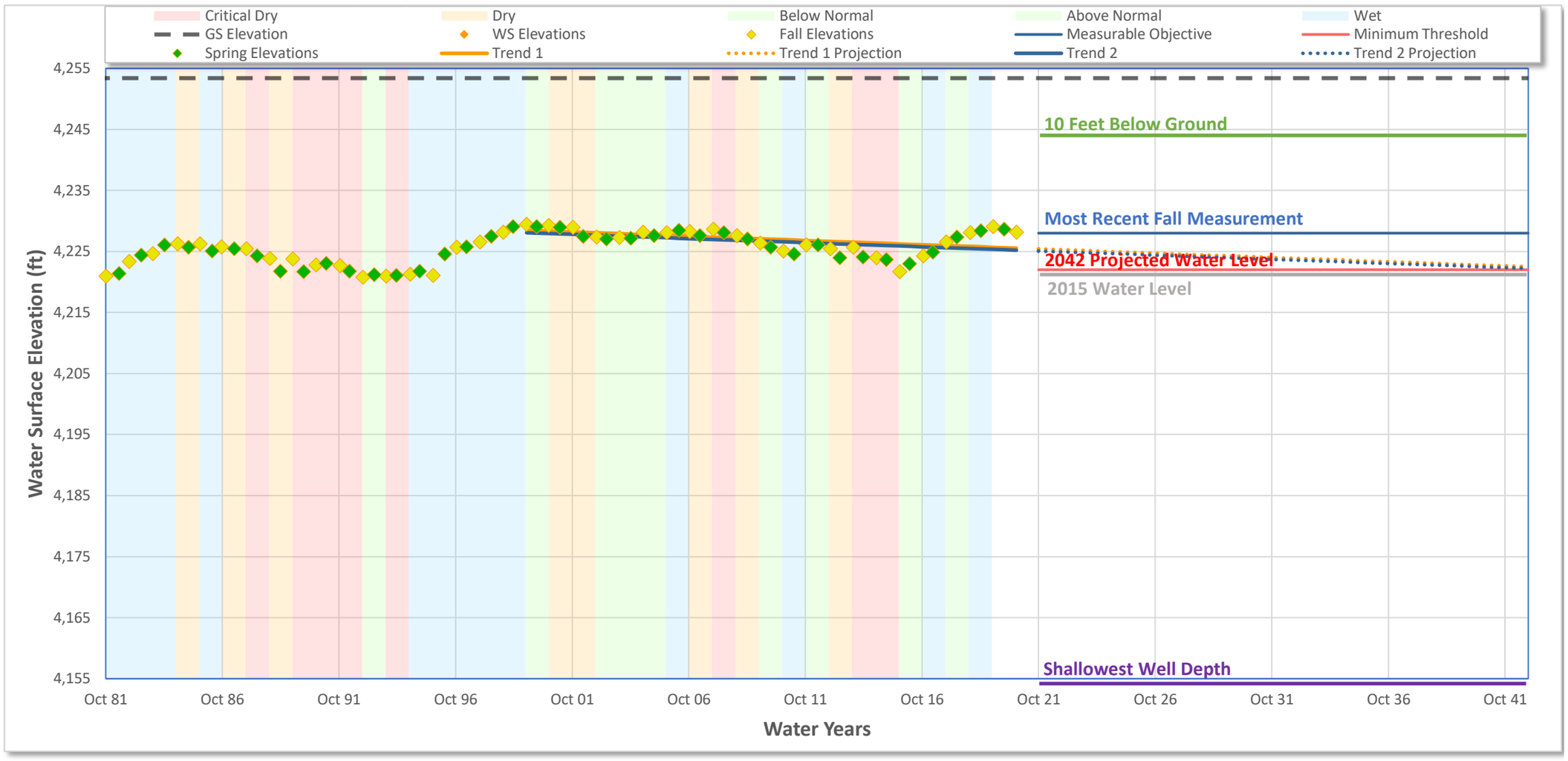
Date: 1/18/2021

Well Information	
Well ID	000010-38N09E08F001M
Alternate Name	08F1
State Number	38N09E08F001M
CASGEM ID	411493N1209656W001
Well Location	
County	Lassen
Basin	BIG VALLEY
Sub-Basin	-
Management Area	-
Proveyor Agency	-
Well Type Information	
Well Type	Unknown
Well Use	Irrigation
Completion Type	Single

Well Coordinates/Geometry		
Location	Lat:	41.1493
	Long:	-120.9656
Well Depth		217 ft
Ground Surface Elevation		4253.40 ft
Ref. Point Elevation		4255.40 ft
Screen Depth Range		26 to 217 ft
Screen Elevation Range		4229 to 4038 ft
Principal Aquifer		-
Well Period of Record		
Period-of-Record		1979..2021
WS Elev-Range	Min:	4220.5 ft
	Max	4229.5 ft

Trend Analysis		
Seasonal Data Method		Apr1/Oct1
Show Trend 1		Fall Data
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	(0.139 ft/yr)
Show Trend 2		Spring Data
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	(0.136 ft/yr)

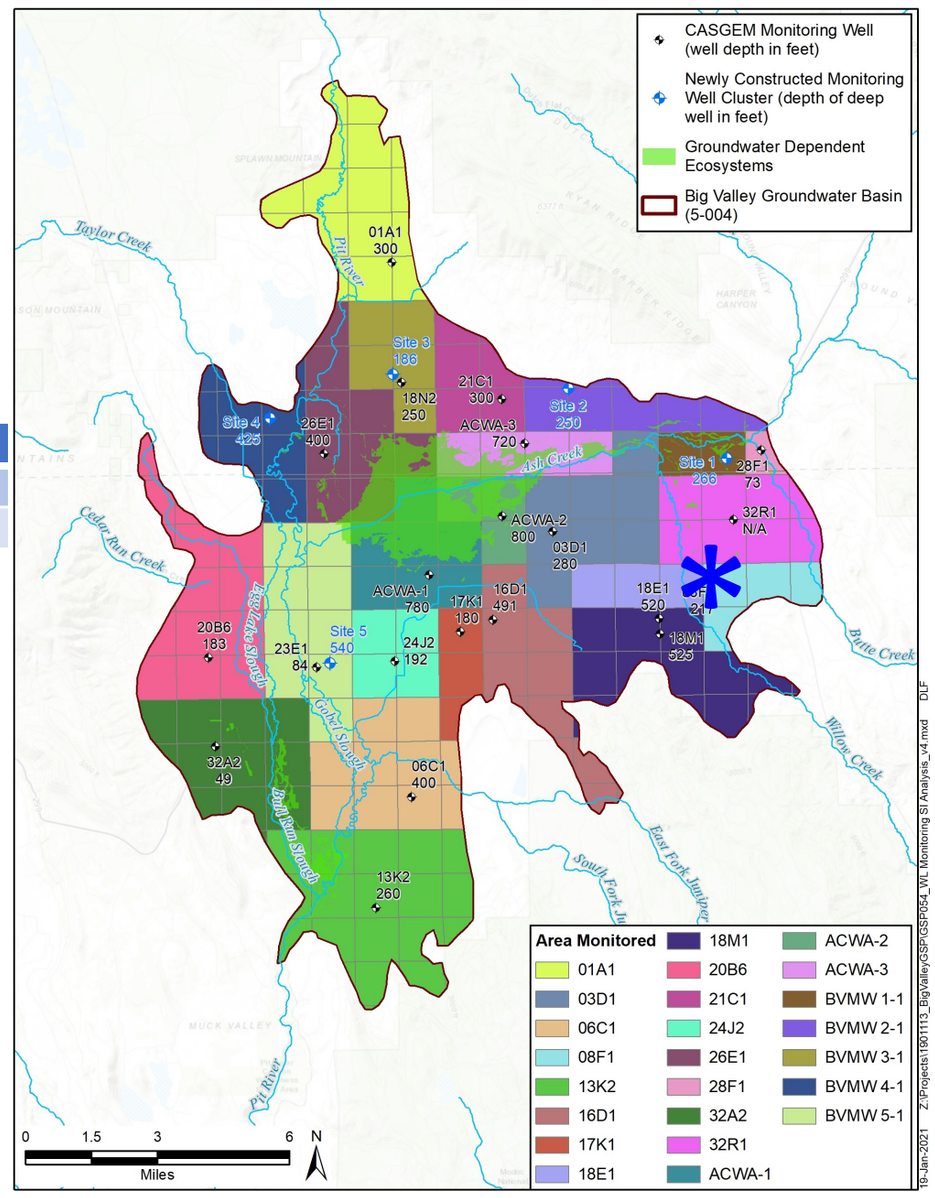
Water Surface Elevation (WSE) Hydrograph



Sustainability Indicator Considerations

Observed WS Elevations		
Parameter		**Value**
WS Elevation Range	Min:	4221 ft
	Max	4230 ft
2015 WS Elevations	Spring:	4224 ft
	Fall:	4222 ft
Most Recent WS Elev	Spring:	4229 ft
	Fall:	4228 ft

Trend Projections		
Year	**Trend 1-Fall**	**Trend 2-Spring**
2022	4225 ft	4225 ft
2027	4225 ft	4224 ft
2032	4224 ft	4224 ft
2037	4223 ft	4223 ft
2042	4223 ft	4222 ft
2047	4222 ft	4222 ft



Sustainability Indicator Settings

Key	Threshold Type	Effect. Yr.	Value	Description
MT	Minimum Threshold	2022	4,222.0 ft	2042 projected water level
MO	Measureable Objective	2022	4,228.0 ft	Most recent Fall measurement

Well Depths Within Area

Well Type	Number of Wells	Shallowest Depth (feet bgs)	Shallowest Elevation (feet msl)
Domestic	3	160	4093
Production (Ag)	5	100	4153

Sustainability Indicators to Consider

Water Levels	Yes
Groundwater Storage	Yes
Water Quality	No
Subsidence	No
Surface Water Depletions	No

Notes:

Other Pertinent Information

Distance From Nearest Perennial Stream	3 miles
Name of Nearest Perennial Stream	Ash Creek
Distance From Nearest GDE	0.5 miles
Description of Nearest GDE	Willow Creek Valley

18E1 Sustainability Indicator Analysis

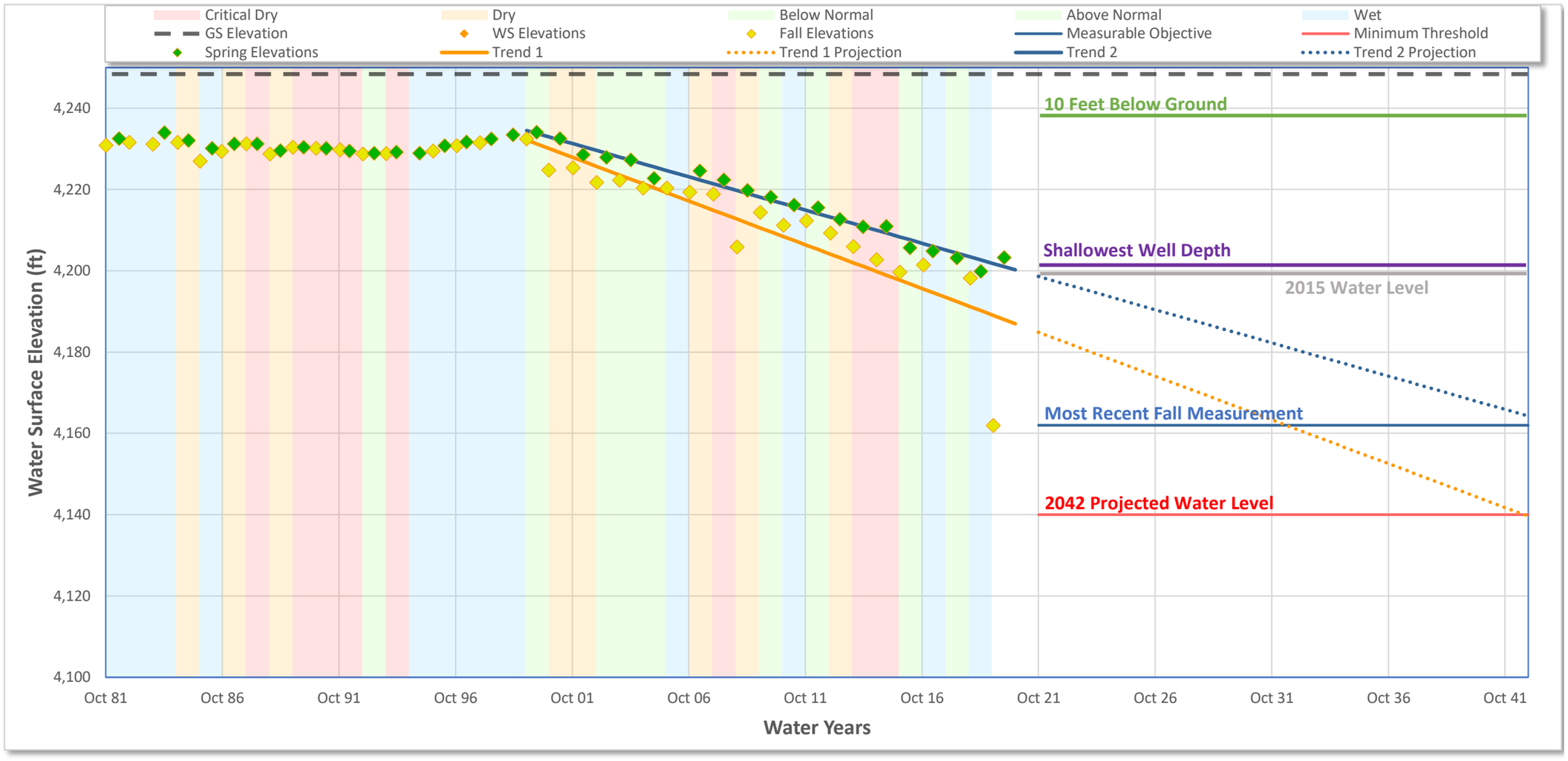
Date: 1/18/2021

Well Information	
Well ID	000011-38N09E18E001M
Alternate Name	18E1
State Number	38N09E18E001M
CASGEM ID	411356N1209900W001
Well Location	
County	Lassen
Basin	BIG VALLEY
Sub-Basin	-
Management Area	-
Proveyor Agency	-
Well Type Information	
Well Type	Unknown
Well Use	Residential
Completion Type	Single

Well Coordinates/Geometry		
Location	Lat:	41.1356
	Long:	-120.9900
Well Depth		520 ft
Ground Surface Elevation		4248.40 ft
Ref. Point Elevation		4249.50 ft
Screen Depth Range		21 to 520 ft
Screen Elevation Range		4229 to 3730 ft
Principal Aquifer		-
Well Period of Record		
Period-of-Record		1981..2020
WS Elev-Range	Min:	4162.0 ft
	Max	4234.1 ft

Trend Analysis		
Seasonal Data Method		Apr1/Oct1
Show Trend 1		Fall Data
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	(2.154 ft/yr)
Show Trend 2		Spring Data
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	(1.635 ft/yr)

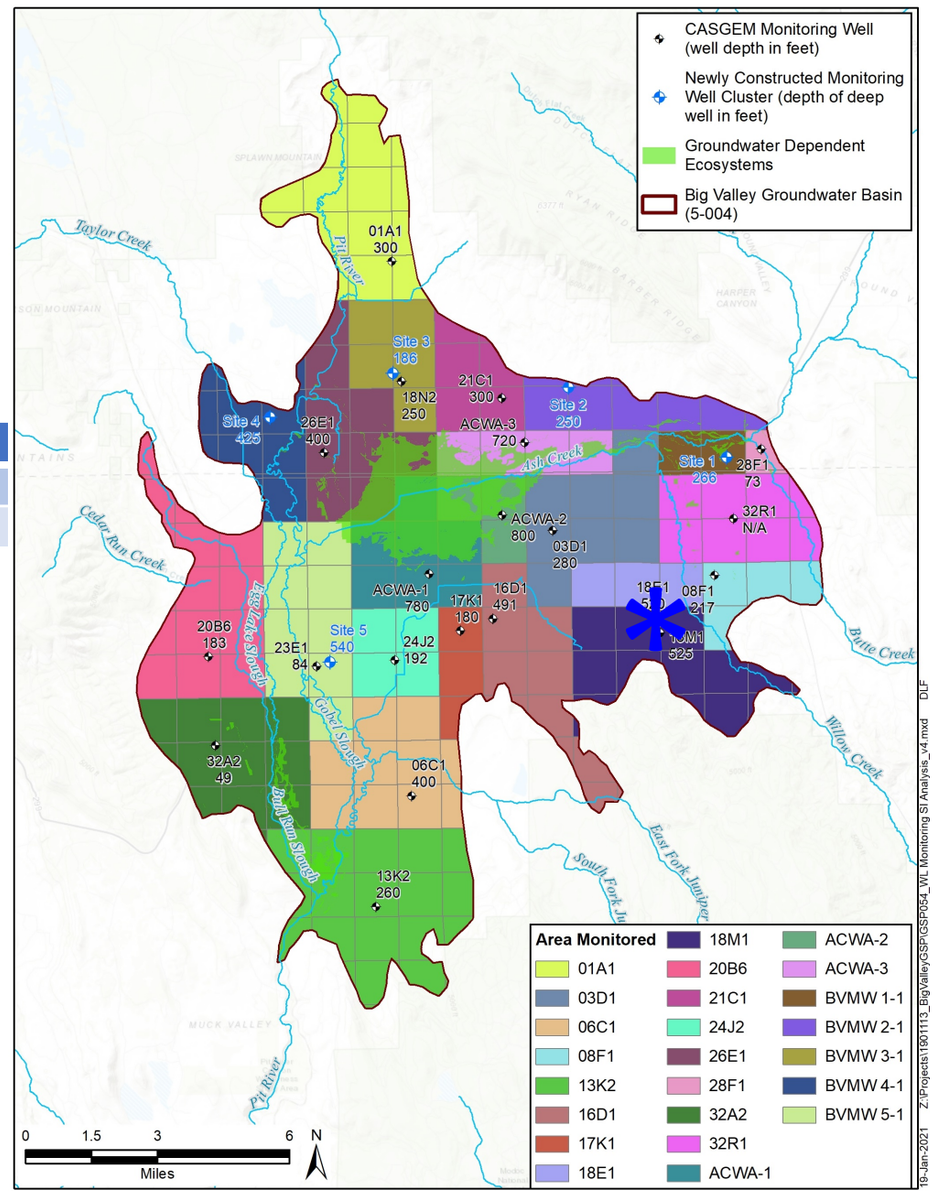
Water Surface Elevation (WSE) Hydrograph



Sustainability Indicator Considerations

Observed WS Elevations		
Parameter		**Value**
WS Elevation Range	Min:	4162 ft
	Max	4234 ft
2015 WS Elevations	Spring:	4211 ft
	Fall:	4200 ft
Most Recent WS Elev	Spring:	4203 ft
	Fall:	4162 ft

Trend Projections		
Year	**Trend 1-Fall**	**Trend 2-Spring**
2022	4183 ft	4197 ft
2027	4172 ft	4189 ft
2032	4161 ft	4181 ft
2037	4150 ft	4172 ft
2042	4140 ft	4164 ft
2047	4129 ft	4156 ft



Sustainability Indicator Settings

Key	Threshold Type	Effect. Yr.	Value	Description
MT	Minimum Threshold	2022	4,140.0 ft	2042 projected water level
MO	Measureable Objective	2022	4,162.0 ft	Most recent Fall measurement

Well Depths Within Area

Well Type	Number of Wells	Shallowest Depth (feet bgs)	Shallowest Elevation (feet msl)
Domestic	4	46	4202
Production (Ag)	3	70	4178

Sustainability Indicators to Consider

Water Levels	Yes
Groundwater Storage	Yes
Water Quality	No
Subsidence	No
Surface Water Depletions	No

Notes:

Other Pertinent Information

Distance From Nearest Perennial Stream	3.8 miles
Name of Nearest Perennial Stream	Ash Creek
Distance From Nearest GDE	1.4 miles
Description of Nearest GDE	Willow Creek Valley

18M1 Sustainability Indicator Analysis

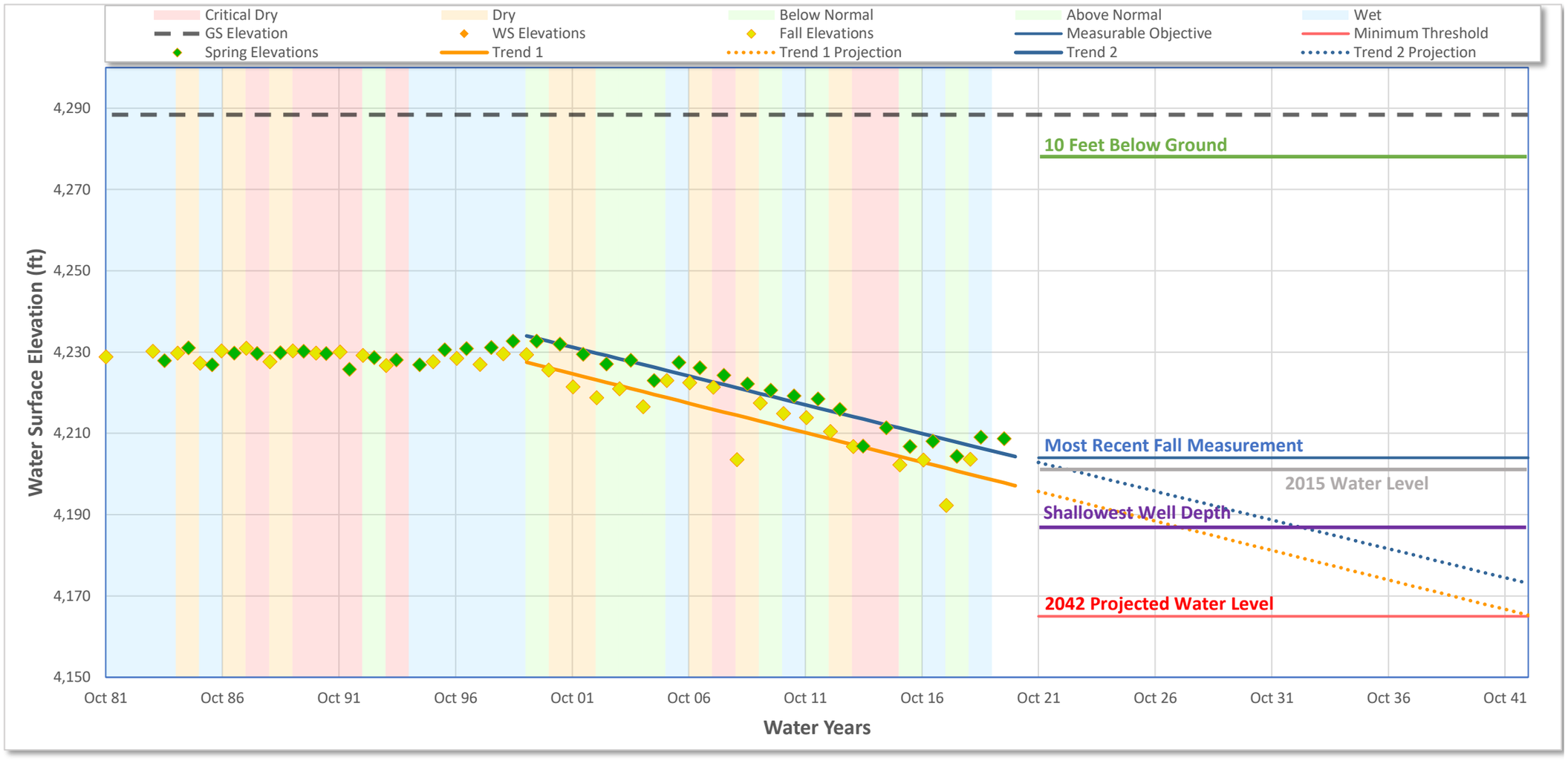
Date: 1/18/2021

Well Information	
Well ID	000012-38N09E18M001M
Alternate Name	18M1
State Number	38N09E18M001M
CASGEM ID	411305N1209896W001
Well Location	
County	Lassen
Basin	BIG VALLEY
Sub-Basin	-
Management Area	-
Proveyor Agency	-
Well Type Information	
Well Type	Unknown
Well Use	Irrigation
Completion Type	Single

Well Coordinates/Geometry		
Location	Lat:	41.1305
	Long:	-120.9897
Well Depth		525 ft
Ground Surface Elevation		4288.40 ft
Ref. Point Elevation		4288.90 ft
Screen Depth Range		40 to 525 ft
Screen Elevation Range		4249 to 3764 ft
Principal Aquifer		-
Well Period of Record		
Period-of-Record		1981..2020
WS Elev-Range	Min:	4192.3 ft
	Max	4232.7 ft

Trend Analysis		
Seasonal Data Method		Apr1/Oct1
Show Trend 1		Fall Data
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	(1.449 ft/yr)
Show Trend 2		Spring Data
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	(1.417 ft/yr)

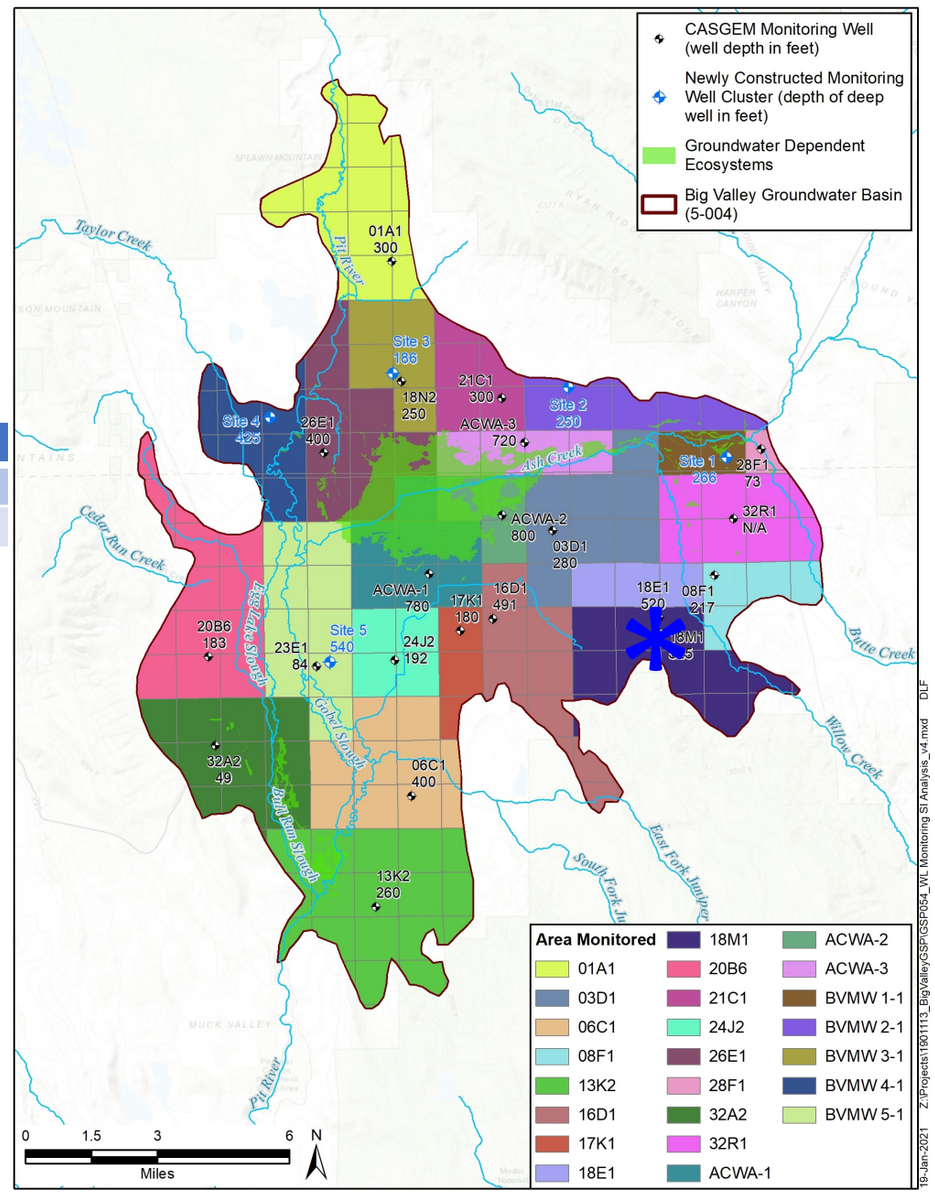
Water Surface Elevation (WSE) Hydrograph



Sustainability Indicator Considerations

Observed WS Elevations		
Parameter		**Value**
WS Elevation Range	Min:	4192 ft
	Max	4233 ft
2015 WS Elevations	Spring:	4211 ft
	Fall:	4202 ft
Most Recent WS Elev	Spring:	4209 ft
	Fall:	4204 ft

Trend Projections		
Year	**Trend 1-Fall**	**Trend 2-Spring**
2022	4194 ft	4201 ft
2027	4187 ft	4194 ft
2032	4180 ft	4187 ft
2037	4173 ft	4180 ft
2042	4165 ft	4173 ft
2047	4158 ft	4166 ft



Sustainability Indicator Settings

Key	Threshold Type	Effect. Yr.	Value	Description
MT	Minimum Threshold	2022	4,165.0 ft	2042 projected water level
MO	Measureable Objective	2022	4,204.0 ft	Most recent Fall measurement

Well Depths Within Area

Well Type	Number of Wells	Shallowest Depth (feet bgs)	Shallowest Elevation (feet msl)
Domestic	11	100	4188
Production (Ag)	10	200	4088

Sustainability Indicators to Consider

Water Levels	Yes
Groundwater Storage	Yes
Water Quality	No
Subsidence	No
Surface Water Depletions	No

Notes:

Other Pertinent Information

Distance From Nearest Perennial Stream	4.2 miles
Name of Nearest Perennial Stream	Ash Creek
Distance From Nearest GDE	1.7 miles
Description of Nearest GDE	Willow Creek Valley

01A1 Sustainability Indicator Analysis

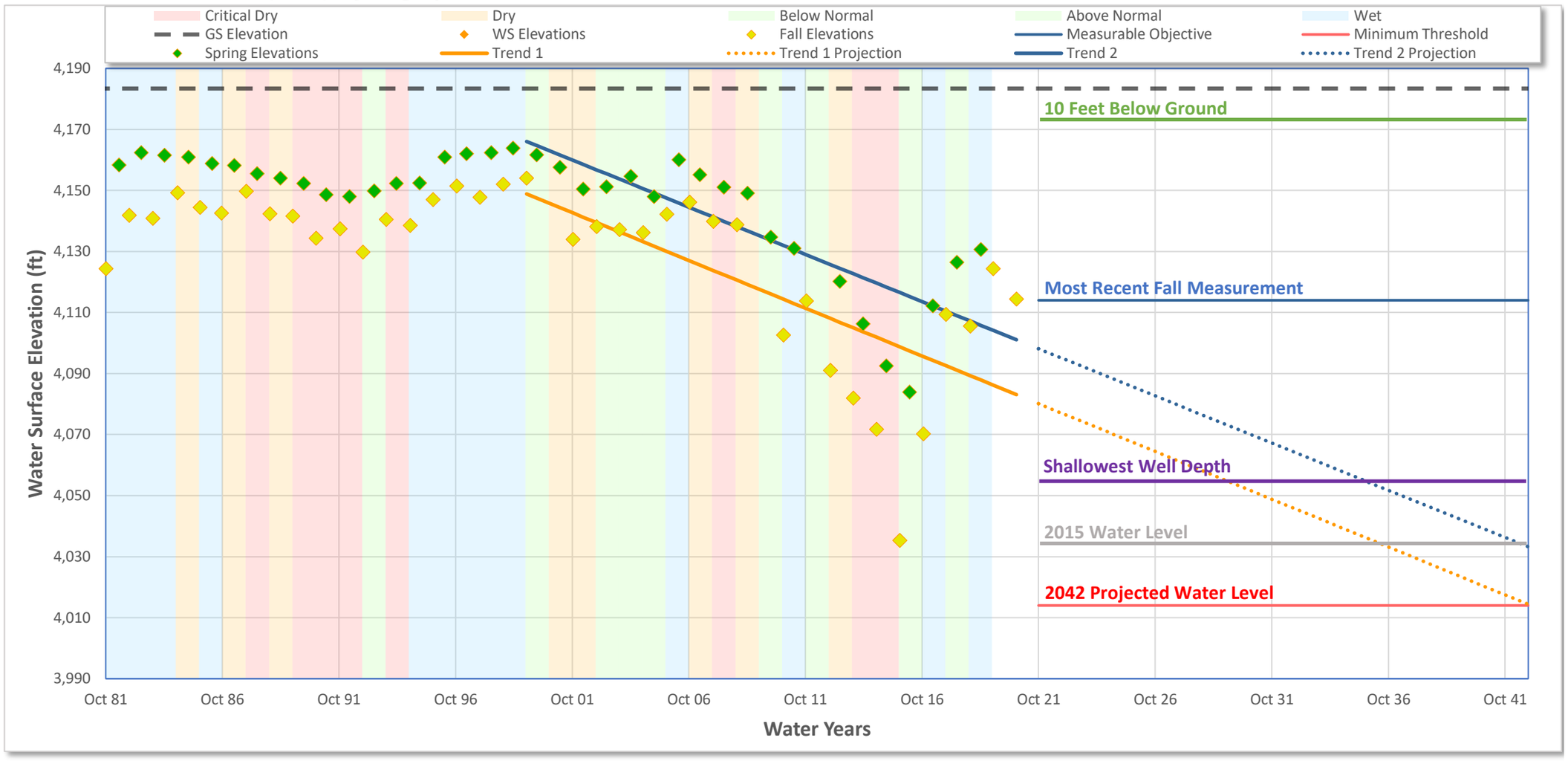
Date: 1/18/2021

Well Information	
Well ID	000013-39N07E01A001M
Alternate Name	01A1
State Number	39N07E01A001M
CASGEM ID	412539N1211050W001
Well Location	
County	Modoc
Basin	BIG VALLEY
Sub-Basin	-
Management Area	-
Proveyor Agency	-
Well Type Information	
Well Type	Unknown
Well Use	Irrigation
Completion Type	Single

Well Coordinates/Geometry		
Location	Lat:	41.2539
	Long:	-121.1050
Well Depth		300 ft
Ground Surface Elevation		4183.40 ft
Ref. Point Elevation		4184.40 ft
Screen Depth Range		-
Screen Elevation Range		-
Principal Aquifer		-
Well Period of Record		
Period-of-Record		1979..2021
WS Elev-Range	Min:	4035.4 ft
	Max	4163.9 ft

Trend Analysis		
Seasonal Data Method		Apr1/Oct1
Show Trend 1		Fall Data
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	(3.131 ft/yr)
Show Trend 2		Spring Data
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	(3.092 ft/yr)

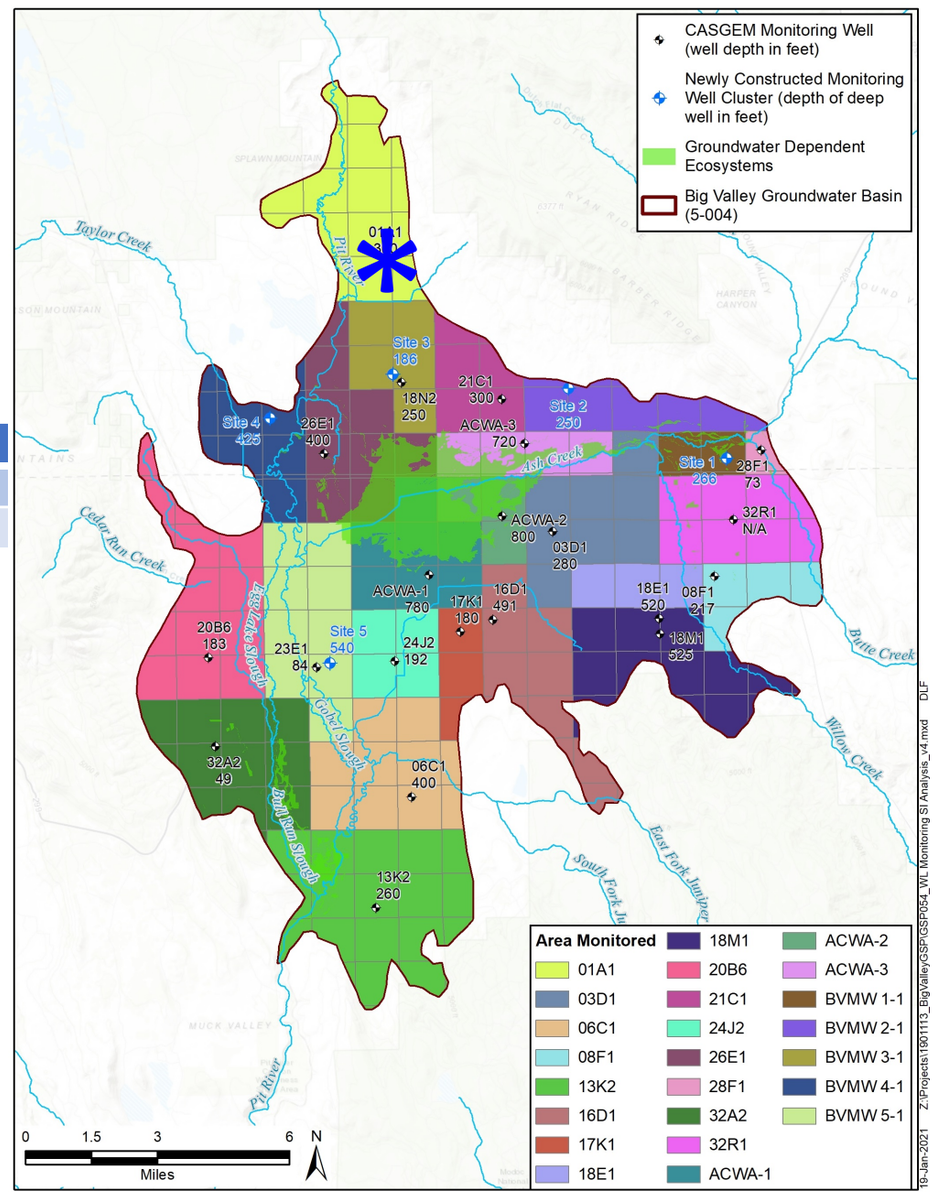
Water Surface Elevation (WSE) Hydrograph



Sustainability Indicator Considerations

Observed WS Elevations		
Parameter		**Value**
WS Elevation Range	Min:	4035 ft
	Max	4164 ft
2015 WS Elevations	Spring:	4093 ft
	Fall:	4035 ft
Most Recent WS Elev	Spring:	4131 ft
	Fall:	4114 ft

Trend Projections		
Year	**Trend 1-Fall**	**Trend 2-Spring**
2022	4077 ft	4095 ft
2027	4061 ft	4080 ft
2032	4046 ft	4064 ft
2037	4030 ft	4049 ft
2042	4014 ft	4033 ft
2047	3999 ft	4018 ft



Sustainability Indicator Settings

Key	Threshold Type	Effect. Yr.	Value	Description
MT	Minimum Threshold	2022	4,014.0 ft	2042 projected water level
MO	Measureable Objective	2022	4,114.0 ft	Most recent Fall measurement

Well Depths Within Area

Well Type	Number of Wells	Shallowest Depth (feet bgs)	Shallowest Elevation (feet msl)
Domestic	12	127	4056
Production (Ag)	25	260	3923

Sustainability Indicators to Consider

Water Levels	Yes
Groundwater Storage	Yes
Water Quality	No
Subsidence	No
Surface Water Depletions	No

Notes:

Other Pertinent Information

Distance From Nearest Perennial Stream	1 miles
Name of Nearest Perennial Stream	Pit River
Distance From Nearest GDE	3.2 miles
Description of Nearest GDE	Pit River

26E1 Sustainability Indicator Analysis

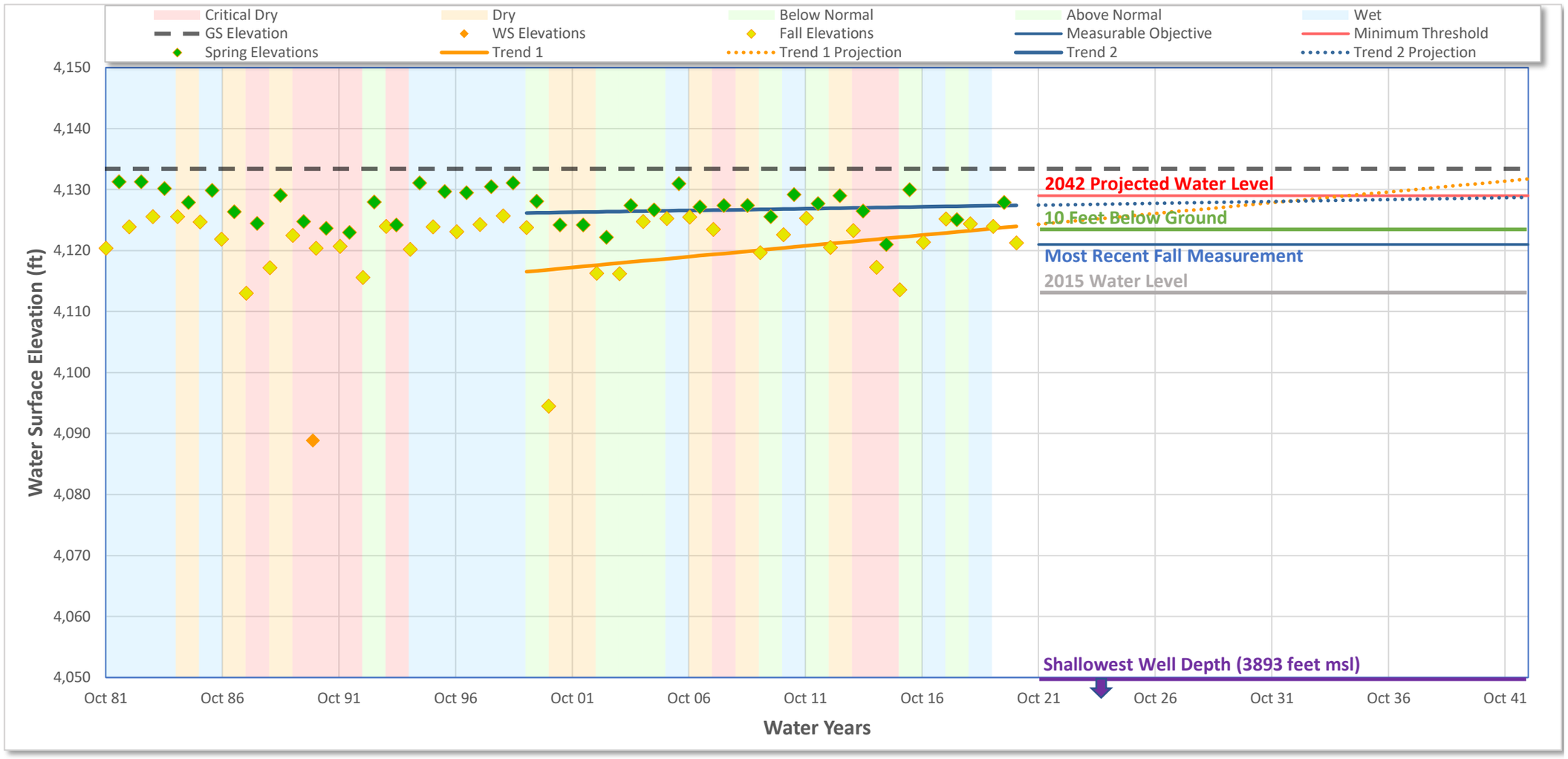
Date: 1/18/2021

Well Information	
Well ID	000014-39N07E26E001M
Alternate Name	26E1
State Number	39N07E26E001M
CASGEM ID	411911N1211354W001
Well Location	
County	Modoc
Basin	BIG VALLEY
Sub-Basin	-
Management Area	-
Proveyor Agency	-
Well Type Information	
Well Type	Unknown
Well Use	Irrigation
Completion Type	Single

Well Coordinates/Geometry		
Location	Lat:	41.1911
	Long:	-121.1354
Well Depth		400 ft
Ground Surface Elevation		4133.40 ft
Ref. Point Elevation		4135.00 ft
Screen Depth Range		20 to 400 ft
Screen Elevation Range		4115 to 3735 ft
Principal Aquifer		-
Well Period of Record		
Period-of-Record		1979..2021
WS Elev-Range	Min:	4088.9 ft
	Max	4131.3 ft

Trend Analysis		
Seasonal Data Method		Apr1/Oct1
Show Trend 1		Fall Data
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	0.354 ft/yr
Show Trend 2		Spring Data
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	0.059 ft/yr

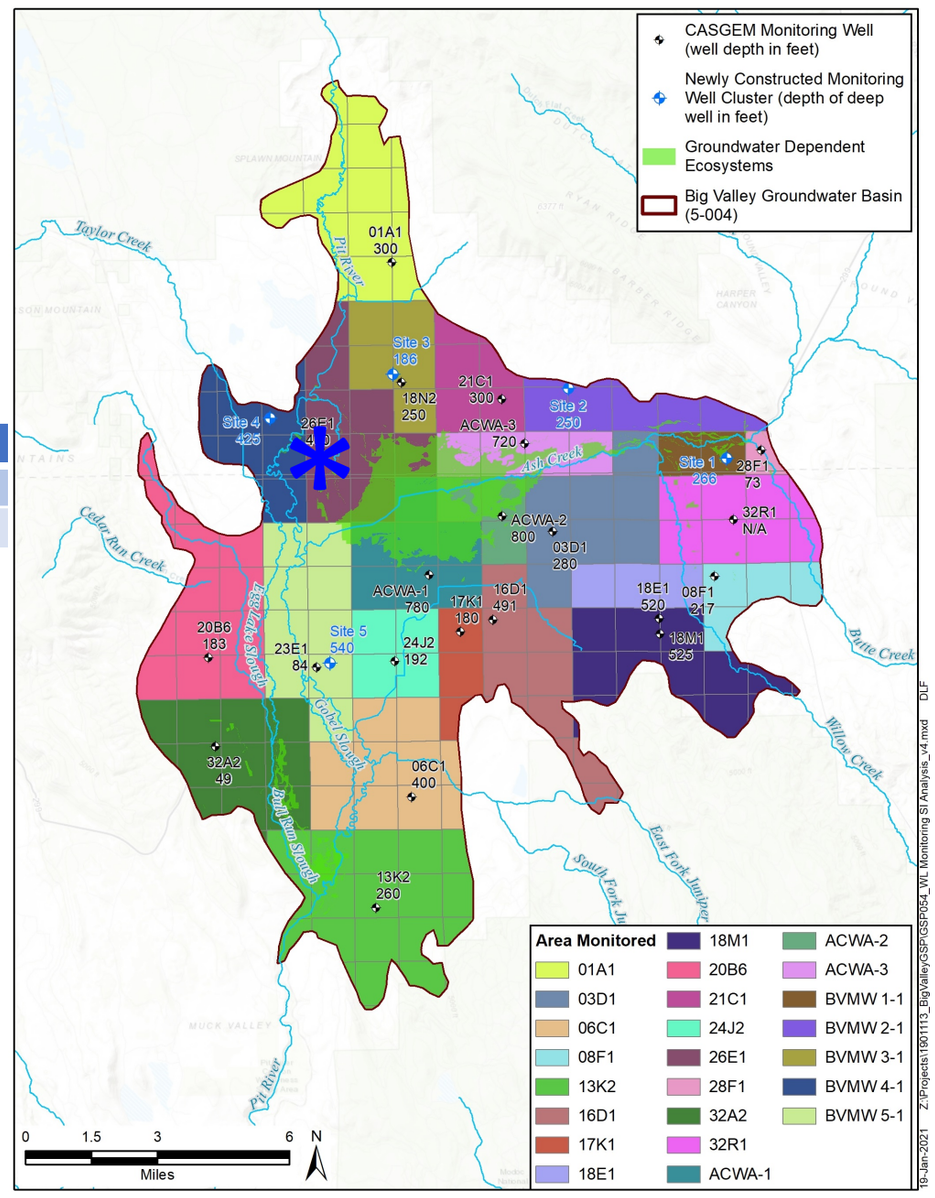
Water Surface Elevation (WSE) Hydrograph



Sustainability Indicator Considerations

Observed WS Elevations		
Parameter		**Value**
WS Elevation Range	Min:	4089 ft
	Max	4131 ft
2015 WS Elevations	Spring:	4121 ft
	Fall:	4114 ft
Most Recent WS Elev	Spring:	4128 ft
	Fall:	4121 ft

Trend Projections		
Year	**Trend 1-Fall**	**Trend 2-Spring**
2022	4125 ft	4128 ft
2027	4126 ft	4128 ft
2032	4128 ft	4128 ft
2037	4130 ft	4128 ft
2042	4132 ft	4129 ft
2047	4133 ft	4129 ft



Sustainability Indicator Settings

Key	Threshold Type	Effect. Yr.	Value	Description
MT	Minimum Threshold	2022	4,129.0 ft	2042 projected water level
MO	Measureable Objective	2022	4,121.0 ft	Most recent Fall measurement

Well Depths Within Area

Well Type	Number of Wells	Shallowest Depth (feet bgs)	Shallowest Elevation (feet msl)
Domestic	4	240	3893
Production (Ag)	21	302	3831

Sustainability Indicators to Consider

Water Levels	Yes
Groundwater Storage	Yes
Water Quality	No
Subsidence	No
Surface Water Depletions	Maybe

Notes:

Other Pertinent Information

Distance From Nearest Perennial Stream	0.7 miles
Name of Nearest Perennial Stream	Pit River
Distance From Nearest GDE	0.3 miles
Description of Nearest GDE	ACWA/Pit River

18N2 Sustainability Indicator Analysis

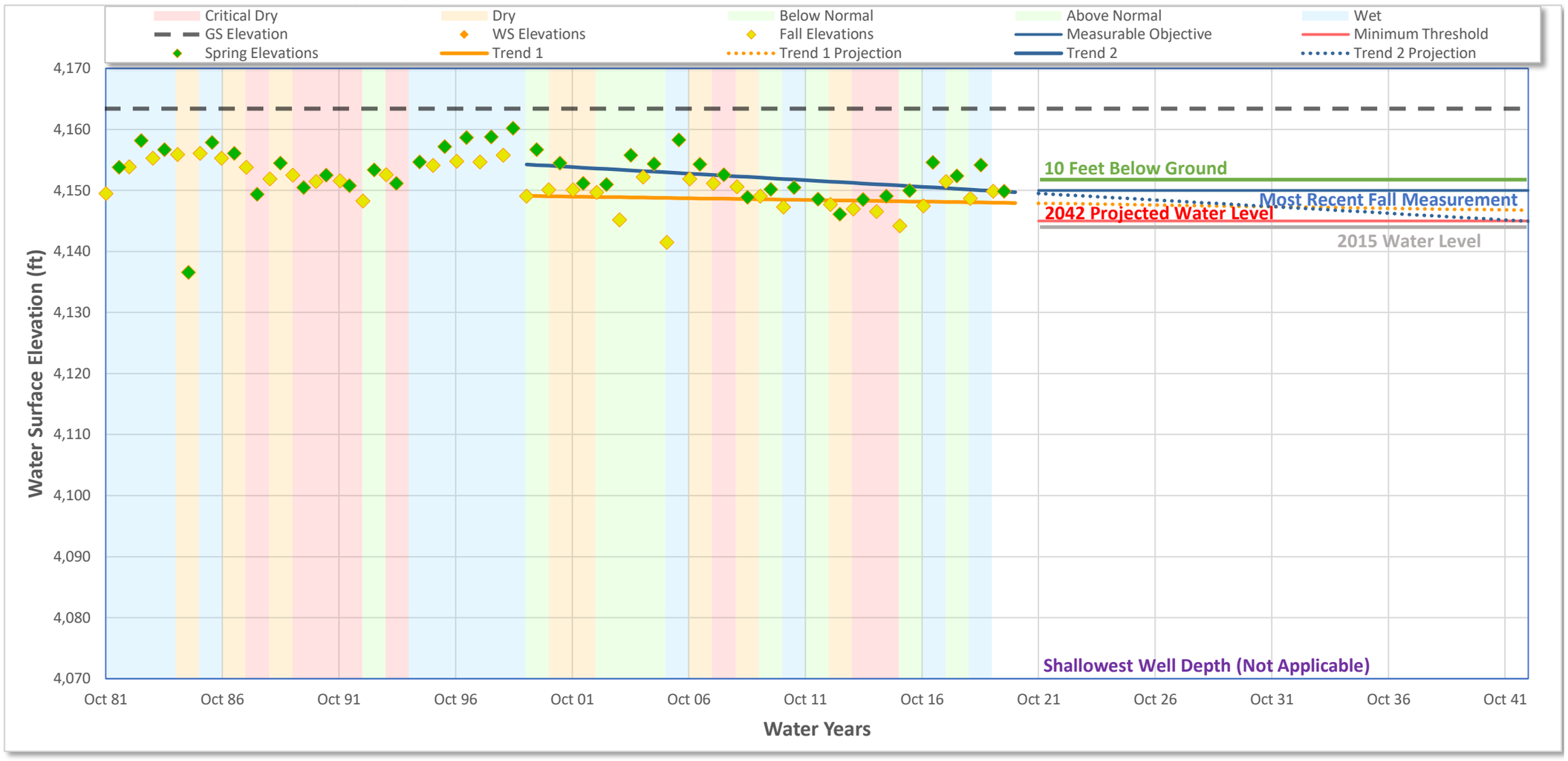
Date: 1/18/2021

Well Information	
Well ID	000015-39N08E18N002M
Alternate Name	18N2
State Number	39N08E18N002M
CASGEM ID	412144N1211013W001
Well Location	
County	Modoc
Basin	BIG VALLEY
Sub-Basin	-
Management Area	-
Proveyor Agency	-
Well Type Information	
Well Type	Unknown
Well Use	Irrigation
Completion Type	Single

Well Coordinates/Geometry		
Location	Lat:	41.2144
	Long:	-121.1013
Well Depth		250 ft
Ground Surface Elevation		4163.40 ft
Ref. Point Elevation		4164.40 ft
Screen Depth Range		-
Screen Elevation Range		-
Principal Aquifer		-
Well Period of Record		
Period-of-Record		1979..2020
WS Elev-Range	Min:	4136.6 ft
	Max	4160.2 ft

Trend Analysis		
Seasonal Data Method		Apr1/Oct1
Show Trend 1		Fall Data
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	(0.055 ft/yr)
Show Trend 2		Spring Data
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	(0.216 ft/yr)

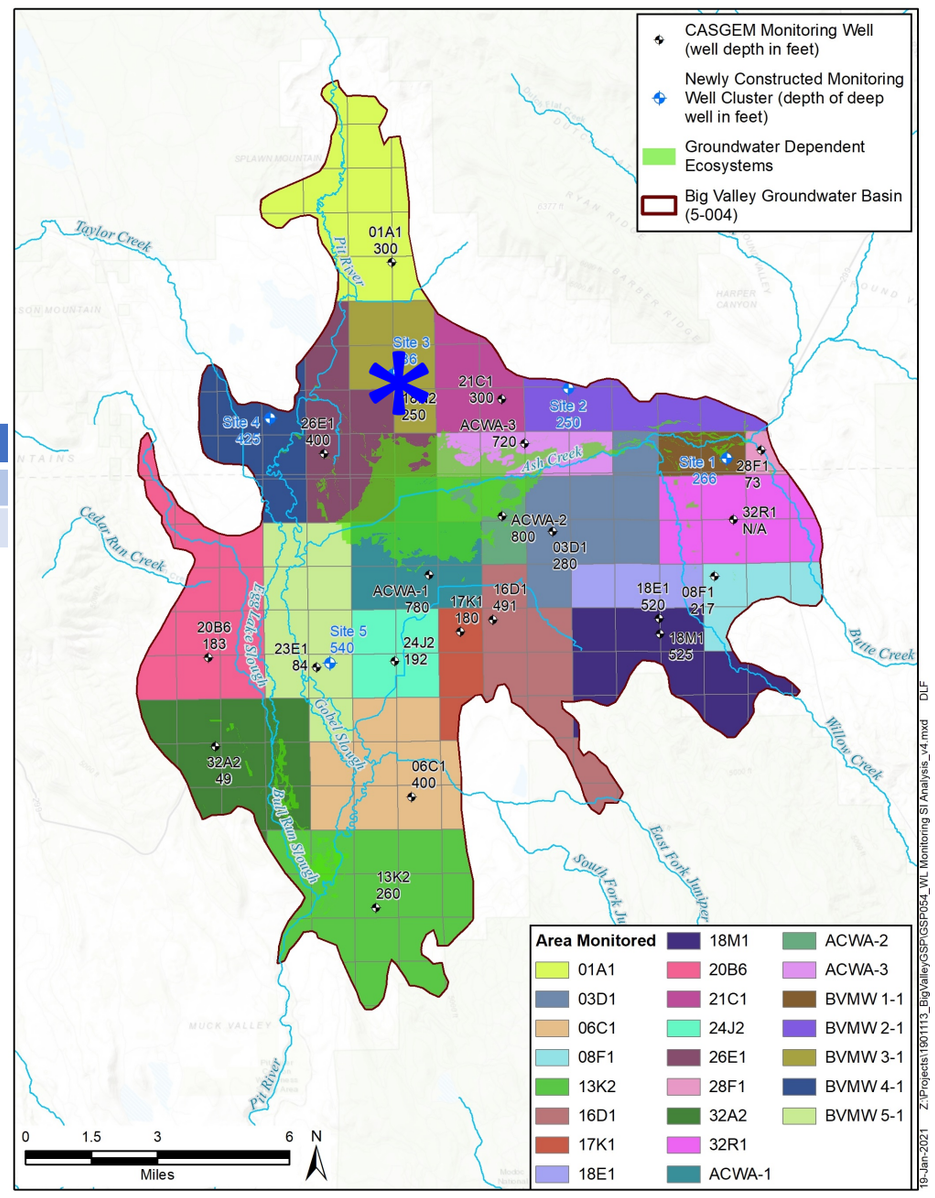
Water Surface Elevation (WSE) Hydrograph



Sustainability Indicator Considerations

Observed WS Elevations		
Parameter		**Value**
WS Elevation Range	Min:	4137 ft
	Max	4160 ft
2015 WS Elevations	Spring:	4149 ft
	Fall:	4144 ft
Most Recent WS Elev	Spring:	4150 ft
	Fall:	4150 ft

Trend Projections		
Year	**Trend 1-Fall**	**Trend 2-Spring**
2022	4148 ft	4149 ft
2027	4148 ft	4148 ft
2032	4147 ft	4147 ft
2037	4147 ft	4146 ft
2042	4147 ft	4145 ft
2047	4146 ft	4144 ft



Sustainability Indicator Settings

Key	Threshold Type	Effect. Yr.	Value	Description
MT	Minimum Threshold	2022	4,145.0 ft	2042 projected water level
MO	Measureable Objective	2022	4,150.0 ft	Most recent Fall measurement

Well Depths Within Area

Well Type	Number of Wells	Shallowest Depth (feet bgs)	Shallowest Elevation (feet msl)
Domestic	0	-	-
Production (Ag)	0	-	-

Sustainability Indicators to Consider

Water Levels	Maybe
Groundwater Storage	Maybe
Water Quality	No
Subsidence	No
Surface Water Depletions	No

Notes:

Other Pertinent Information

Distance From Nearest Perennial Stream	1.6 miles
Name of Nearest Perennial Stream	Pit River
Distance From Nearest GDE	1.4 miles
Description of Nearest GDE	Ash Creek Wildlife Area

21C1 Sustainability Indicator Analysis

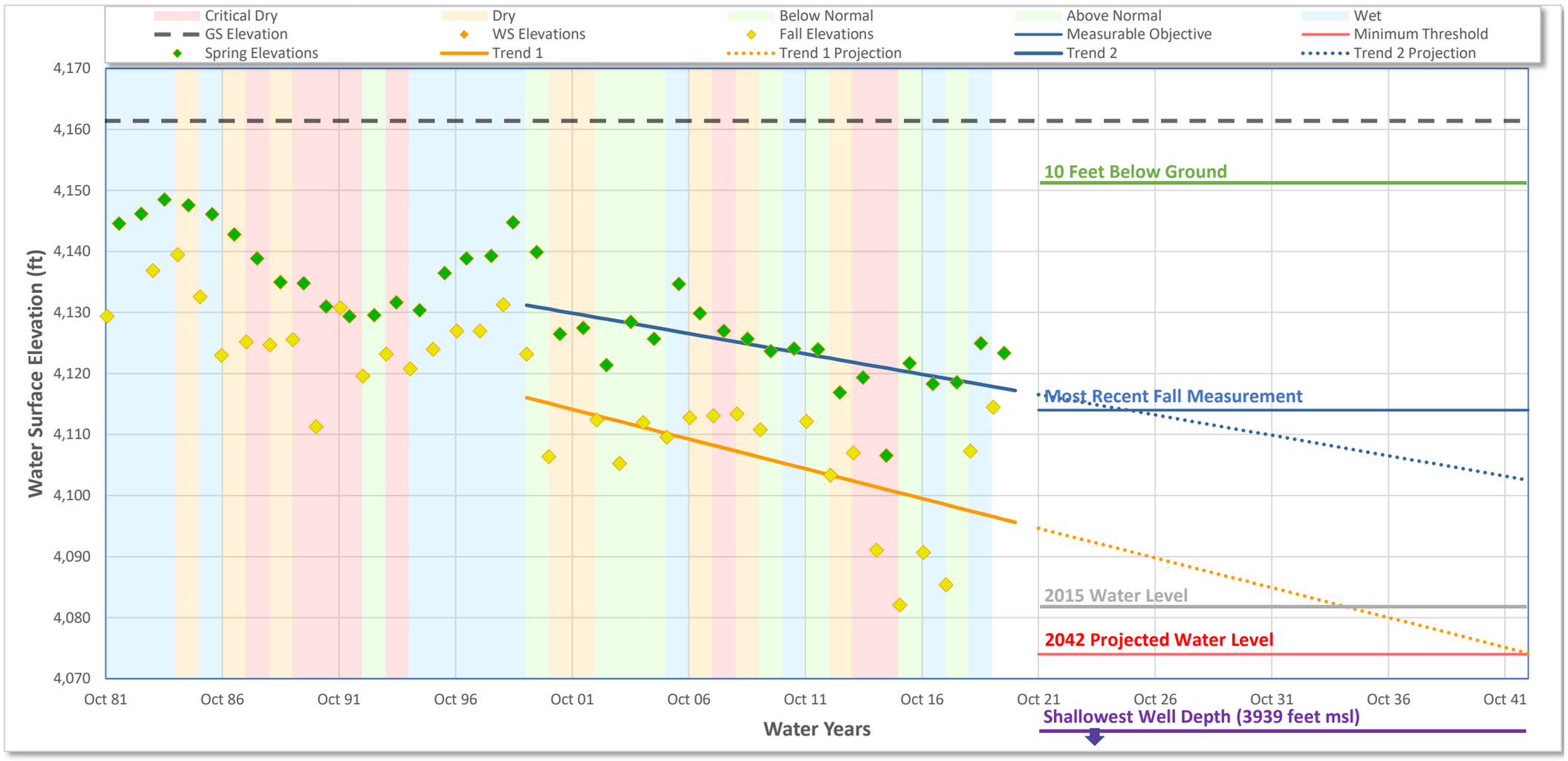
Date: 1/18/2021

Well Information	
Well ID	000016-39N08E21C001M
Alternate Name	21C1
State Number	39N08E21C001M
CASGEM ID	412086N1210574W001
Well Location	
County	Modoc
Basin	BIG VALLEY
Sub-Basin	-
Management Area	-
Proveyor Agency	-
Well Type Information	
Well Type	Unknown
Well Use	Irrigation
Completion Type	Single

Well Coordinates/Geometry		
Location	Lat:	41.2084
	Long:	-121.0576
Well Depth		300 ft
Ground Surface Elevation		4161.40 ft
Ref. Point Elevation		4161.70 ft
Screen Depth Range		30 to 40 ft
Screen Elevation Range		4132 to 4122 ft
Principal Aquifer		-
Well Period of Record		
Period-of-Record		1979..2020
WS Elev-Range	Min:	4082.1 ft
	Max	4148.5 ft

Trend Analysis		
Seasonal Data Method		Apr1/Oct1
Show Trend 1		Fall Data
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	(0.975 ft/yr)
Show Trend 2		Spring Data
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	(0.667 ft/yr)

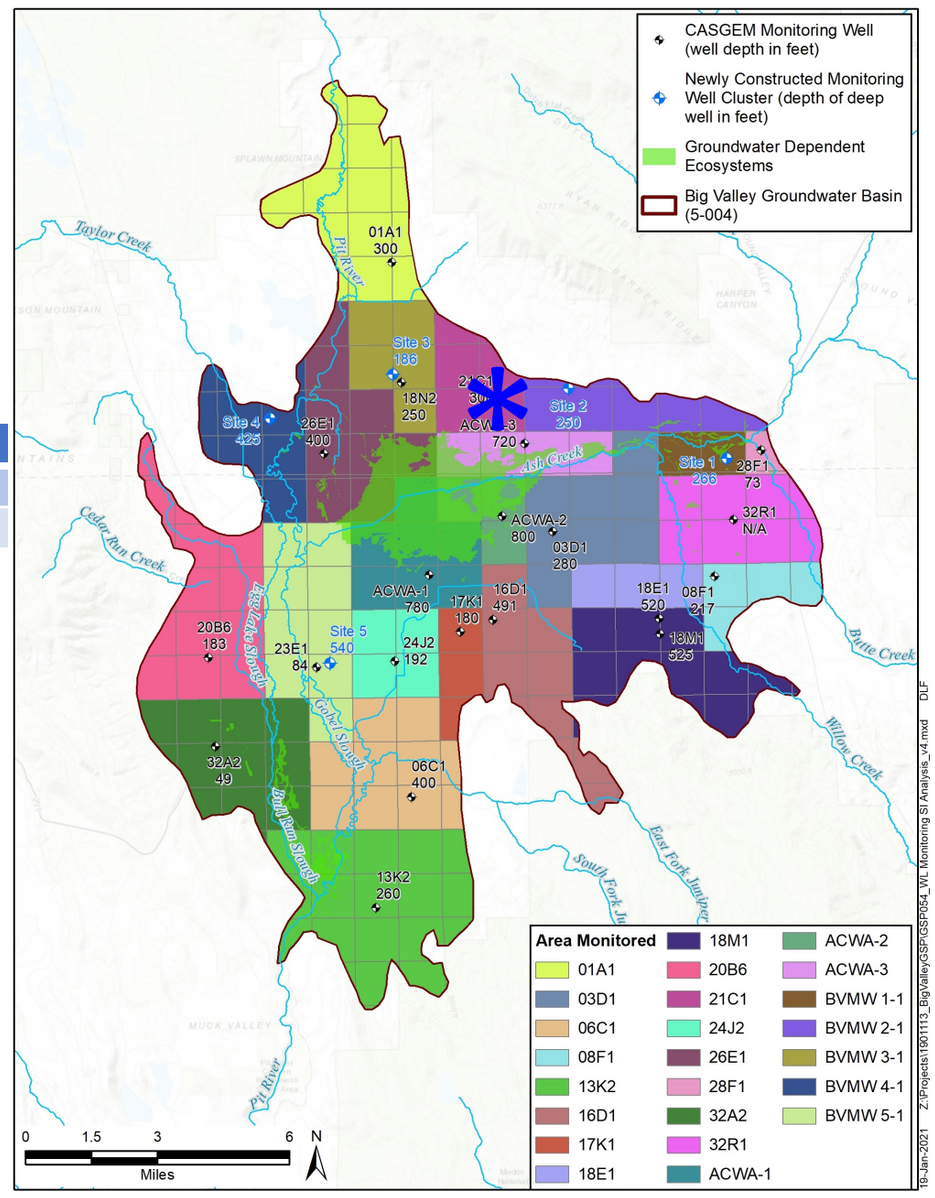
Water Surface Elevation (WSE) Hydrograph



Sustainability Indicator Considerations

Observed WS Elevations		
Parameter		**Value**
WS Elevation Range	Min:	4082 ft
	Max	4149 ft
2015 WS Elevations	Spring:	4107 ft
	Fall:	4082 ft
Most Recent WS Elev	Spring:	4123 ft
	Fall:	4115 ft

Trend Projections		
Year	**Trend 1-Fall**	**Trend 2-Spring**
2022	4094 ft	4116 ft
2027	4089 ft	4113 ft
2032	4084 ft	4109 ft
2037	4079 ft	4106 ft
2042	4074 ft	4103 ft
2047	4069 ft	4099 ft



Sustainability Indicator Settings

Key	Threshold Type	Effect. Yr.	Value	Description
MT	Minimum Threshold	2022	4,074.0 ft	2042 projected water level
MO	Measureable Objective	2022	4,114.0 ft	Most recent Fall measurement

Well Depths Within Area

Well Type	Number of Wells	Shallowest Depth (feet bgs)	Shallowest Elevation (feet msl)
Domestic	2	222	3939
Production (Ag)	13	340	3821

Sustainability Indicators to Consider

Water Levels	Yes
Groundwater Storage	Yes
Water Quality	No
Subsidence	No
Surface Water Depletions	No

Notes:

Other Pertinent Information

Distance From Nearest Perennial Stream	1.8 miles
Name of Nearest Perennial Stream	Ash Creek
Distance From Nearest GDE	1 miles
Description of Nearest GDE	Ash Creek Wildlife Area

28F1 Sustainability Indicator Analysis

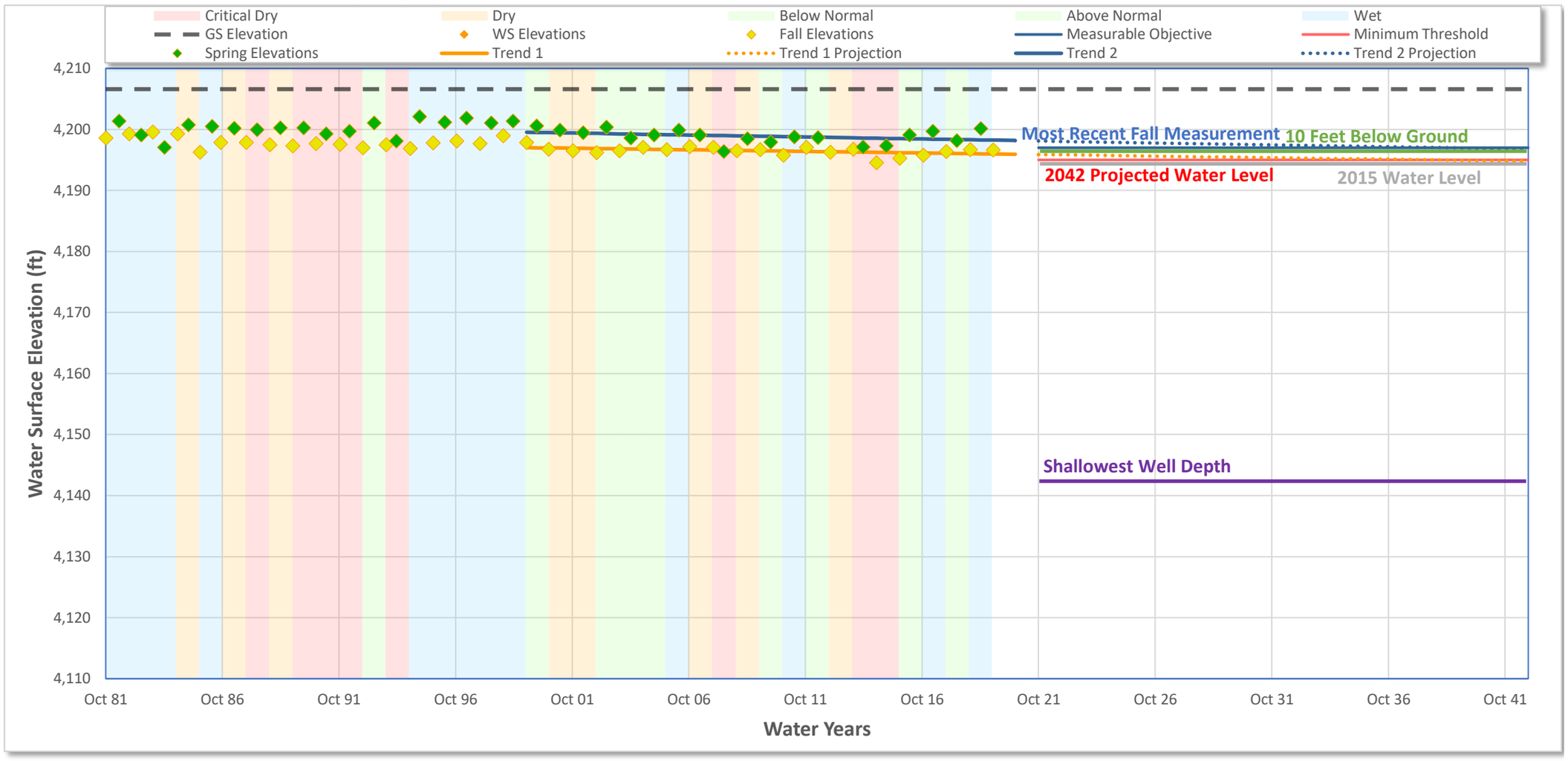
Date: 1/18/2021

Well Information	
Well ID	000017-39N09E28F001M
Alternate Name	28F1
State Number	39N09E28F001M
CASGEM ID	411907N1209447W001
Well Location	
County	Modoc
Basin	BIG VALLEY
Sub-Basin	-
Management Area	-
Proveyor Agency	-
Well Type Information	
Well Type	Unknown
Well Use	Residential
Completion Type	Single

Well Coordinates/Geometry		
Location	Lat:	41.1907
	Long:	-120.9447
Well Depth		73 ft
Ground Surface Elevation		4206.60 ft
Ref. Point Elevation		4207.10 ft
Screen Depth Range		-
Screen Elevation Range		-
Principal Aquifer		-
Well Period of Record		
Period-of-Record		1982..2020
WS Elev-Range	Min:	4194.6 ft
	Max	4202.1 ft

Trend Analysis		
Seasonal Data Method		Apr1/Oct1
Show Trend 1		Fall Data
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	(0.052 ft/yr)
Show Trend 2		Spring Data
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	(0.065 ft/yr)

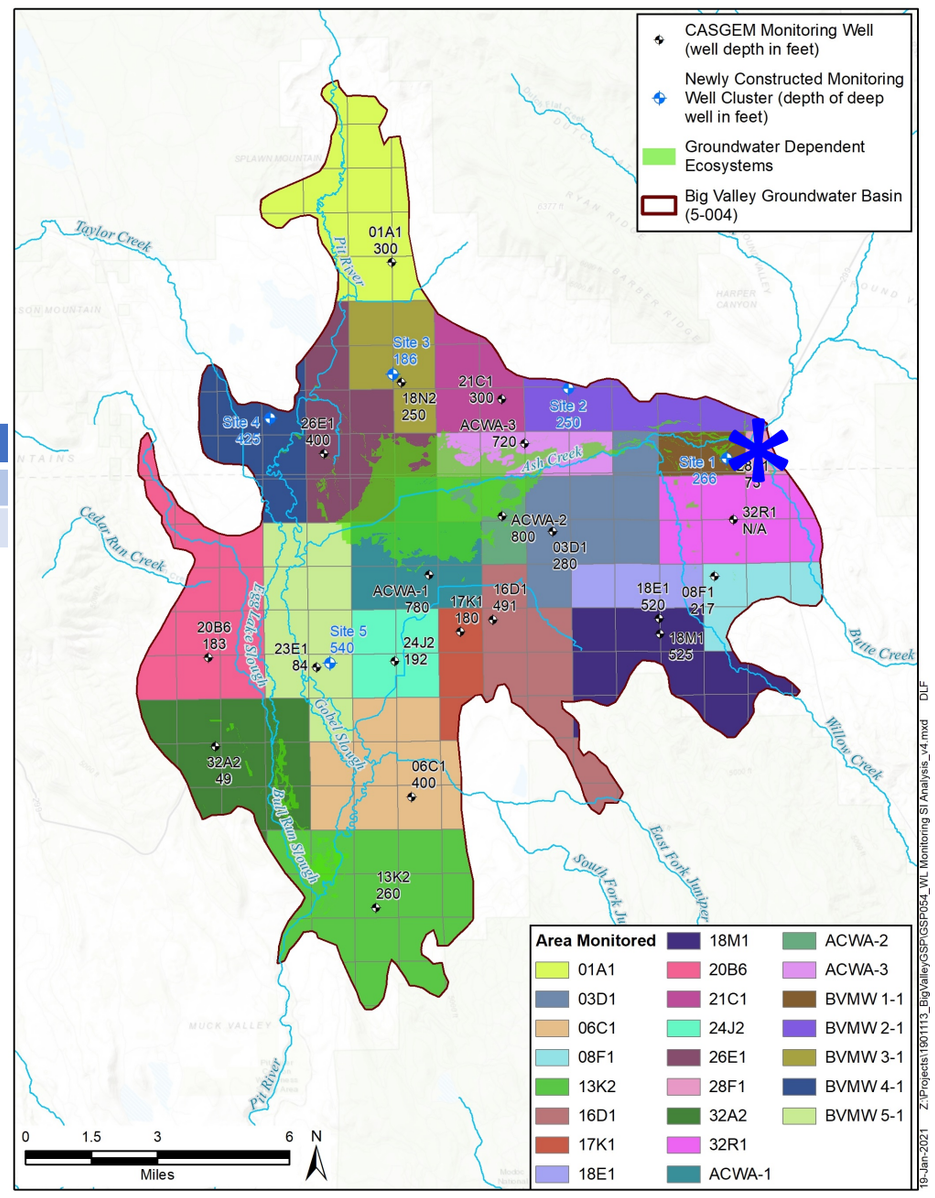
Water Surface Elevation (WSE) Hydrograph



Sustainability Indicator Considerations

Observed WS Elevations		
Parameter		**Value**
WS Elevation Range	Min:	4195 ft
	Max	4202 ft
2015 WS Elevations	Spring:	4197 ft
	Fall:	4195 ft
Most Recent WS Elev	Spring:	4200 ft
	Fall:	4197 ft

Trend Projections		
Year	**Trend 1-Fall**	**Trend 2-Spring**
2022	4196 ft	4198 ft
2027	4196 ft	4198 ft
2032	4195 ft	4197 ft
2037	4195 ft	4197 ft
2042	4195 ft	4197 ft
2047	4195 ft	4196 ft



Sustainability Indicator Settings

Key	Threshold Type	Effect. Yr.	Value	Description
MT	Minimum Threshold	2022	4,195.0 ft	2042 projected water level
MO	Measureable Objective	2022	4,197.0 ft	Most recent Fall measurement

Well Depths Within Area

Well Type	Number of Wells	Shallowest Depth (feet bgs)	Shallowest Elevation (feet msl)
Domestic	18	65	4142
Production (Ag)	3	103	4104

Sustainability Indicators to Consider

Water Levels	No
Groundwater Storage	No
Water Quality	No
Subsidence	No
Surface Water Depletions	Yes

Notes:

Other Pertinent Information

Distance From Nearest Perennial Stream	0.3 miles
Name of Nearest Perennial Stream	Ash Creek
Distance From Nearest GDE	0.2 miles
Description of Nearest GDE	Butte Creek Valley

32R1 Sustainability Indicator Analysis

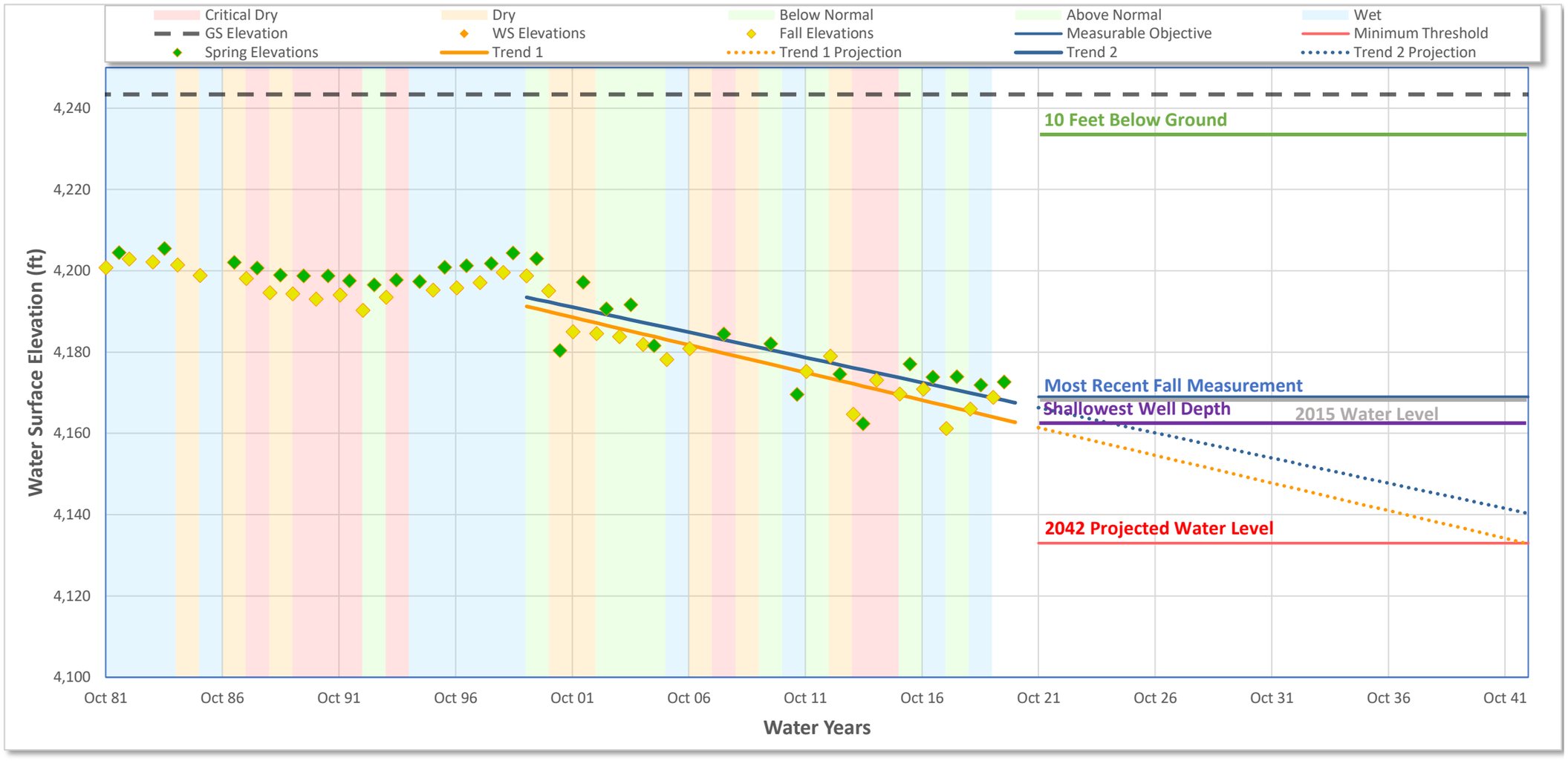
Date: 1/18/2021

Well Information	
Well ID	000018-39N09E32R001M
Alternate Name	32R1
State Number	39N09E32R001M
CASGEM ID	411649N1209569W001
Well Location	
County	Lassen
Basin	BIG VALLEY
Sub-Basin	-
Management Area	-
Proveyor Agency	-
Well Type Information	
Well Type	Unknown
Well Use	Residential
Completion Type	Single

Well Coordinates/Geometry		
Location	Lat:	41.1680
	Long:	-120.9570
Well Depth		-
Ground Surface Elevation		4243.40 ft
Ref. Point Elevation		4243.60 ft
Screen Depth Range		-
Screen Elevation Range		-
Principal Aquifer		-
Well Period of Record		
Period-of-Record		1981..2020
WS Elev-Range	Min:	4161.2 ft
	Max	4205.5 ft

Trend Analysis		
Seasonal Data Method		Apr1/Oct1
Show Trend 1		Fall Data
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	(1.359 ft/yr)
Show Trend 2		Spring Data
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	(1.238 ft/yr)

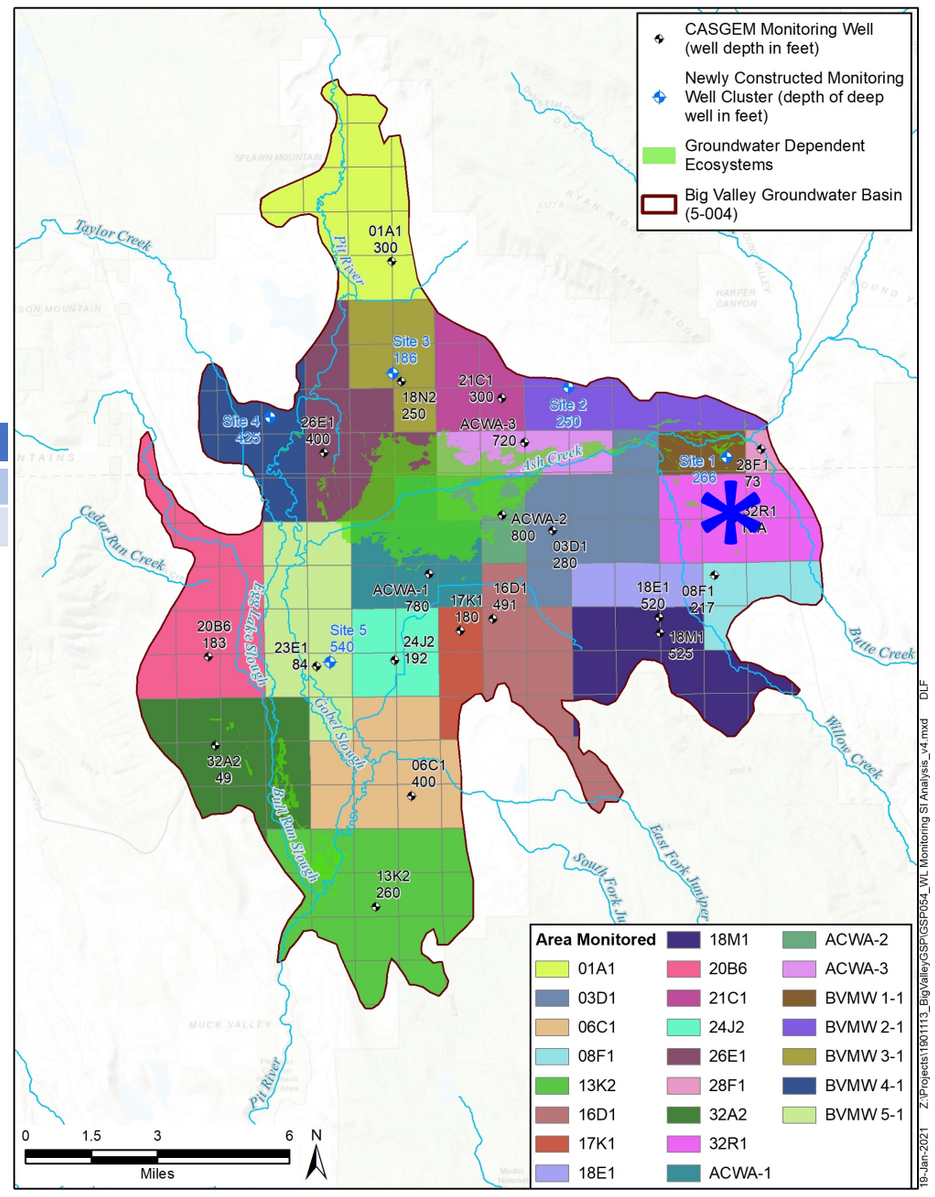
Water Surface Elevation (WSE) Hydrograph



Sustainability Indicator Considerations

Observed WS Elevations		
Parameter		**Value**
WS Elevation Range	Min:	4161 ft
	Max	4206 ft
2015 WS Elevations	Spring:	-
	Fall:	4170 ft
Most Recent WS Elev	Spring:	4173 ft
	Fall:	4169 ft

Trend Projections		
Year	**Trend 1-Fall**	**Trend 2-Spring**
2022	4160 ft	4165 ft
2027	4153 ft	4159 ft
2032	4146 ft	4153 ft
2037	4140 ft	4147 ft
2042	4133 ft	4140 ft
2047	4126 ft	4134 ft



Sustainability Indicator Settings

Key	Threshold Type	Effect. Yr.	Value	Description
MT	Minimum Threshold	2022	4,133.0 ft	2042 projected water level
MO	Measureable Objective	2022	4,169.0 ft	Most recent Fall measurement

Well Depths Within Area

Well Type	Number of Wells	Shallowest Depth (feet bgs)	Shallowest Elevation (feet msl)
Domestic	18	80	4163
Production (Ag)	18	160	4083

Sustainability Indicators to Consider

Water Levels	Maybe
Groundwater Storage	Maybe
Water Quality	No
Subsidence	No
Surface Water Depletions	Maybe

Other Pertinent Information

Distance From Nearest Perennial Stream	1.8 miles
Name of Nearest Perennial Stream	Ash Creek
Distance From Nearest GDE	0.9 miles
Description of Nearest GDE	Willow Creek Valley

Notes:

The depth of this well is unknown. Therefore can only be used if depth is determined.

13K2 Sustainability Indicator Analysis

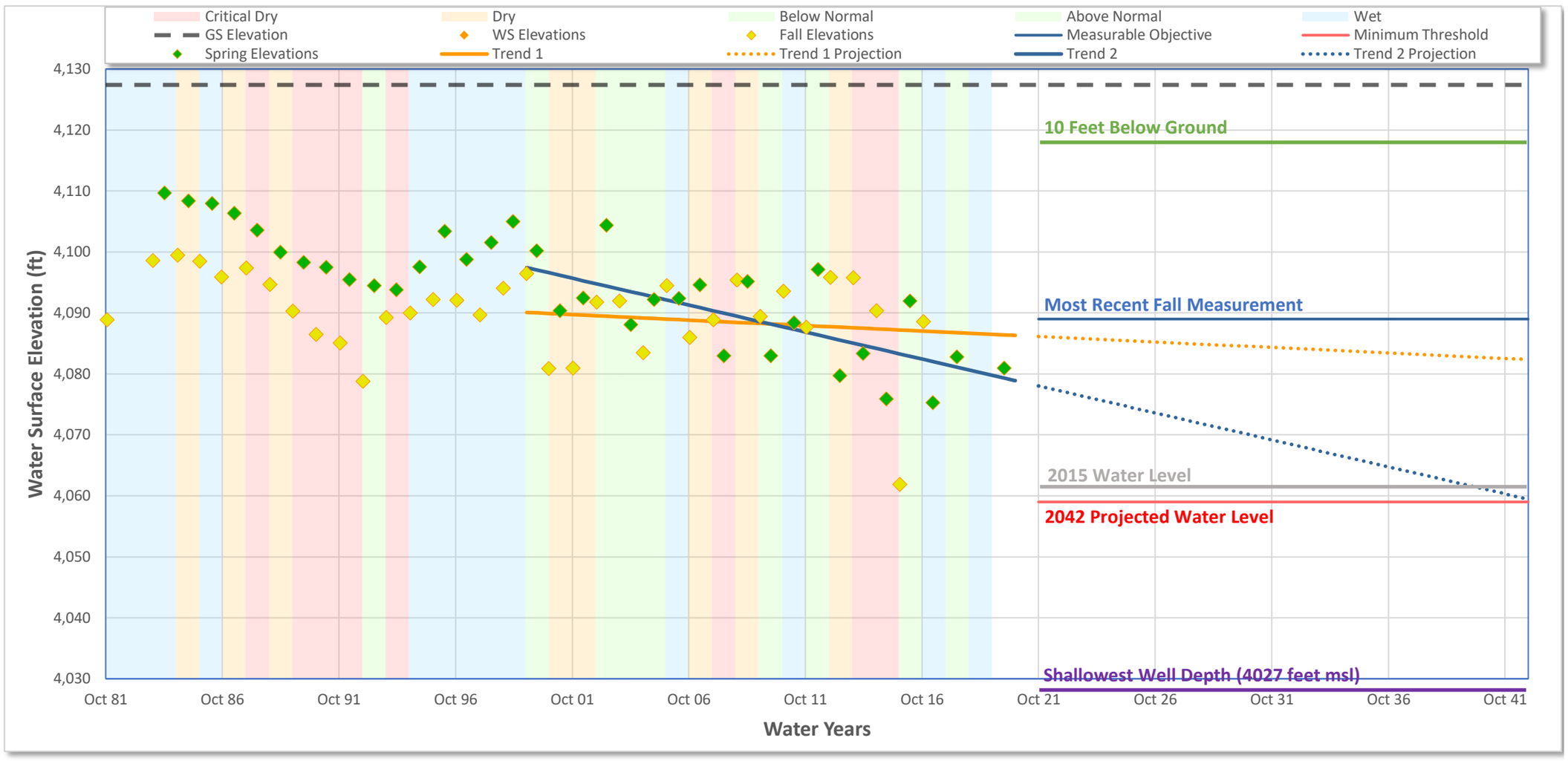
Date: 1/18/2021

Well Information	
Well ID	000019-37N07E13K002M
Alternate Name	13K2
State Number	37N07E13K002M
CASGEM ID	410413N1211147W001
Well Location	
County	Lassen
Basin	BIG VALLEY
Sub-Basin	-
Management Area	-
Proveyor Agency	-
Well Type Information	
Well Type	Unknown
Well Use	Irrigation
Completion Type	Single

Well Coordinates/Geometry		
Location	Lat:	41.0413
	Long:	-121.1147
Well Depth		260 ft
Ground Surface Elevation		4127.40 ft
Ref. Point Elevation		4127.90 ft
Screen Depth Range		20 to 260 ft
Screen Elevation Range		4108 to 3868 ft
Principal Aquifer		-
Well Period of Record		
Period-of-Record		1982..2020
WS Elev-Range	Min:	4061.9 ft
	Max	4109.7 ft

Trend Analysis		
Seasonal Data Method		Apr1/Oct1
Show Trend 1		Fall Data
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	(0.179 ft/yr)
Show Trend 2		Spring Data
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	(0.884 ft/yr)

Water Surface Elevation (WSE) Hydrograph



Sustainability Indicator Considerations

Observed WS Elevations		
Parameter		**Value**
WS Elevation Range	Min:	4062 ft
	Max	4110 ft
2015 WS Elevations	Spring:	4076 ft
	Fall:	4062 ft
Most Recent WS Elev	Spring:	4081 ft
	Fall:	4089 ft

Trend Projections		
Year	**Trend 1-Fall**	**Trend 2-Spring**
2022	4086 ft	4077 ft
2027	4085 ft	4073 ft
2032	4084 ft	4068 ft
2037	4083 ft	4064 ft
2042	4082 ft	4059 ft
2047	4081 ft	4055 ft

Sustainability Indicator Settings

Key	Threshold Type	Effect. Yr.	Value	Description
MT	Minimum Threshold	2022	4,059.0 ft	2042 projected water level
MO	Measureable Objective	2022	4,089.0 ft	Most recent Fall measurement

Well Depths Within Area

Well Type	Number of Wells	Shallowest Depth (feet bgs)	Shallowest Elevation (feet msl)
Domestic	7	100	4027
Production (Ag)	13	200	3927

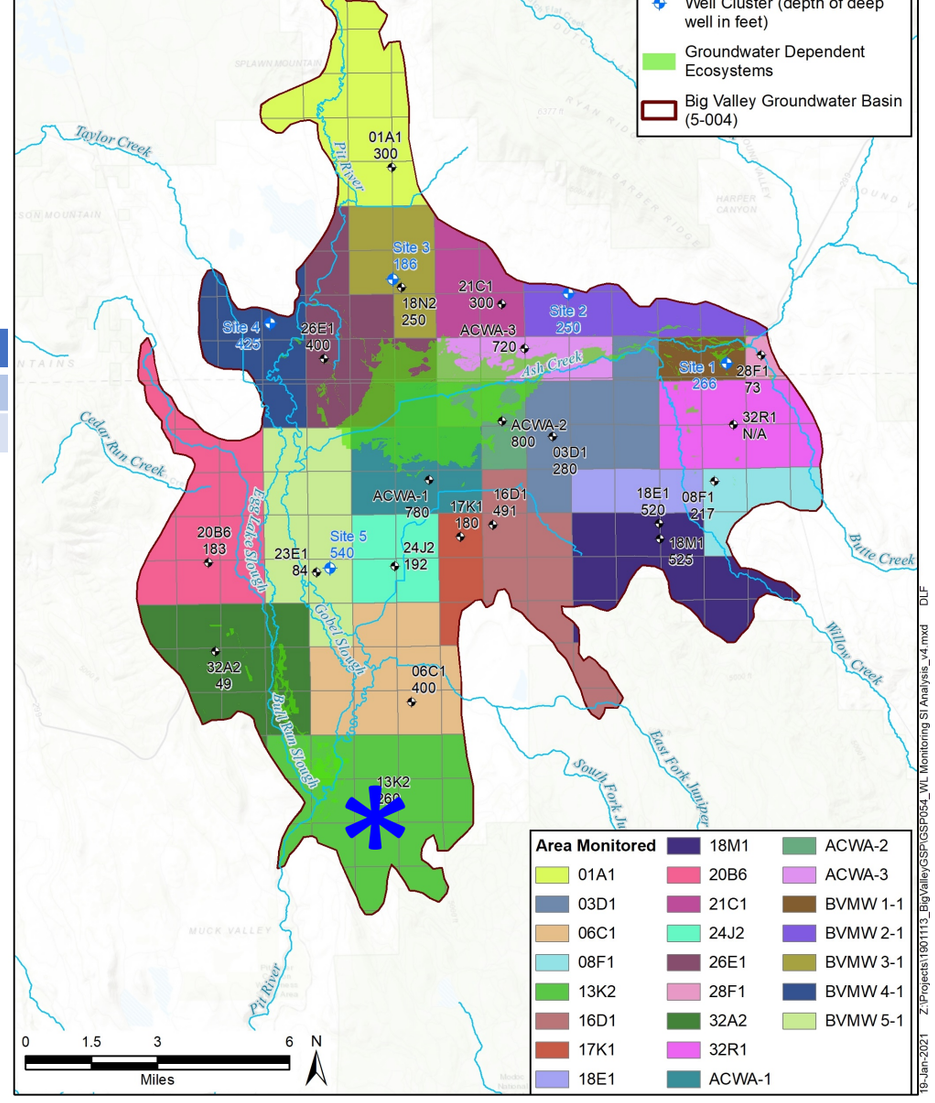
Sustainability Indicators to Consider

Water Levels	Yes
Groundwater Storage	Yes
Water Quality	No
Subsidence	No
Surface Water Depletions	No

Other Pertinent Information

Distance From Nearest Perennial Stream	1.1 miles
Name of Nearest Perennial Stream	Pit River
Distance From Nearest GDE	0.9 miles
Description of Nearest GDE	Pit River/Bull Run Slough at south end of basin

Notes:



06C1 Sustainability Indicator Analysis

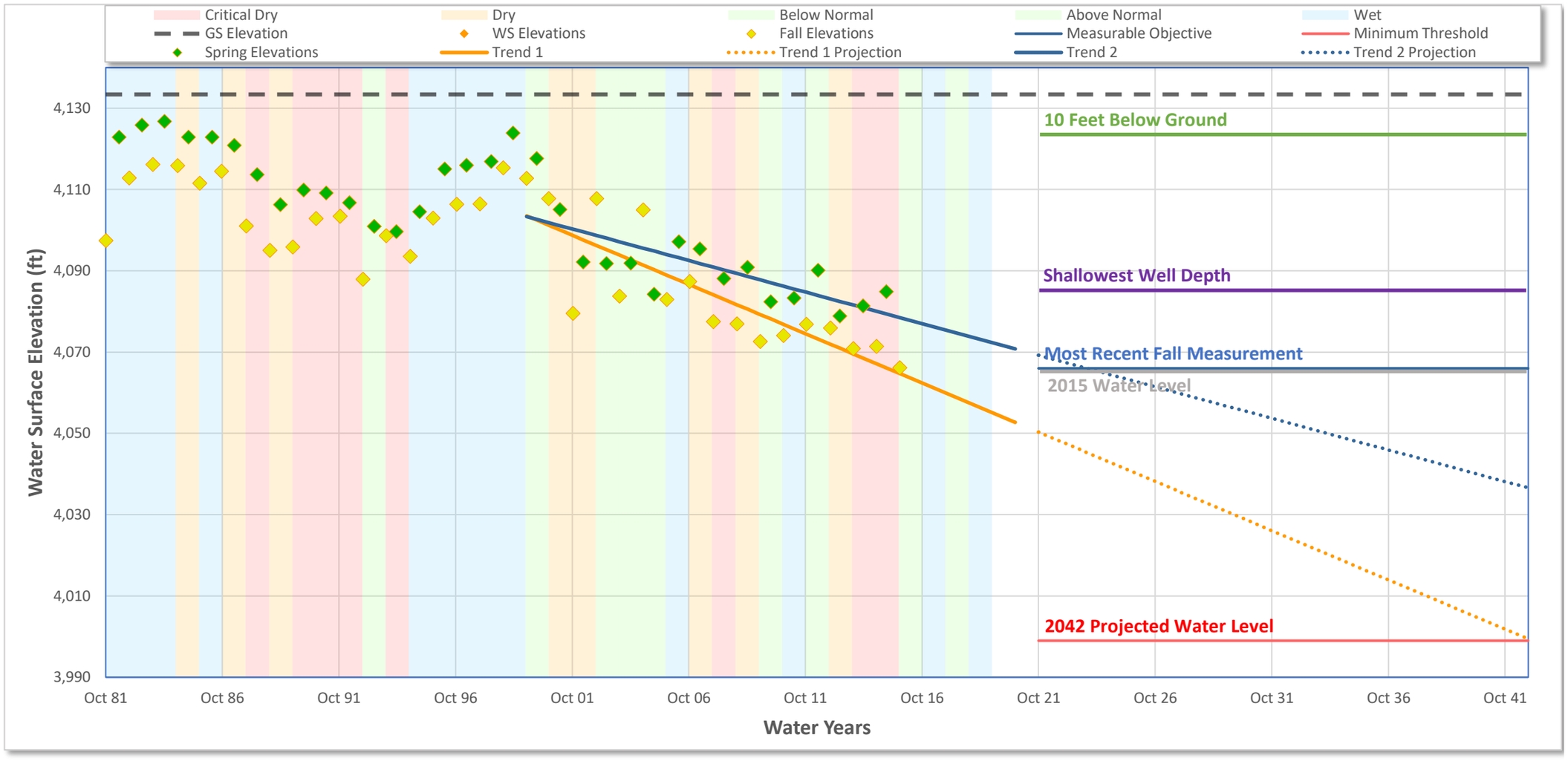
Date: 1/18/2021

Well Information	
Well ID	000020-37N08E06C001M
Alternate Name	06C1
State Number	37N08E06C001M
CASGEM ID	410777N1210986W001
Well Location	
County	Lassen
Basin	BIG VALLEY
Sub-Basin	-
Management Area	-
Proveyor Agency	-
Well Type Information	
Well Type	Unknown
Well Use	Residential
Completion Type	Single

Well Coordinates/Geometry		
Location	Lat:	41.0777
	Long:	-121.0986
Well Depth		400 ft
Ground Surface Elevation		4133.40 ft
Ref. Point Elevation		4133.90 ft
Screen Depth Range		20 to 400 ft
Screen Elevation Range		4114 to 3734 ft
Principal Aquifer		-
Well Period of Record		
Period-of-Record		1982..2016
WS Elev-Range	Min:	4066.2 ft
	Max	4126.8 ft

Trend Analysis		
Seasonal Data Method		Apr1/Oct1
Show Trend 1		Fall Data
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	(2.423 ft/yr)
Show Trend 2		Spring Data
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	(1.553 ft/yr)

Water Surface Elevation (WSE) Hydrograph



Sustainability Indicator Considerations

Observed WS Elevations		
Parameter		**Value**
WS Elevation Range	Min:	4066 ft
	Max	4127 ft
2015 WS Elevations	Spring:	4085 ft
	Fall:	4066 ft
Most Recent WS Elev	Spring:	4085 ft
	Fall:	4066 ft

Trend Projections		
Year	**Trend 1-Fall**	**Trend 2-Spring**
2022	4048 ft	4068 ft
2027	4036 ft	4060 ft
2032	4024 ft	4052 ft
2037	4012 ft	4044 ft
2042	3999 ft	4037 ft
2047	3987 ft	4029 ft

Sustainability Indicator Settings

Key	Threshold Type	Effect. Yr.	Value	Description
MT	Minimum Threshold	2022	3,999.0 ft	2042 projected water level
MO	Measureable Objective	2022	4,066.0 ft	Most recent Fall measurement

Well Depths Within Area

Well Type	Number of Wells	Shallowest Depth (feet bgs)	Shallowest Elevation (feet msl)
Domestic	6	80	4053
Production (Ag)	30	47	4086

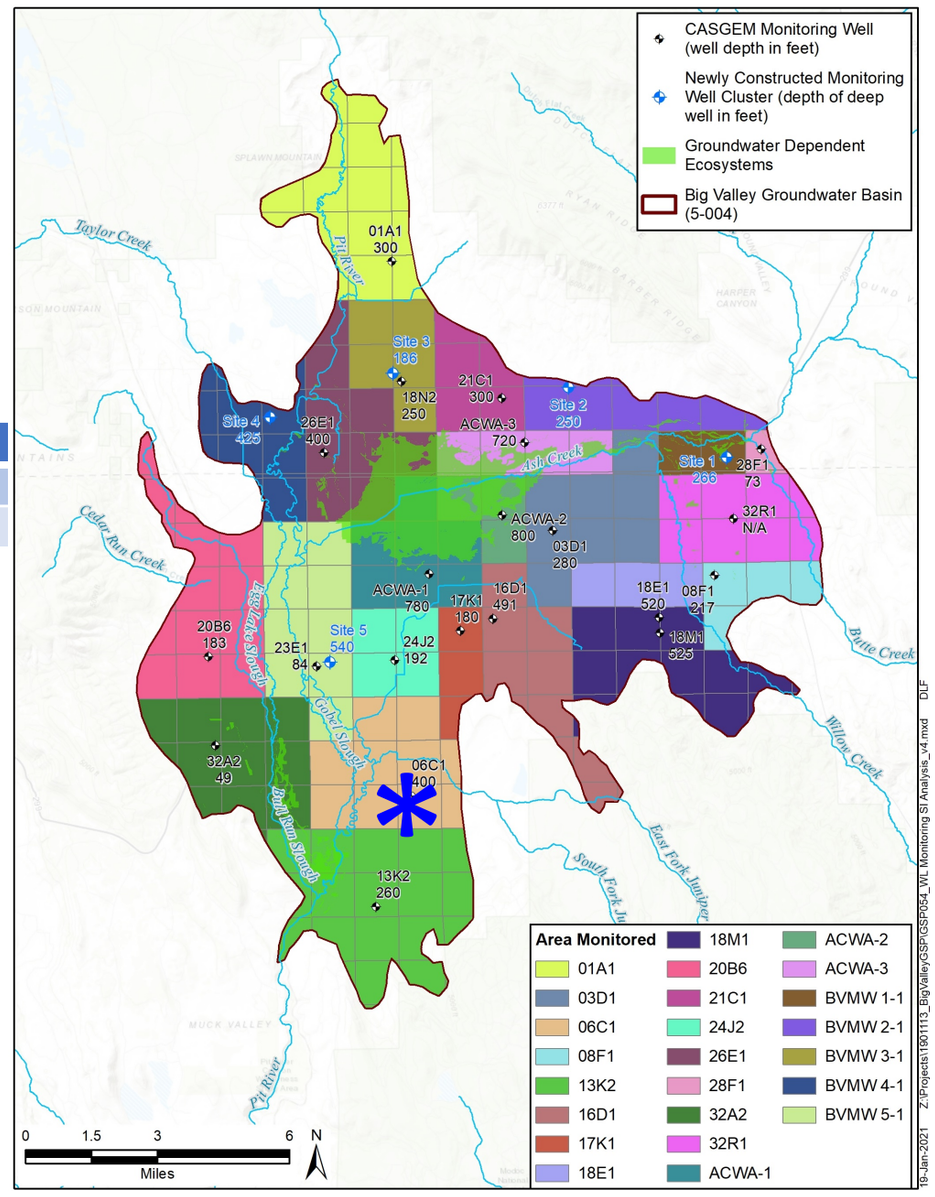
Sustainability Indicators to Consider

Water Levels	Yes
Groundwater Storage	Yes
Water Quality	No
Subsidence	No
Surface Water Depletions	No

Other Pertinent Information

Distance From Nearest Perennial Stream	1 miles
Name of Nearest Perennial Stream	Pit River
Distance From Nearest GDE	1.9 miles
Description of Nearest GDE	Pit River/Bull Run Slough

Notes:



ACWA-1 Sustainability Indicator Analysis

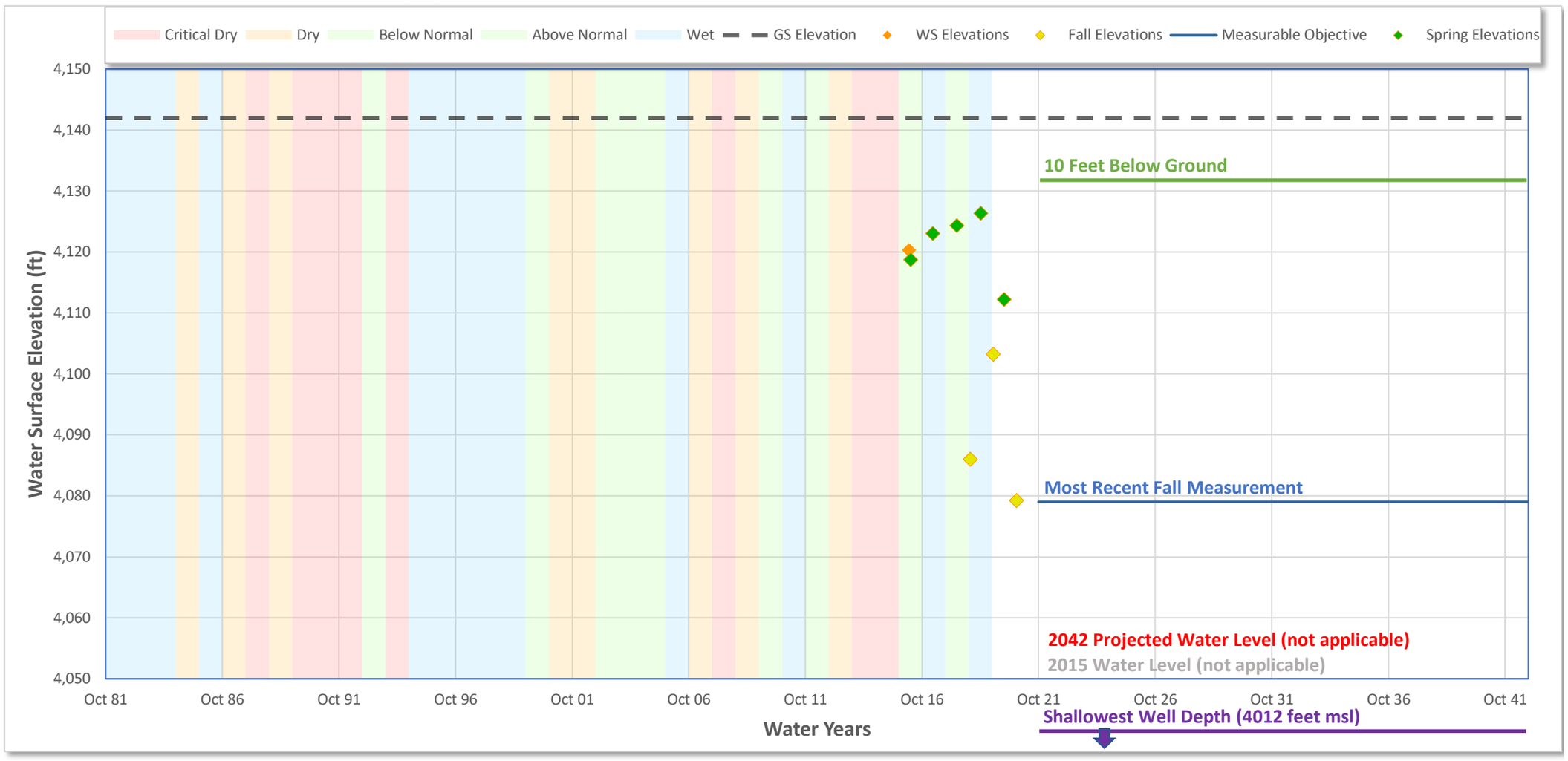
Date: 1/18/2021

Well Information	
Well ID	000021-ACWA-1
Alternate Name	ACWA-1
State Number	38N08E07A001M
CASGEM ID	411508N1210900W001
Well Location	
County	Lassen
Basin	BIG VALLEY
Sub-Basin	-
Management Area	-
Proveyor Agency	-
Well Type Information	
Well Type	Unknown
Well Use	Stockwatering
Completion Type	Single

Well Coordinates/Geometry		
Location	Lat:	41.1508
	Long:	-121.0900
Well Depth		780 ft
Ground Surface Elevation		4142.00 ft
Ref. Point Elevation		4142.75 ft
Screen Depth Range		60 to 780 ft
Screen Elevation Range		4083 to 3363 ft
Principal Aquifer		-
Well Period of Record		
Period-of-Record		2016..2021
WS Elev-Range	Min:	4039.2 ft
	Max	4126.4 ft

Trend Analysis		
Seasonal Data Method		Apr1/Oct1
Show Trend 1		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-
Show Trend 2		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-

Water Surface Elevation (WSE) Hydrograph



Sustainability Indicator Considerations

Observed WS Elevations		
Parameter		**Value**
WS Elevation Range	Min:	4039 ft
	Max	4126 ft
2015 WS Elevations	Spring:	-
	Fall:	-
Most Recent WS Elev	Spring:	4112 ft
	Fall:	4079 ft

Trend Projections		
Year	**Trend 1-Fall**	**Trend 2-Spring**
2022	-	-
2027	-	-
2032	-	-
2037	-	-
2042	-	-
2047	-	-

Sustainability Indicator Settings

Key	Threshold Type	Effect. Yr.	Value	Description
MO	Measureable Objective	2022	4,079.0 ft	Most recent Fall measurement

Well Depths Within Area

Well Type	Number of Wells	Shallowest Depth (feet bgs)	Shallowest Elevation (feet msl)
Domestic	3	130	4012
Production (Ag)	11	162	3980

Other Pertinent Information

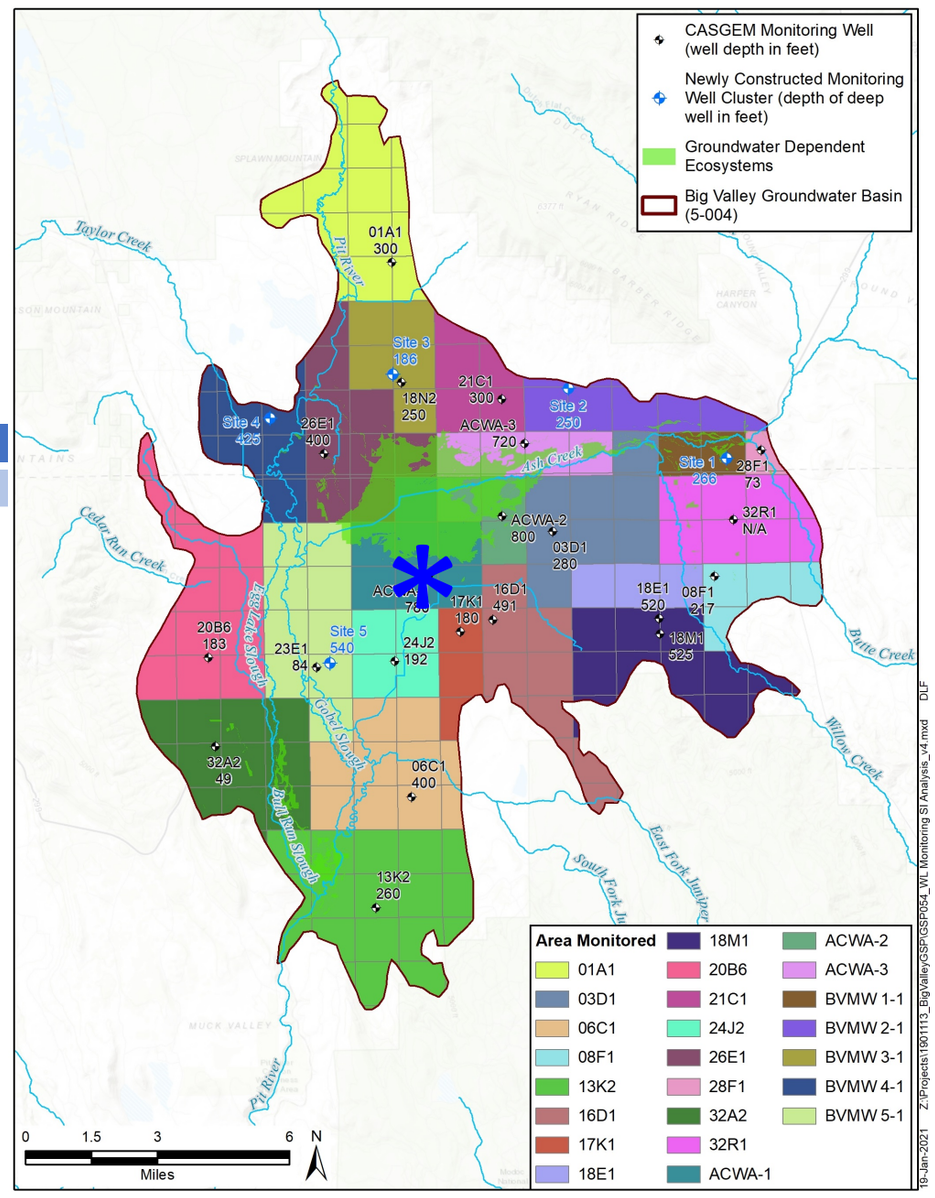
Distance From Nearest Perennial Stream	1.7 miles
Name of Nearest Perennial Stream	Ash Creek
Distance From Nearest GDE	0.3 miles
Description of Nearest GDE	Ash Creek Wildlife Area

Sustainability Indicators to Consider

Water Levels	Yes
Groundwater Storage	Yes
Water Quality	No
Subsidence	No
Surface Water Depletions	Maybe

Notes:

Deep well, but located right on ACWA, so could potentially be an indicator for GDE (spring water levels). Screen comes up to 60 feet bgs.



ACWA-2 Sustainability Indicator Analysis

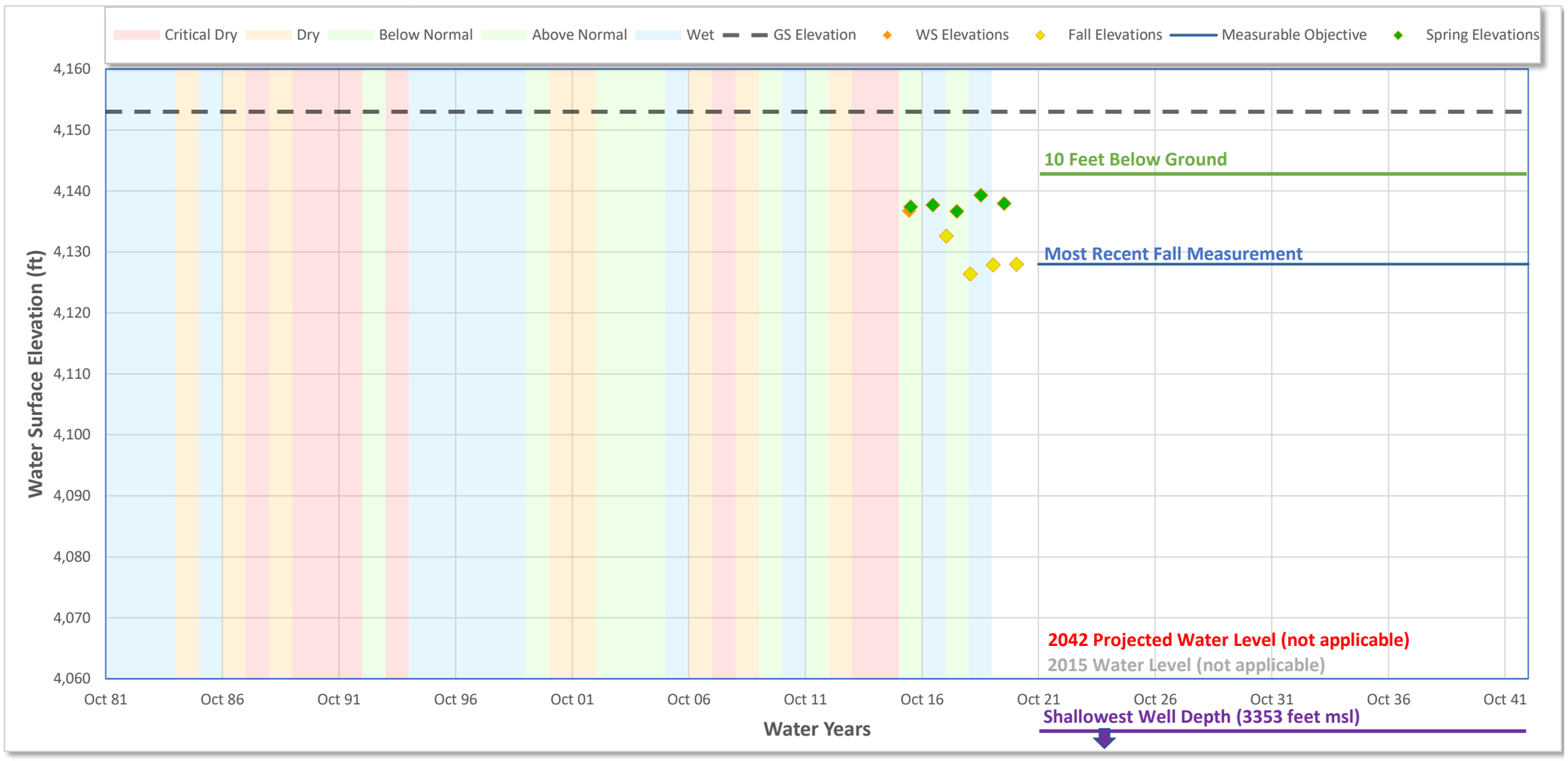
Date: 1/18/2021

Well Information	
Well ID	000001-ACWA-2
Alternate Name	ACWA-2
State Number	39N08E33P002M
CASGEM ID	411699N1210579W001
Well Location	
County	Lassen
Basin	BIG VALLEY
Sub-Basin	-
Management Area	-
Proveyor Agency	-
Well Type Information	
Well Type	Unknown
Well Use	Irrigation
Completion Type	Single

Well Coordinates/Geometry		
Location	Lat:	41.1699
	Long:	-121.0579
Well Depth		800 ft
Ground Surface Elevation		4153.00 ft
Ref. Point Elevation		4153.20 ft
Screen Depth Range		50 to 800 ft
Screen Elevation Range		4103 to 3353 ft
Principal Aquifer		-
Well Period of Record		
Period-of-Record		2016..2021
WS Elev-Range	Min:	4126.4 ft
	Max	4139.4 ft

Trend Analysis		
Seasonal Data Method		Apr1/Oct1
Show Trend 1		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-
Show Trend 2		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-

Water Surface Elevation (WSE) Hydrograph



Sustainability Indicator Considerations

Observed WS Elevations		
Parameter		**Value**
WS Elevation Range	Min:	4126 ft
	Max	4139 ft
2015 WS Elevations	Spring:	-
	Fall:	-
Most Recent WS Elev	Spring:	4138 ft
	Fall:	4128 ft

Trend Projections		
Year	**Trend 1-Fall**	**Trend 2-Spring**
2022	-	-
2027	-	-
2032	-	-
2037	-	-
2042	-	-
2047	-	-

Sustainability Indicator Settings

Key	Threshold Type	Effect. Yr.	Value	Description
MO	Measureable Objective	2022	4,128.0 ft	Most Recent Fall Measurement

Well Depths Within Area

Well Type	Number of Wells	Shallowest Depth (feet bgs)	Shallowest Elevation (feet msl)
Domestic	0	-	-
Production (Ag)	1	800	3353

Other Pertinent Information

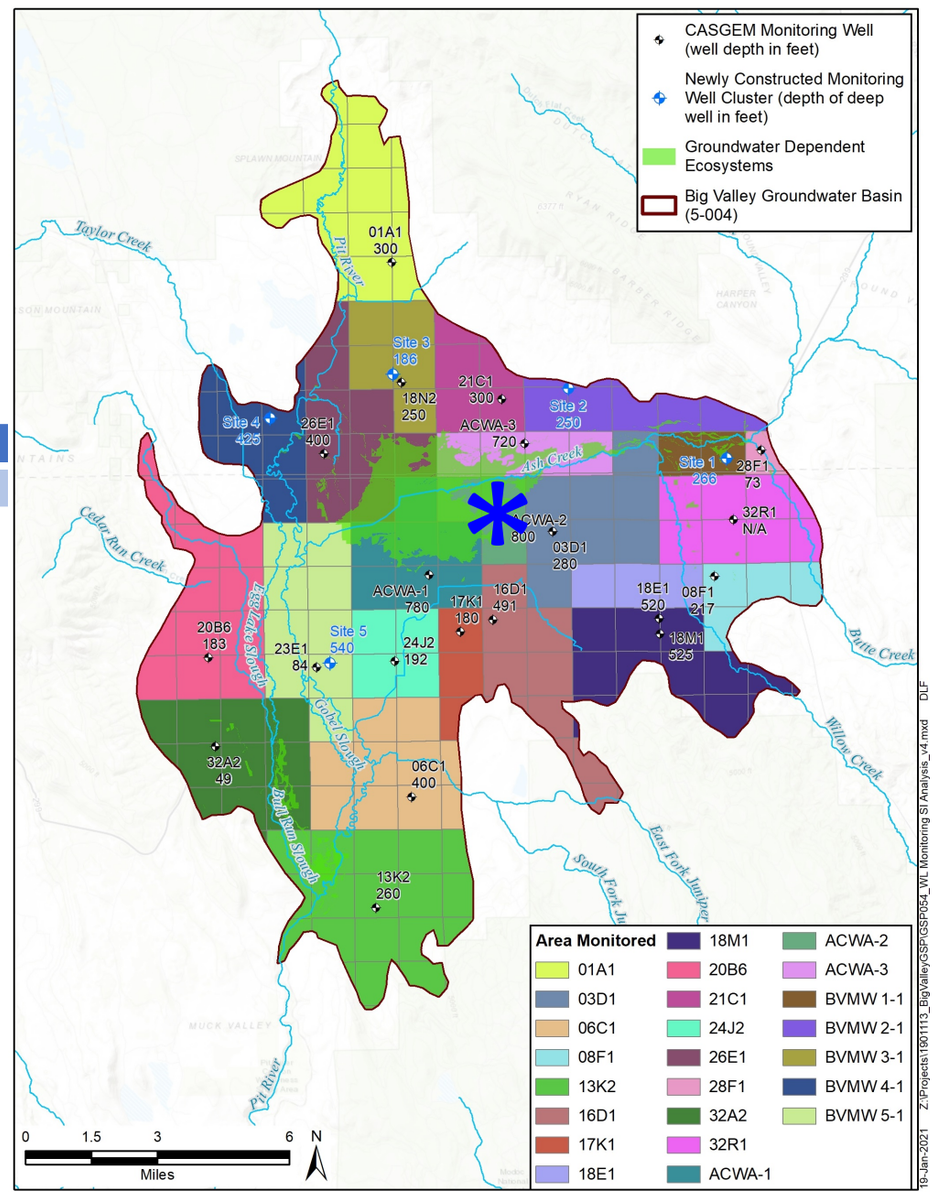
Distance From Nearest Perennial Stream	0.9 miles
Name of Nearest Perennial Stream	Ash Creek
Distance From Nearest GDE	0 miles
Description of Nearest GDE	Ash Creek Wildlife Area

Sustainability Indicators to Consider

Water Levels	Yes
Groundwater Storage	Yes
Water Quality	No
Subsidence	No
Surface Water Depletions	Maybe

Notes:

Deep well, but located right on ACWA, so could potentially be an indicator for GDE (spring water levels). Screen starts at 50 feet bgs.



ACWA-3 Sustainability Indicator Analysis

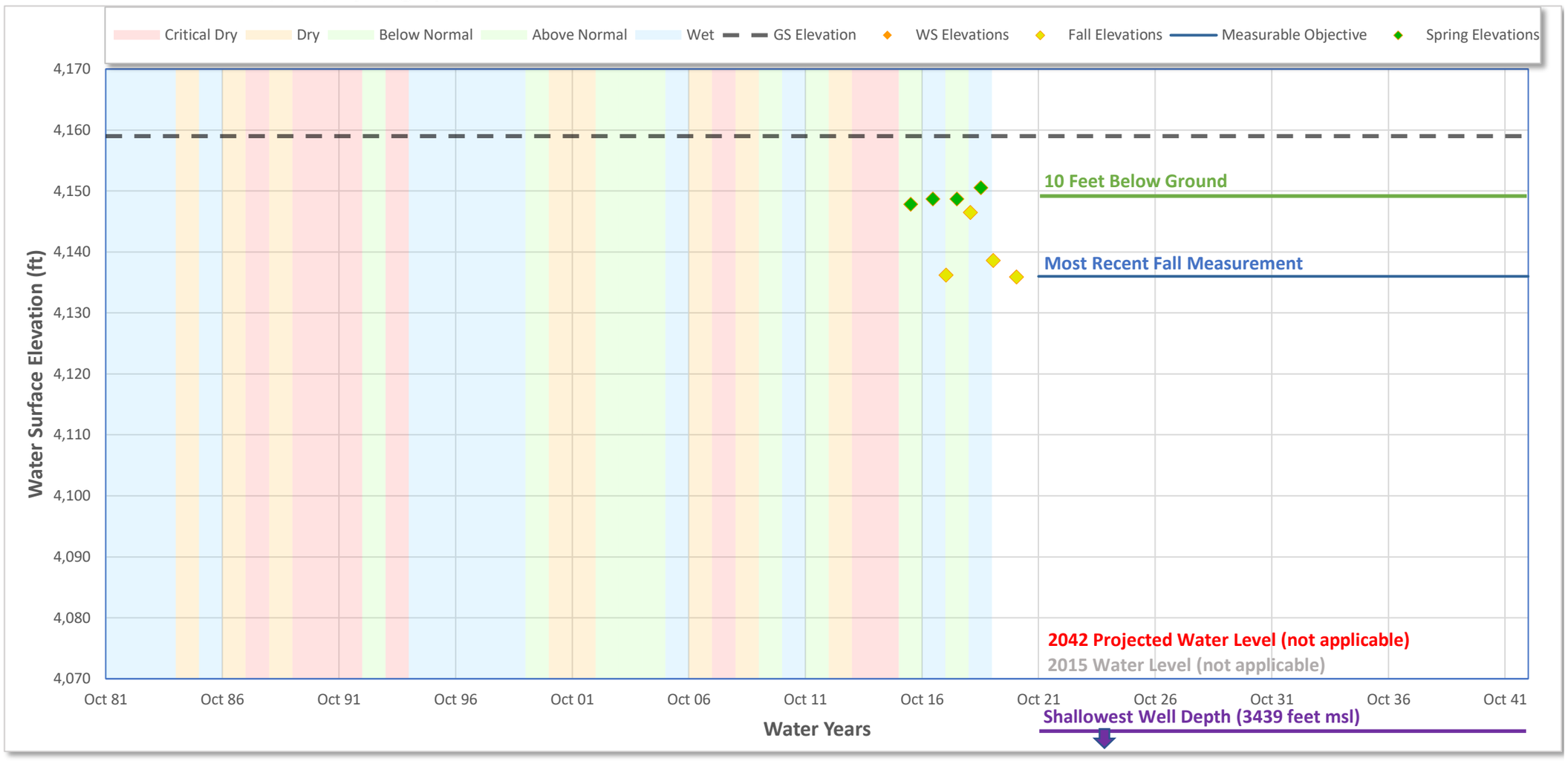
Date: 1/18/2021

Well Information	
Well ID	000022-ACWA-3
Alternate Name	ACWA-3
State Number	39N08E28A001M
CASGEM ID	411938N1210478W001
Well Location	
County	Modoc
Basin	BIG VALLEY
Sub-Basin	-
Management Area	-
Proveyor Agency	-
Well Type Information	
Well Type	Unknown
Well Use	Irrigation
Completion Type	Single

Well Coordinates/Geometry		
Location	Lat:	41.1938
	Long:	-121.0478
Well Depth		720 ft
Ground Surface Elevation		4159.00 ft
Ref. Point Elevation		4159.83 ft
Screen Depth Range		60 to 720 ft
Screen Elevation Range		4100 to 3440 ft
Principal Aquifer		-
Well Period of Record		
Period-of-Record		2016..2021
WS Elev-Range	Min:	4135.9 ft
	Max	4150.6 ft

Trend Analysis		
Seasonal Data Method		Apr1/Oct1
Show Trend 1		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-
Show Trend 2		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-

Water Surface Elevation (WSE) Hydrograph



Sustainability Indicator Considerations

Observed WS Elevations		
Parameter		**Value**
WS Elevation Range	Min:	4136 ft
	Max	4151 ft
2015 WS Elevations	Spring:	-
	Fall:	-
Most Recent WS Elev	Spring:	4151 ft
	Fall:	4136 ft

Trend Projections		
Year	**Trend 1-Fall**	**Trend 2-Spring**
2022	-	-
2027	-	-
2032	-	-
2037	-	-
2042	-	-
2047	-	-

Sustainability Indicator Settings

Key	Threshold Type	Effect. Yr.	Value	Description
MO	Measureable Objective	2022	4,136.0 ft	Most recent Fall measurement

Well Depths Within Area

Well Type	Number of Wells	Shallowest Depth (feet bgs)	Shallowest Elevation (feet msl)
Domestic	0	-	-
Production (Ag)	1	720	3439

Other Pertinent Information

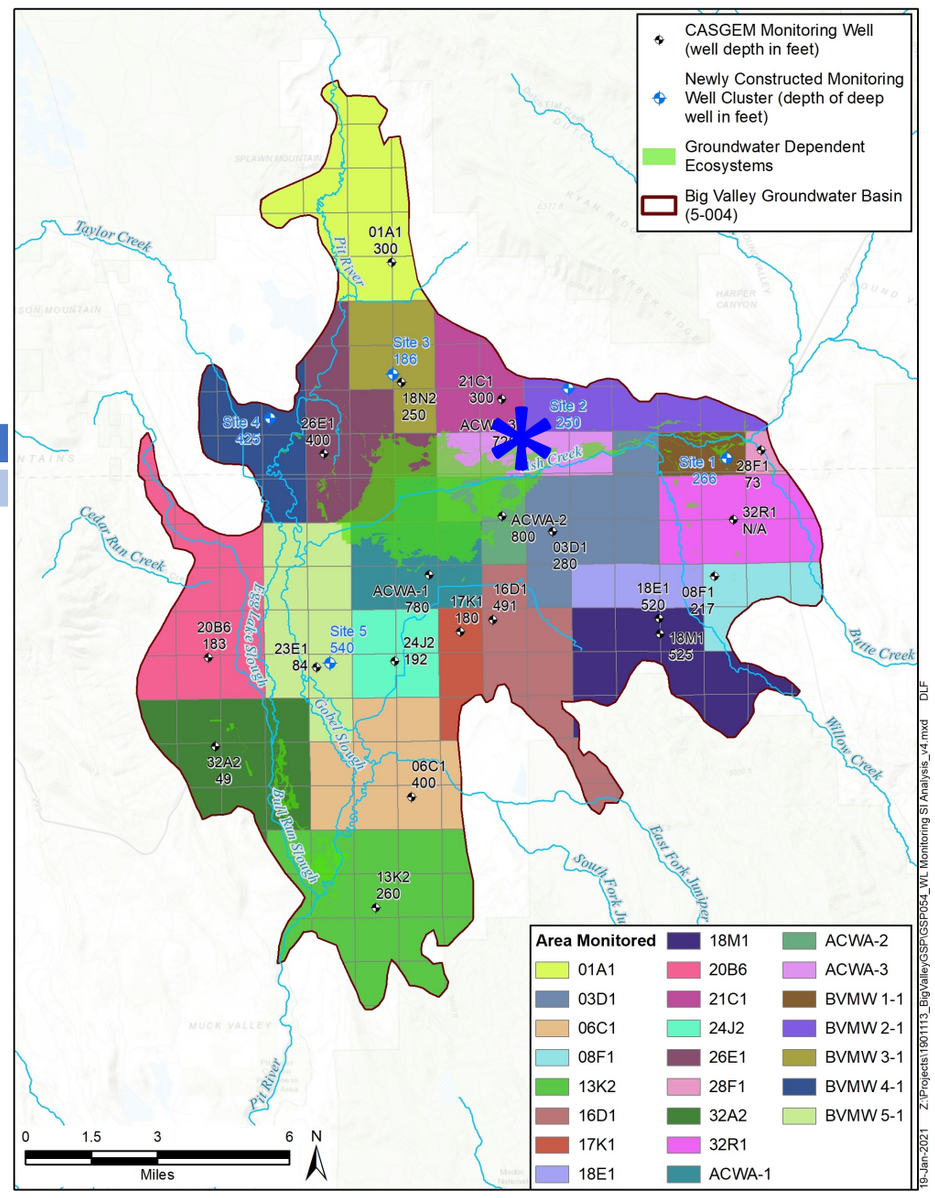
Distance From Nearest Perennial Stream	0.7 miles
Name of Nearest Perennial Stream	Ash Creek
Distance From Nearest GDE	0 miles
Description of Nearest GDE	Ash Creek Wildlife Area

Sustainability Indicators to Consider

Water Levels	Yes
Groundwater Storage	Yes
Water Quality	No
Subsidence	No
Surface Water Depletions	Maybe

Notes:

Deep well, but located right on ACWA, so could potentially be an indicator for GDE (spring water levels). Screen comes up to 60 feet bgs.



BVMW 1-1 Sustainability Indicator Analysis

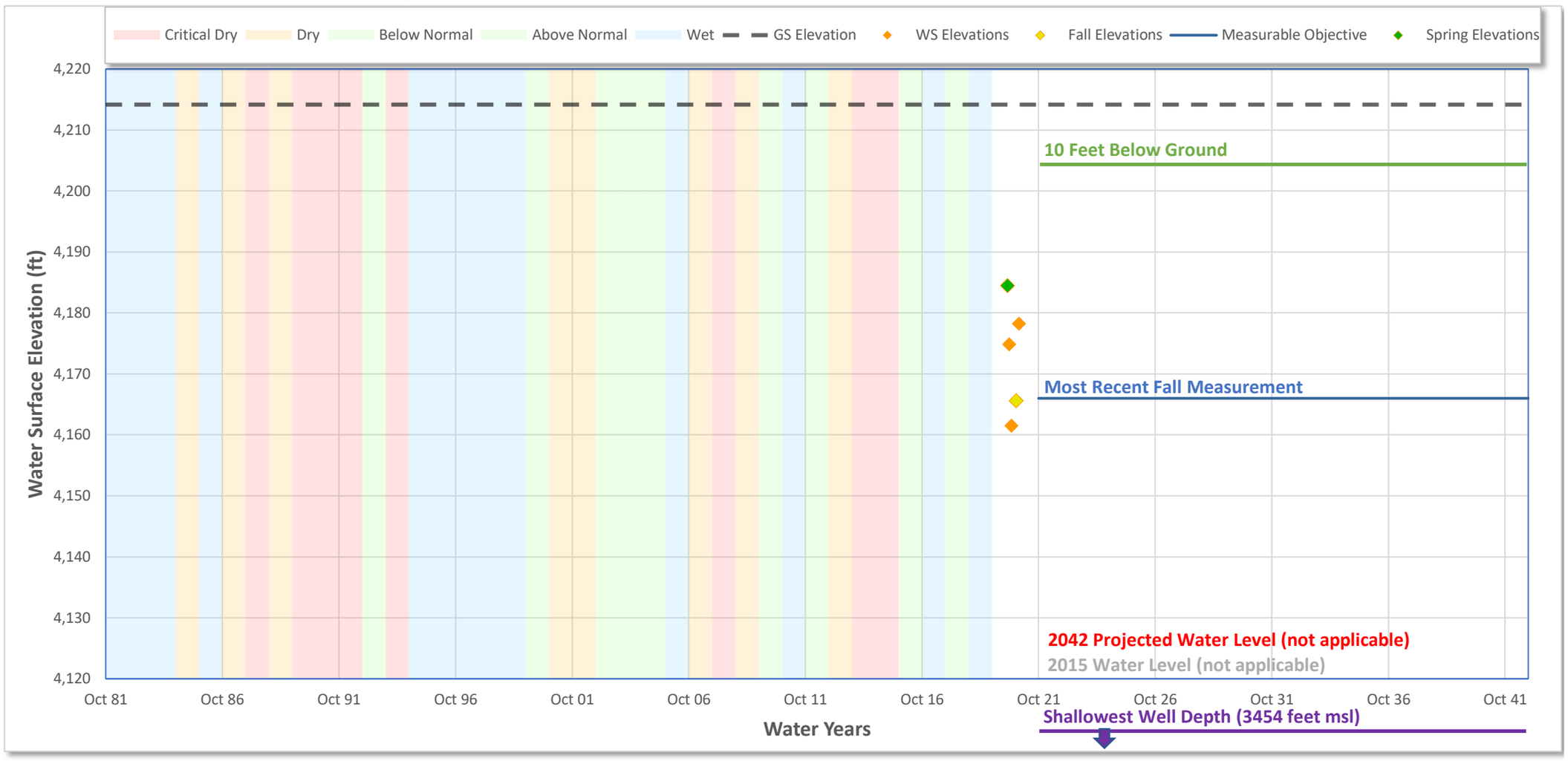
Date: 1/18/2021

Well Information	
Well ID	000147-BVMW 1-1
Alternate Name	BVMW 1-1
State Number	-
CASGEM ID	-
Well Location	
County	Modoc
Basin	BIG VALLEY
Sub-Basin	-
Management Area	-
Proveyor Agency	-
Well Type Information	
Well Type	Monitoring
Well Use	Observation
Completion Type	Single/Cluster

Well Coordinates/Geometry		
Location	Lat:	41.1880
	Long:	-120.9599
Well Depth		470 ft
Ground Surface Elevation		4214.17 ft
Ref. Point Elevation		4213.84 ft
Screen Depth Range		175 to 265 ft
Screen Elevation Range		4039 to 3949 ft
Principal Aquifer		-
Well Period of Record		
Period-of-Record		2020..2021
WS Elev-Range	Min:	4161.5 ft
	Max	4184.5 ft

Trend Analysis		
Seasonal Data Method		Apr1/Oct1
Show Trend 1		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-
Show Trend 2		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-

Water Surface Elevation (WSE) Hydrograph



Sustainability Indicator Considerations

Observed WS Elevations		
Parameter		**Value**
WS Elevation Range	Min:	4162 ft
	Max	4185 ft
2015 WS Elevations	Spring:	-
	Fall:	-
Most Recent WS Elev	Spring:	4185 ft
	Fall:	4166 ft

Trend Projections		
Year	**Trend 1-Fall**	**Trend 2-Spring**
2022	-	-
2027	-	-
2032	-	-
2037	-	-
2042	-	-
2047	-	-

Sustainability Indicator Settings

Key	Threshold Type	Effect. Yr.	Value	Description
MO	Measureable Objective	2022	4,166.0 ft	Most recent Fall measurement

Well Depths Within Area

Well Type	Number of Wells	Shallowest Depth (feet bgs)	Shallowest Elevation (feet msl)
Domestic	0	-	-
Production (Ag)	3	760	3454

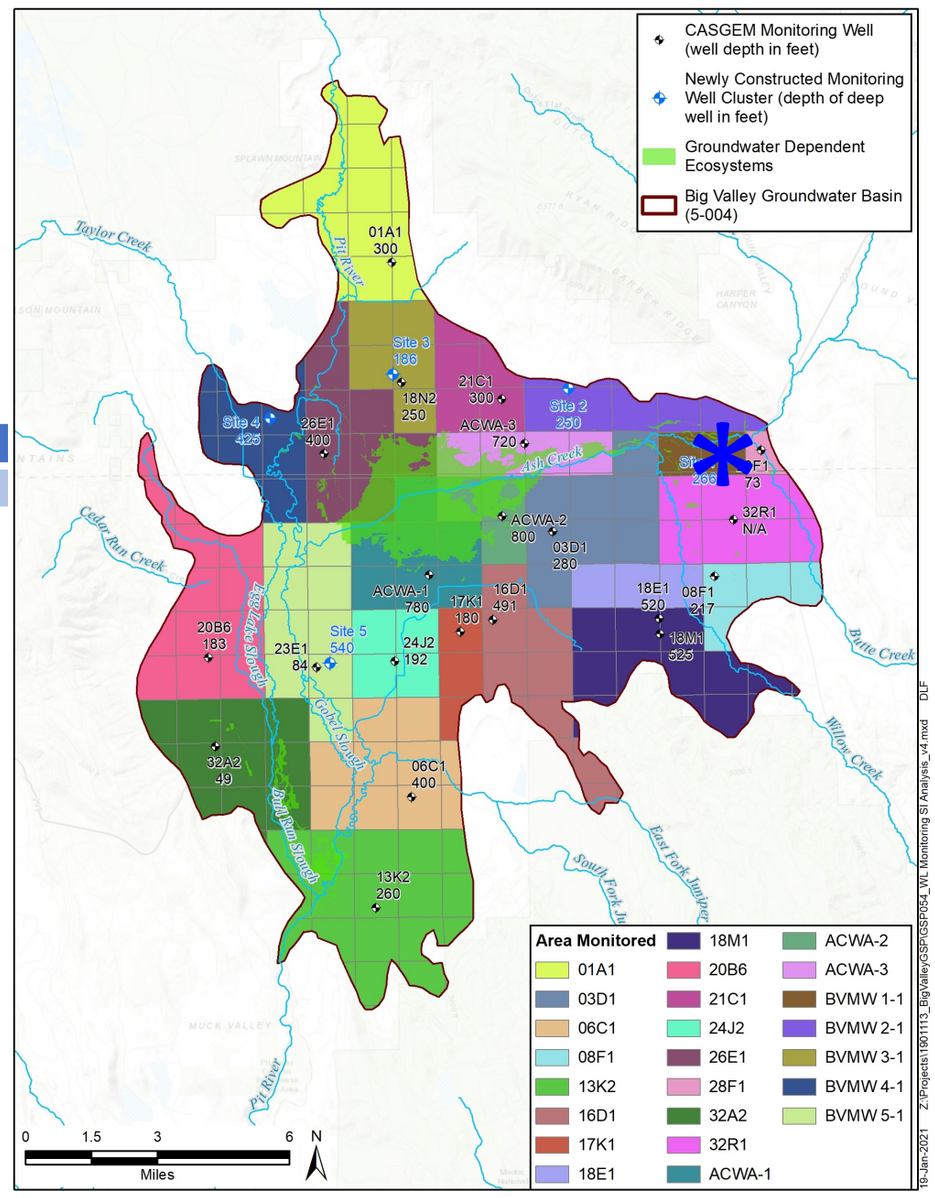
Sustainability Indicators to Consider

Water Levels	Yes
Groundwater Storage	Yes
Water Quality	Maybe
Subsidence	No
Surface Water Depletions	No

Notes:

Other Pertinent Information

Distance From Nearest Perennial Stream	0.4 miles
Name of Nearest Perennial Stream	Ash Creek
Distance From Nearest GDE	0 miles
Description of Nearest GDE	Ash Creek above Willow Creek



BVMW 1-2 Sustainability Indicator Analysis

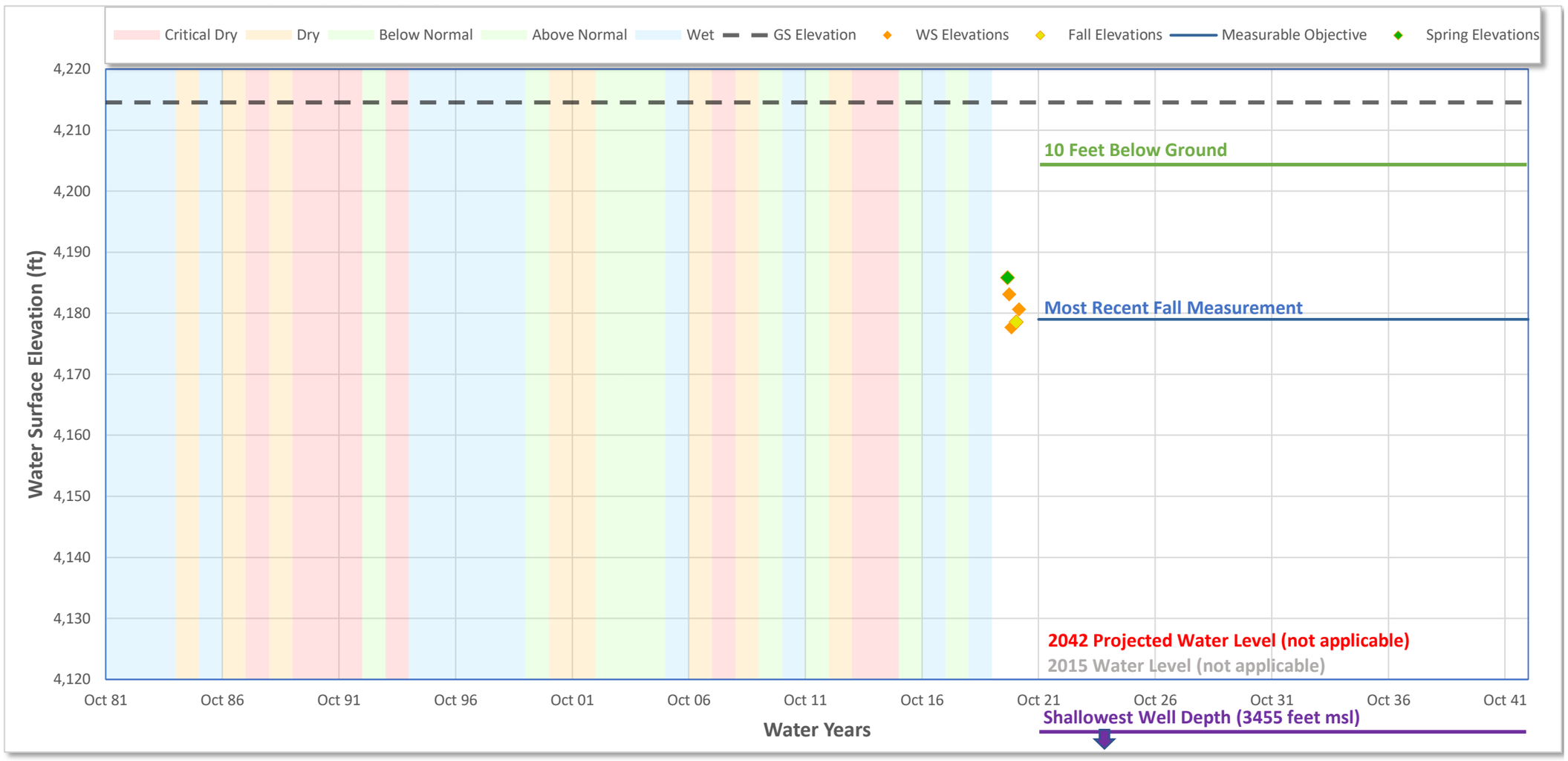
Date: 1/18/2021

Well Information	
Well ID	000148-BVMW 1-2
Alternate Name	BVMW 1-2
State Number	-
CASGEM ID	-
Well Location	
County	Modoc
Basin	BIG VALLEY
Sub-Basin	-
Management Area	-
Proveyor Agency	-
Well Type Information	
Well Type	Monitoring
Well Use	Observation
Completion Type	Single/Cluster

Well Coordinates/Geometry		
Location	Lat:	41.1881
	Long:	-120.9598
Well Depth		60 ft
Ground Surface Elevation		4214.54 ft
Ref. Point Elevation		4214.21 ft
Screen Depth Range		32 to 52 ft
Screen Elevation Range		4182 to 4162 ft
Principal Aquifer		-
Well Period of Record		
Period-of-Record		2020..2021
WS Elev-Range	Min:	4177.7 ft
	Max	4185.9 ft

Trend Analysis		
Seasonal Data Method		Apr1/Oct1
Show Trend 1		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-
Show Trend 2		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-

Water Surface Elevation (WSE) Hydrograph



Sustainability Indicator Considerations

Observed WS Elevations		
Parameter		**Value**
WS Elevation Range	Min:	4178 ft
	Max	4186 ft
2015 WS Elevations	Spring:	-
	Fall:	-
Most Recent WS Elev	Spring:	4186 ft
	Fall:	4179 ft

Trend Projections		
Year	**Trend 1-Fall**	**Trend 2-Spring**
2022	-	-
2027	-	-
2032	-	-
2037	-	-
2042	-	-
2047	-	-

Sustainability Indicator Settings

Key	Threshold Type	Effect. Yr.	Value	Description
MO	Measureable Objective	2022	4,179.0 ft	Most recent Fall measurement

Well Depths Within Area

Well Type	Number of Wells	Shallowest Depth (feet bgs)	Shallowest Elevation (feet msl)
Domestic	0	-	-
Production (Ag)	3	760	3455

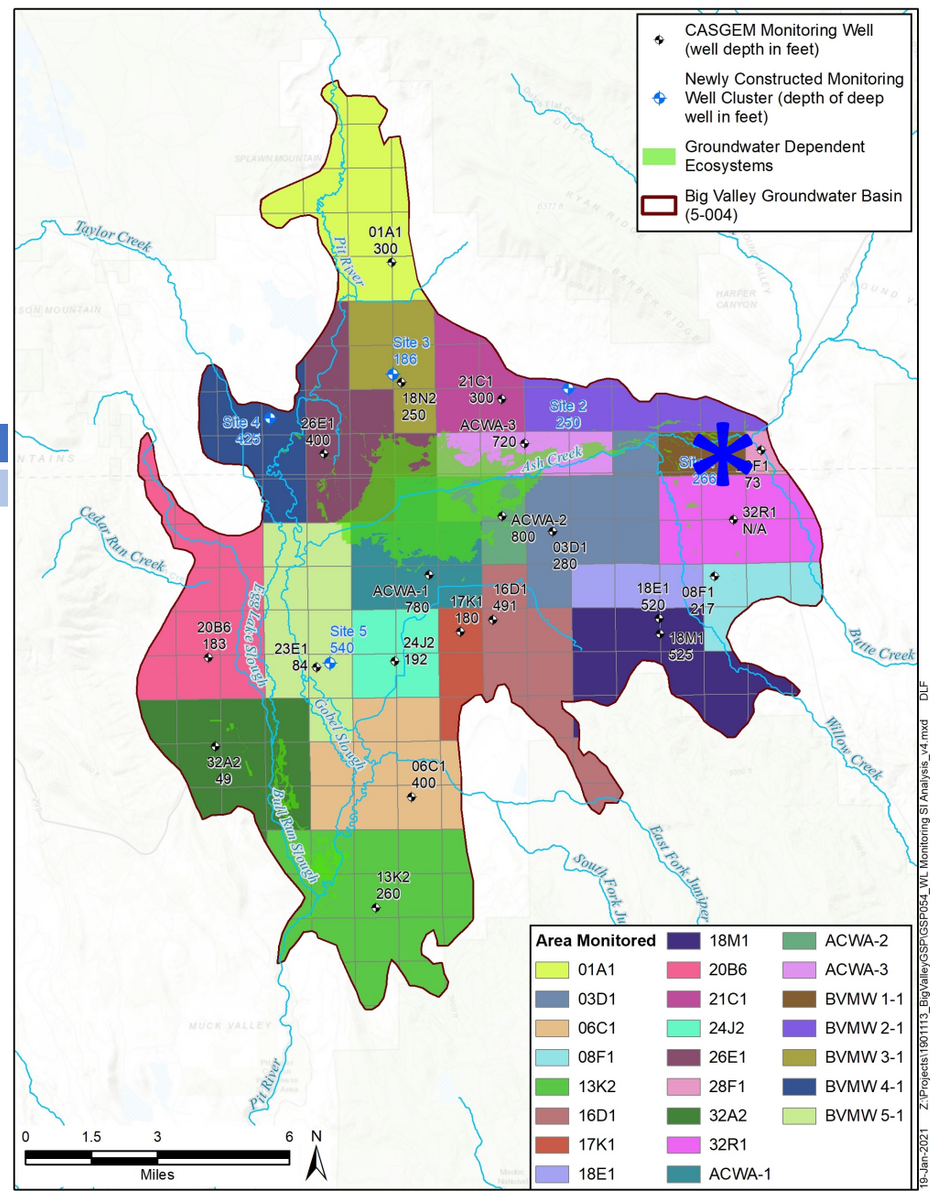
Sustainability Indicators to Consider

Water Levels	No
Groundwater Storage	No
Water Quality	No
Subsidence	No
Surface Water Depletions	Yes

Notes:

Other Pertinent Information

Distance From Nearest Perennial Stream	0.4 miles
Name of Nearest Perennial Stream	Ash Creek
Distance From Nearest GDE	0 miles
Description of Nearest GDE	Ash Creek above Willow Creek



BVMW 1-3 Sustainability Indicator Analysis

Date: 1/18/2021

Well Information	
Well ID	000149-BVMW 1-3
Alternate Name	BVMW 1-3
State Number	-
CASGEM ID	-
Well Location	
County	Modoc
Basin	BIG VALLEY
Sub-Basin	-
Management Area	-
Proveyor Agency	-
Well Type Information	
Well Type	Monitoring
Well Use	Observation
Completion Type	Single/Cluster

Well Coordinates/Geometry		
Location	Lat:	41.1878
	Long:	-120.9593
Well Depth		60 ft
Ground Surface Elevation		4218.50 ft
Ref. Point Elevation		4218.17 ft
Screen Depth Range		30 to 50 ft
Screen Elevation Range		4184 to 4164 ft
Principal Aquifer		-
Well Period of Record		
Period-of-Record		2020..2021
WS Elev-Range	Min:	4177.7 ft
	Max	4185.8 ft

Trend Analysis		
Seasonal Data Method		Apr1/Oct1
Show Trend 1		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-
Show Trend 2		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-

Water Surface Elevation (WSE) Hydrograph

Sustainability Indicator Considerations

Observed WS Elevations		
Parameter		**Value**
WS Elevation Range	Min:	4178 ft
	Max	4186 ft
2015 WS Elevations	Spring:	-
	Fall:	-
Most Recent WS Elev	Spring:	4186 ft
	Fall:	4179 ft

Trend Projections		
Year	**Trend 1-Fall**	**Trend 2-Spring**
2022	-	-
2027	-	-
2032	-	-
2037	-	-
2042	-	-
2047	-	-

Sustainability Indicator Settings

Key	Threshold Type	Effect. Yr.	Value	Description
MO	Measureable Objective	2022	4,179.0 ft	Most recent Fall measurement

Well Depths Within Area

Well Type	Number of Wells	Shallowest Depth (feet bgs)	Shallowest Elevation (feet msl)
Domestic	0	-	-
Production (Ag)	3	760	3459

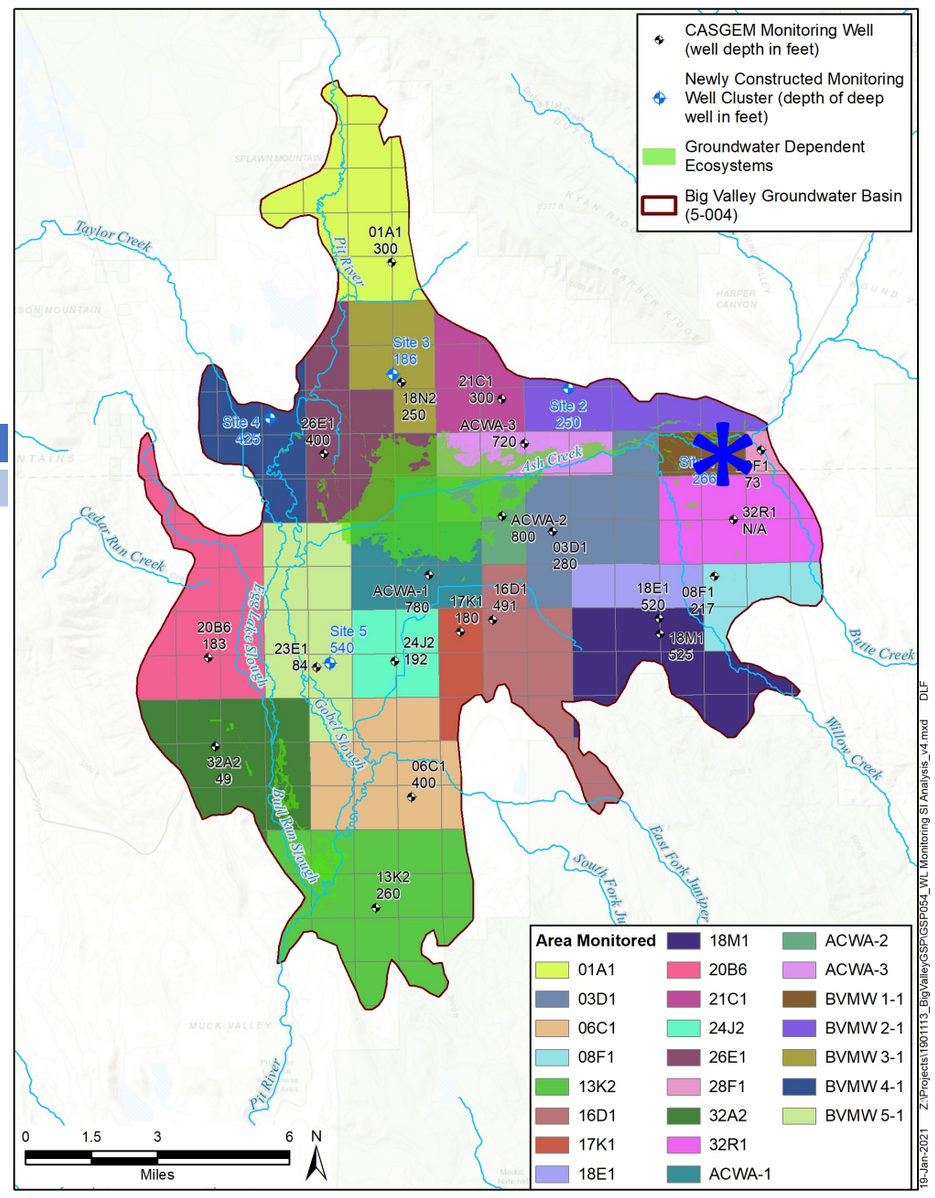
Sustainability Indicators to Consider

Water Levels	No
Groundwater Storage	No
Water Quality	No
Subsidence	No
Surface Water Depletions	Yes

Notes:

Other Pertinent Information

Distance From Nearest Perennial Stream	0.4 miles
Name of Nearest Perennial Stream	Ash Creek
Distance From Nearest GDE	0 miles
Description of Nearest GDE	Ash Creek above Willow Creek



BVMW 1-4 Sustainability Indicator Analysis

Date: 1/18/2021

Well Information	
Well ID	000150-BVMW 1-4
Alternate Name	BVMW 1-4
State Number	-
CASGEM ID	-
Well Location	
County	Modoc
Basin	BIG VALLEY
Sub-Basin	-
Management Area	-
Proveyor Agency	-
Well Type Information	
Well Type	Monitoring
Well Use	Observation
Completion Type	Single/Cluster

Well Coordinates/Geometry		
Location	Lat:	41.1880
	Long:	-120.9590
Well Depth		59 ft
Ground Surface Elevation		4218.39 ft
Ref. Point Elevation		4218.06 ft
Screen Depth Range		29 to 49 ft
Screen Elevation Range		4189 to 4169 ft
Principal Aquifer		-
Well Period of Record		
Period-of-Record		2020..2021
WS Elev-Range	Min:	4178.0 ft
	Max	4186.0 ft

Trend Analysis		
Seasonal Data Method		Apr1/Oct1
Show Trend 1		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-
Show Trend 2		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-

Water Surface Elevation (WSE) Hydrograph

Sustainability Indicator Considerations

Observed WS Elevations		
Parameter		**Value**
WS Elevation Range	Min:	4178 ft
	Max	4186 ft
2015 WS Elevations	Spring:	-
	Fall:	-
Most Recent WS Elev	Spring:	4186 ft
	Fall:	4179 ft

Trend Projections		
Year	**Trend 1-Fall**	**Trend 2-Spring**
2022	-	-
2027	-	-
2032	-	-
2037	-	-
2042	-	-
2047	-	-

Sustainability Indicator Settings

Key	Threshold Type	Effect. Yr.	Value	Description
MO	Measureable Objective	2022	4,179.0 ft	Most recent Fall measurement

Well Depths Within Area

Well Type	Number of Wells	Shallowest Depth (feet bgs)	Shallowest Elevation (feet msl)
Domestic	0	-	-
Production (Ag)	3	760	3458

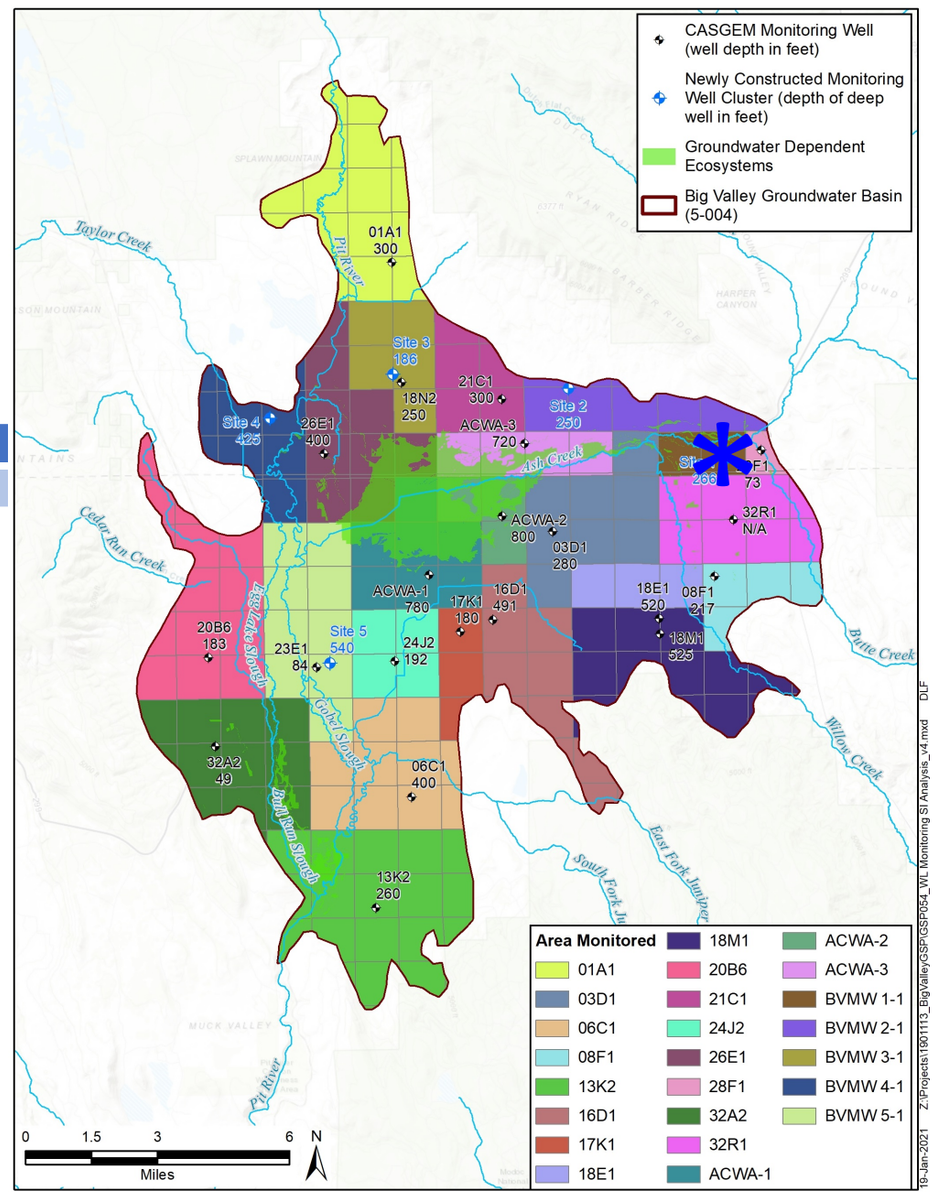
Sustainability Indicators to Consider

Water Levels	No
Groundwater Storage	No
Water Quality	No
Subsidence	No
Surface Water Depletions	Yes

Notes:

Other Pertinent Information

Distance From Nearest Perennial Stream	0.4 miles
Name of Nearest Perennial Stream	Ash Creek
Distance From Nearest GDE	0 miles
Description of Nearest GDE	Ash Creek above Willow Creek



BVMW 2-1 Sustainability Indicator Analysis

Date: 1/18/2021

Well Information	
Well ID	000151-BVMW 2-1
Alternate Name	BVMW 2-1
State Number	-
CASGEM ID	-

Well Location	
County	Modoc
Basin	BIG VALLEY
Sub-Basin	-
Management Area	-
Proveyor Agency	-

Well Type Information	
Well Type	Monitoring
Well Use	Observation
Completion Type	Single/Cluster

Well Coordinates/Geometry		
Location	Lat:	41.2119
	Long:	-121.0286
Well Depth		505 ft
Ground Surface Elevation		4216.51 ft
Ref. Point Elevation		4216.18 ft
Screen Depth Range		210 to 250 ft
Screen Elevation Range		4006 to 3966 ft
Principal Aquifer		-

Well Period of Record		
Period-of-Record		2020..2021
WS Elev-Range	Min:	4194.2 ft
	Max	4194.9 ft

Trend Analysis		
Seasonal Data Method		Apr1/Oct1
Show Trend 1		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-
Show Trend 2		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-

Water Surface Elevation (WSE) Hydrograph

Sustainability Indicator Considerations

Observed WS Elevations		
Parameter		**Value**
WS Elevation Range	Min:	4194 ft
	Max	4195 ft
2015 WS Elevations	Spring:	-
	Fall:	-
Most Recent WS Elev	Spring:	4195 ft
	Fall:	4194 ft

Trend Projections		
Year	**Trend 1-Fall**	**Trend 2-Spring**
2022	-	-
2027	-	-
2032	-	-
2037	-	-
2042	-	-
2047	-	-

Sustainability Indicator Settings

Key	Threshold Type	Effect. Yr.	Value	Description
MO	Measureable Objective	2022	4,194.0 ft	Most recent Fall measurement

Well Depths Within Area

Well Type	Number of Wells	Shallowest Depth (feet bgs)	Shallowest Elevation (feet msl)
Domestic	10	36	4181
Production (Ag)	5	300	3917

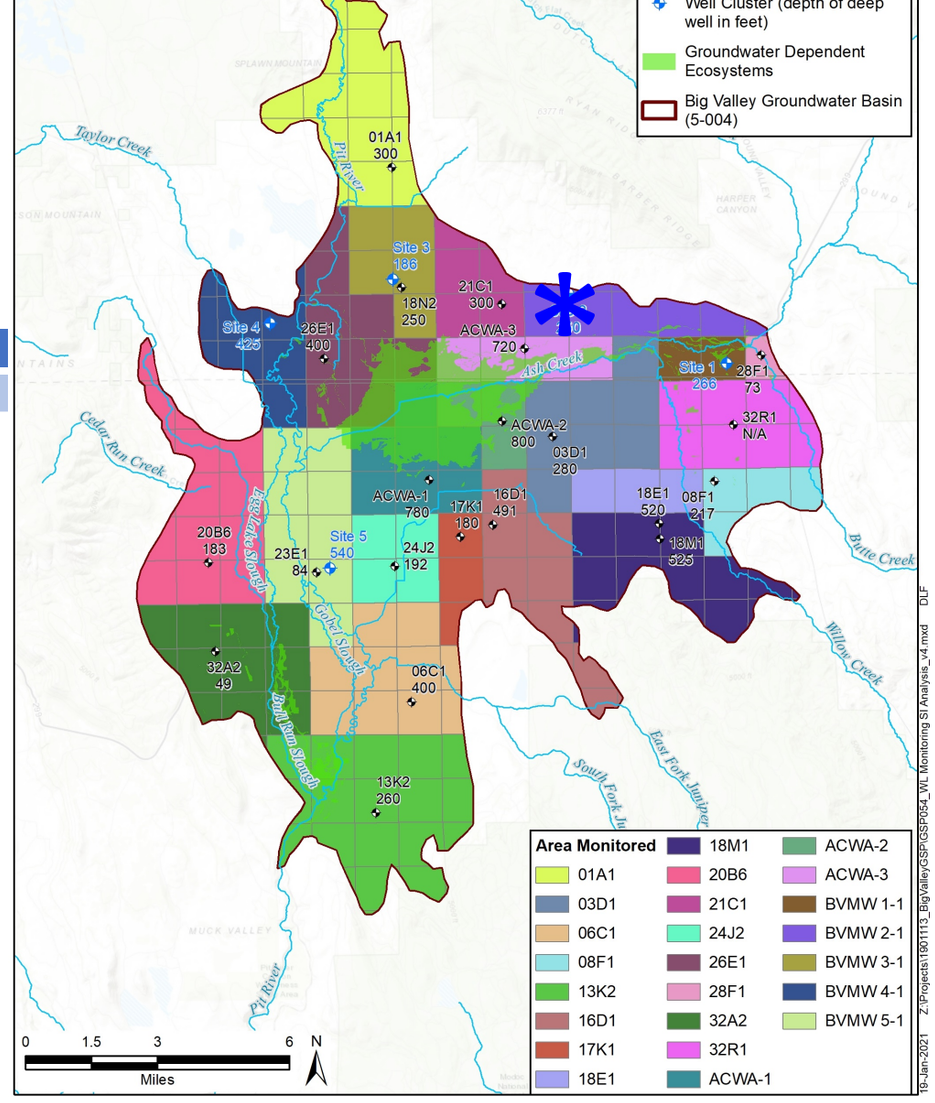
Sustainability Indicators to Consider

Water Levels	Yes
Groundwater Storage	Yes
Water Quality	Maybe
Subsidence	No
Surface Water Depletions	No

Notes:

Other Pertinent Information

Distance From Nearest Perennial Stream	1.6 miles
Name of Nearest Perennial Stream	Ash Creek
Distance From Nearest GDE	1.1 miles
Description of Nearest GDE	Ash Creek Wildlife Area



BVMW 2-2 Sustainability Indicator Analysis

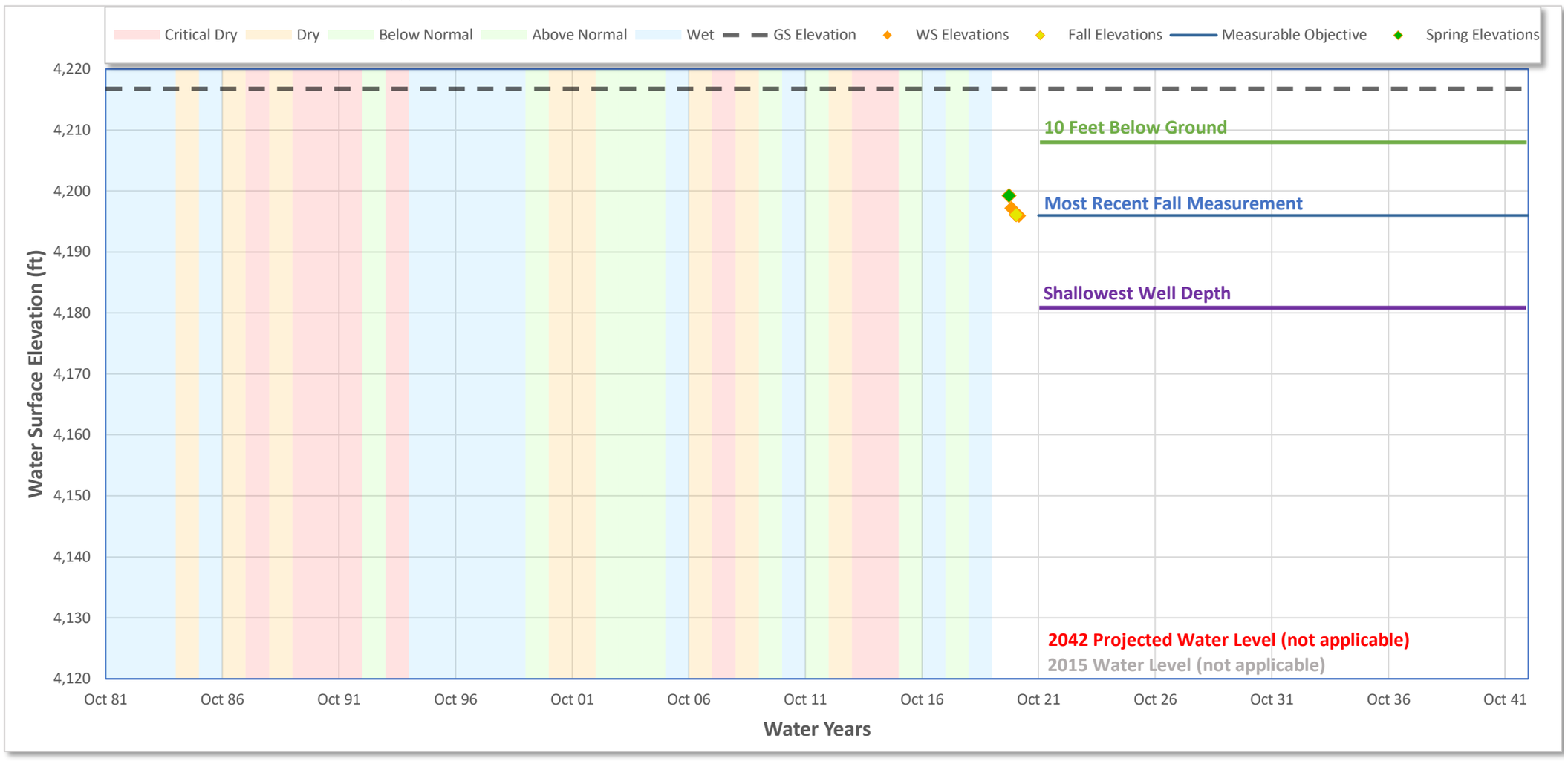
Date: 1/18/2021

Well Information	
Well ID	000152-BVMW 2-2
Alternate Name	BVMW 2-2
State Number	-
CASGEM ID	-
Well Location	
County	Modoc
Basin	BIG VALLEY
Sub-Basin	-
Management Area	-
Proveyor Agency	-
Well Type Information	
Well Type	Monitoring
Well Use	Observation
Completion Type	Single/Cluster

Well Coordinates/Geometry		
Location	Lat:	41.2118
	Long:	-121.0286
Well Depth		75 ft
Ground Surface Elevation		4216.77 ft
Ref. Point Elevation		4216.44 ft
Screen Depth Range		50 to 70 ft
Screen Elevation Range		4166 to 4146 ft
Principal Aquifer		-
Well Period of Record		
Period-of-Record		2020..2021
WS Elev-Range	Min:	4196.0 ft
	Max	4199.3 ft

Trend Analysis		
Seasonal Data Method		Apr1/Oct1
Show Trend 1		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-
Show Trend 2		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-

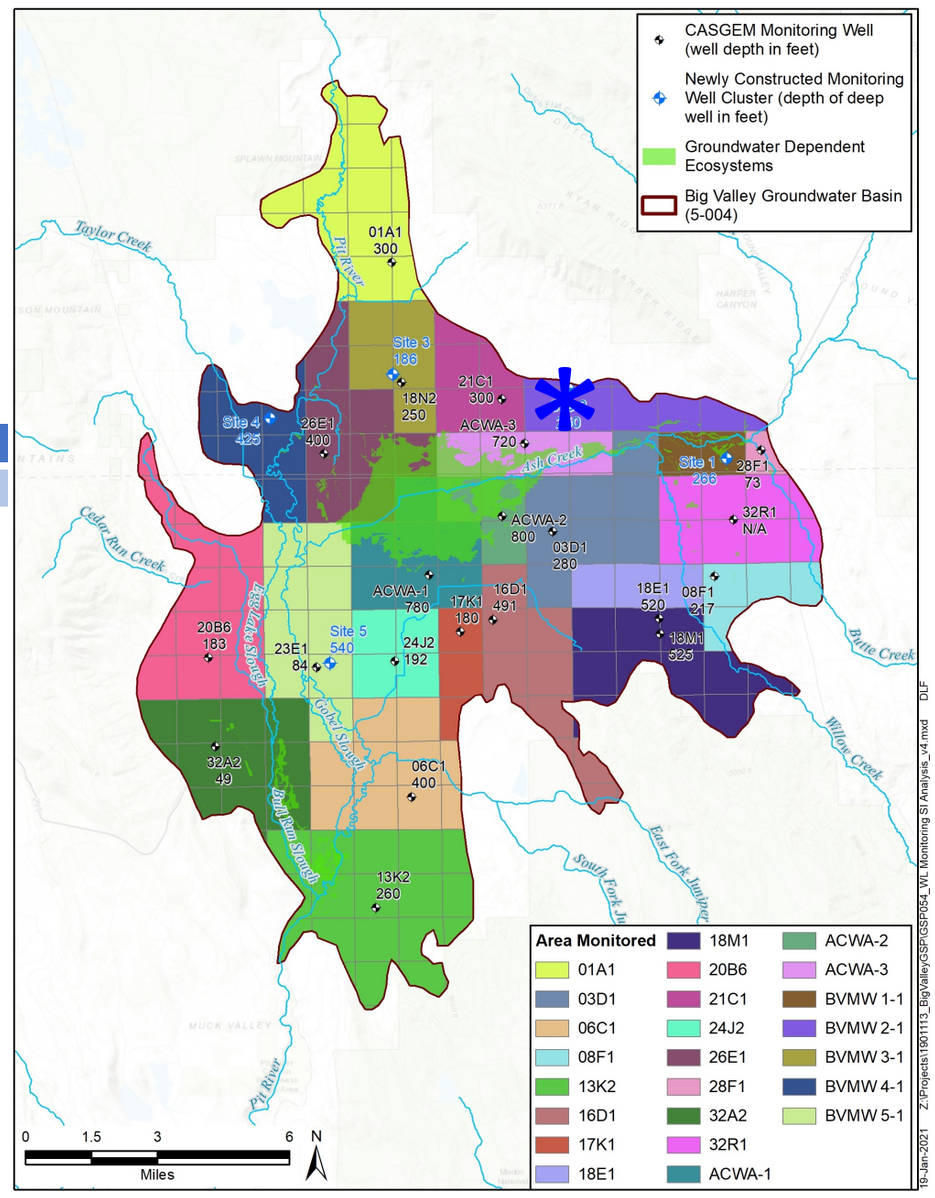
Water Surface Elevation (WSE) Hydrograph



Sustainability Indicator Considerations

Observed WS Elevations		
Parameter		**Value**
WS Elevation Range	Min:	4196 ft
	Max	4199 ft
2015 WS Elevations	Spring:	-
	Fall:	-
Most Recent WS Elev	Spring:	4199 ft
	Fall:	4196 ft

Trend Projections		
Year	**Trend 1-Fall**	**Trend 2-Spring**
2022	-	-
2027	-	-
2032	-	-
2037	-	-
2042	-	-
2047	-	-



Sustainability Indicator Settings

Key	Threshold Type	Effect. Yr.	Value	Description
MO	Measureable Objective	2022	4,196.0 ft	Most recent Fall measurement

Well Depths Within Area

Well Type	Number of Wells	Shallowest Depth (feet bgs)	Shallowest Elevation (feet msl)
Domestic	10	36	4181
Production (Ag)	5	300	3917

Sustainability Indicators to Consider

Water Levels	No
Groundwater Storage	No
Water Quality	No
Subsidence	No
Surface Water Depletions	Maybe

Notes:

Other Pertinent Information

Distance From Nearest Perennial Stream	1.6 miles
Name of Nearest Perennial Stream	Ash Creek
Distance From Nearest GDE	1.1 miles
Description of Nearest GDE	Ash Creek Wildlife Area

BVMW 2-3 Sustainability Indicator Analysis

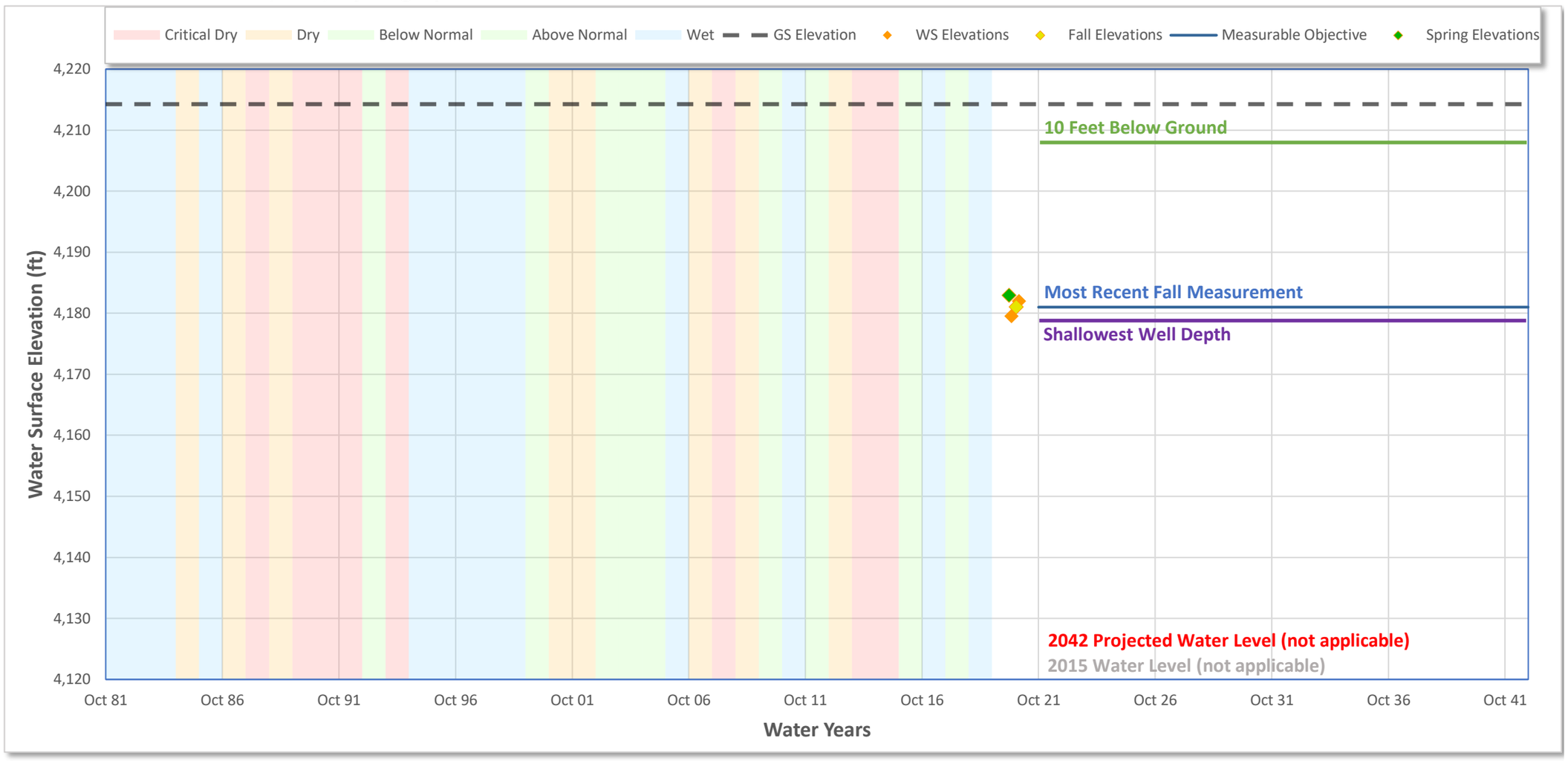
Date: 1/18/2021

Well Information	
Well ID	000153-BVMW 2-3
Alternate Name	BVMW 2-3
State Number	-
CASGEM ID	-
Well Location	
County	Modoc
Basin	BIG VALLEY
Sub-Basin	-
Management Area	-
Proveyor Agency	-
Well Type Information	
Well Type	Monitoring
Well Use	Observation
Completion Type	Single/Cluster

Well Coordinates/Geometry		
Location	Lat:	41.2110
	Long:	-121.0287
Well Depth		75 ft
Ground Surface Elevation		4214.26 ft
Ref. Point Elevation		4213.93 ft
Screen Depth Range		50 to 70 ft
Screen Elevation Range		4166 to 4146 ft
Principal Aquifer		-
Well Period of Record		
Period-of-Record		2020..2021
WS Elev-Range	Min:	4179.5 ft
	Max	4183.0 ft

Trend Analysis		
Seasonal Data Method		Apr1/Oct1
Show Trend 1		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-
Show Trend 2		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-

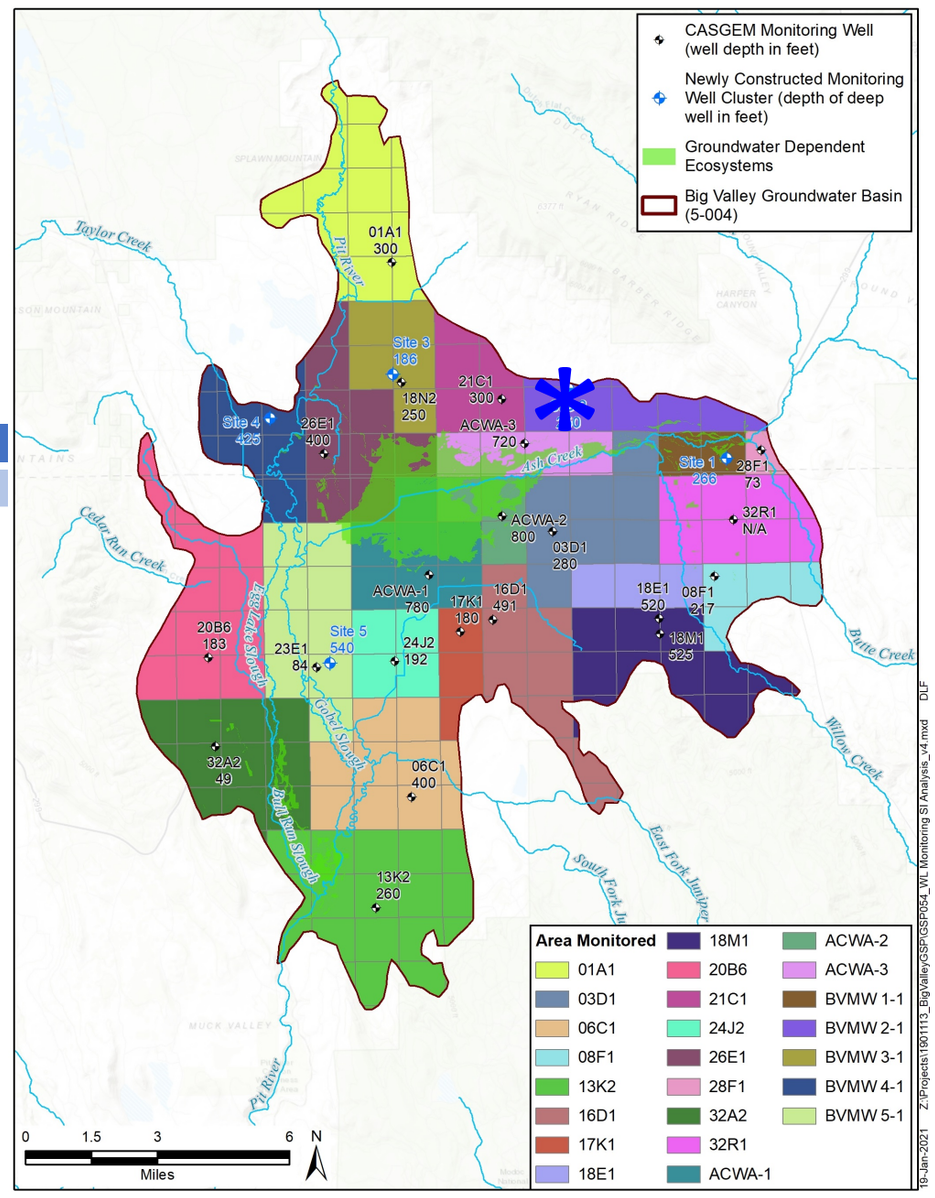
Water Surface Elevation (WSE) Hydrograph



Sustainability Indicator Considerations

Observed WS Elevations		
Parameter		**Value**
WS Elevation Range	Min:	4180 ft
	Max	4183 ft
2015 WS Elevations	Spring:	-
	Fall:	-
Most Recent WS Elev	Spring:	4183 ft
	Fall:	4181 ft

Trend Projections		
Year	**Trend 1-Fall**	**Trend 2-Spring**
2022	-	-
2027	-	-
2032	-	-
2037	-	-
2042	-	-
2047	-	-



Sustainability Indicator Settings

Key	Threshold Type	Effect. Yr.	Value	Description
MO	Measureable Objective	2022	4,181.0 ft	Most recent Fall measurement

Well Depths Within Area

Well Type	Number of Wells	Shallowest Depth (feet bgs)	Shallowest Elevation (feet msl)
Domestic	10	36	4178
Production (Ag)	5	300	3914

Sustainability Indicators to Consider

Water Levels	No
Groundwater Storage	No
Water Quality	No
Subsidence	No
Surface Water Depletions	Maybe

Notes:

Other Pertinent Information

Distance From Nearest Perennial Stream	1.6 miles
Name of Nearest Perennial Stream	Ash Creek
Distance From Nearest GDE	1.1 miles
Description of Nearest GDE	Ash Creek Wildlife Area

BVMW 2-4 Sustainability Indicator Analysis

Date: 1/18/2021

Well Information	
Well ID	000154-BVMW 2-4
Alternate Name	BVMW 2-4
State Number	-
CASGEM ID	-

Well Location	
County	Modoc
Basin	BIG VALLEY
Sub-Basin	-
Management Area	-
Proveyor Agency	-

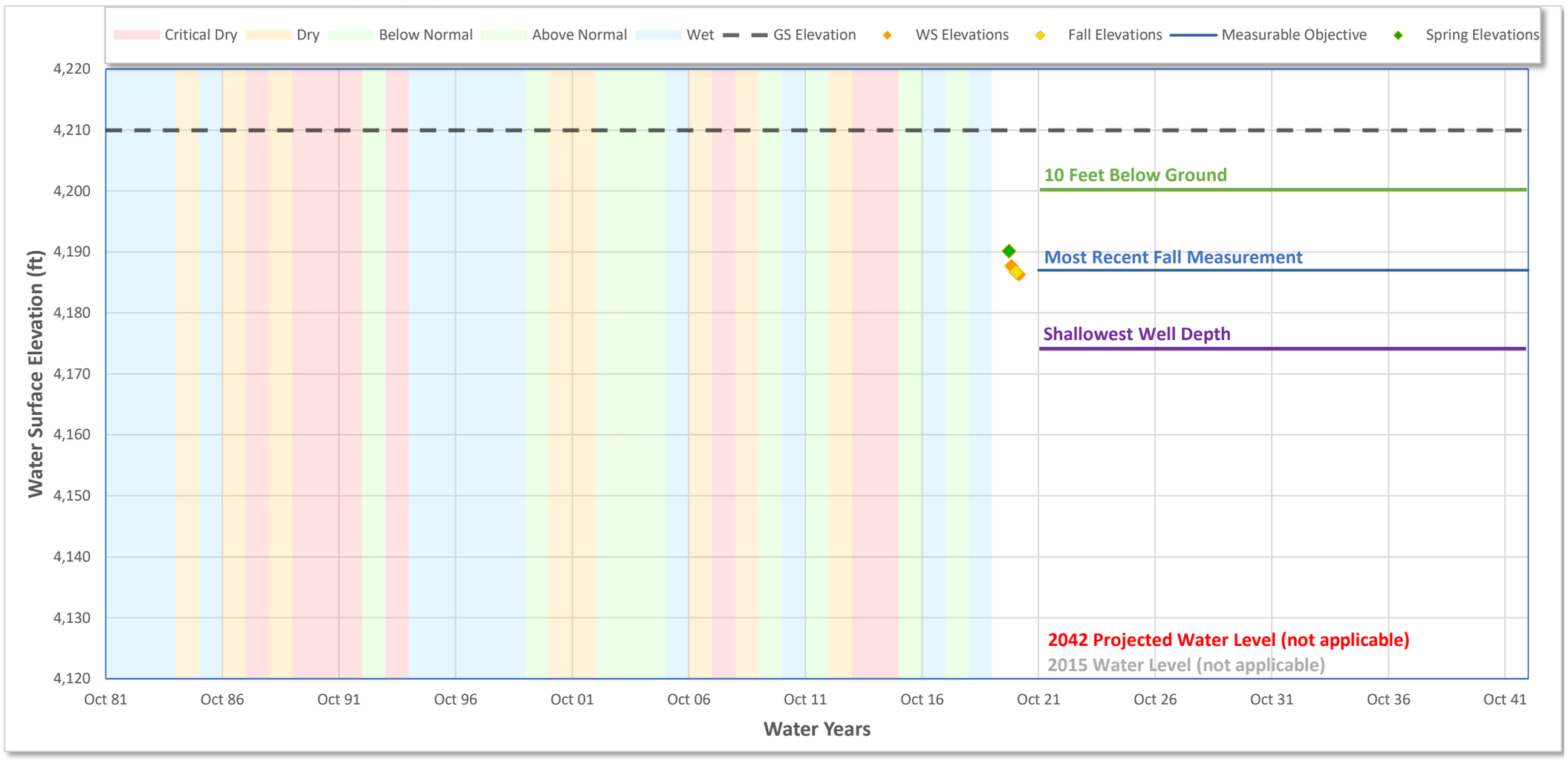
Well Type Information	
Well Type	Monitoring
Well Use	Observation
Completion Type	Single/Cluster

Well Coordinates/Geometry		
Location	Lat:	41.2120
	Long:	-121.0294
Well Depth		65 ft
Ground Surface Elevation		4209.95 ft
Ref. Point Elevation		4209.62 ft
Screen Depth Range		40 to 60 ft
Screen Elevation Range		4174 to 4154 ft
Principal Aquifer		-

Well Period of Record		
Period-of-Record		2020..2021
WS Elev-Range	Min:	4186.3 ft
	Max	4190.2 ft

Trend Analysis		
Seasonal Data Method		Apr1/Oct1
Show Trend 1		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-
Show Trend 2		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-

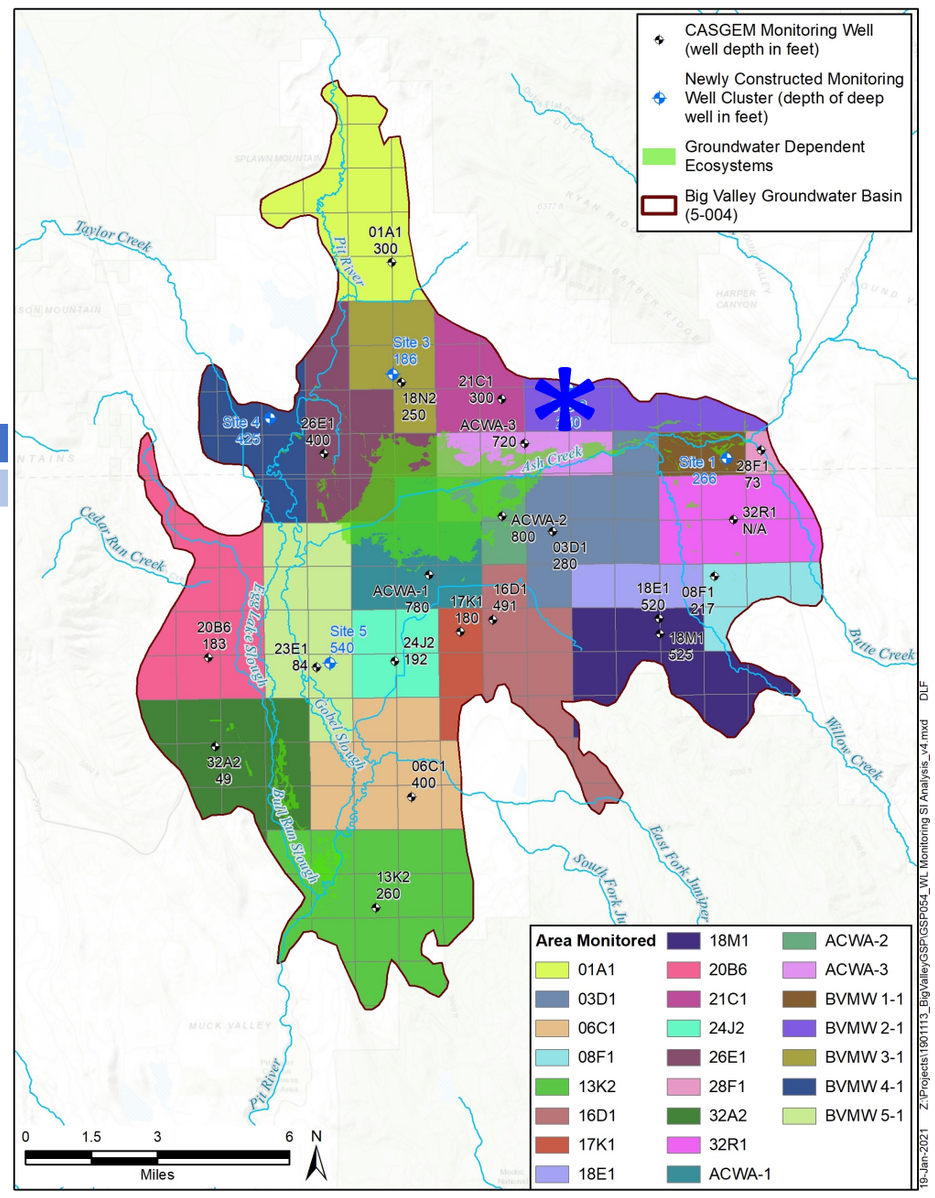
Water Surface Elevation (WSE) Hydrograph



Sustainability Indicator Considerations

Observed WS Elevations		
Parameter		**Value**
WS Elevation Range	Min:	4186 ft
	Max	4190 ft
2015 WS Elevations	Spring:	-
	Fall:	-
Most Recent WS Elev	Spring:	4190 ft
	Fall:	4187 ft

Trend Projections		
Year	**Trend 1-Fall**	**Trend 2-Spring**
2022	-	-
2027	-	-
2032	-	-
2037	-	-
2042	-	-
2047	-	-



Sustainability Indicator Settings

Key	Threshold Type	Effect. Yr.	Value	Description
MO	Measureable Objective	2022	4,187.0 ft	Most recent Fall measurement

Well Depths Within Area

Well Type	Number of Wells	Shallowest Depth (feet bgs)	Shallowest Elevation (feet msl)
Domestic	10	36	4174
Production (Ag)	5	300	3910

Sustainability Indicators to Consider

Water Levels	No
Groundwater Storage	No
Water Quality	No
Subsidence	No
Surface Water Depletions	Maybe

Notes:

Other Pertinent Information

Distance From Nearest Perennial Stream	1.6 miles
Name of Nearest Perennial Stream	Ash Creek
Distance From Nearest GDE	1.1 miles
Description of Nearest GDE	Ash Creek Wildlife Area

BVMW 3-1 Sustainability Indicator Analysis

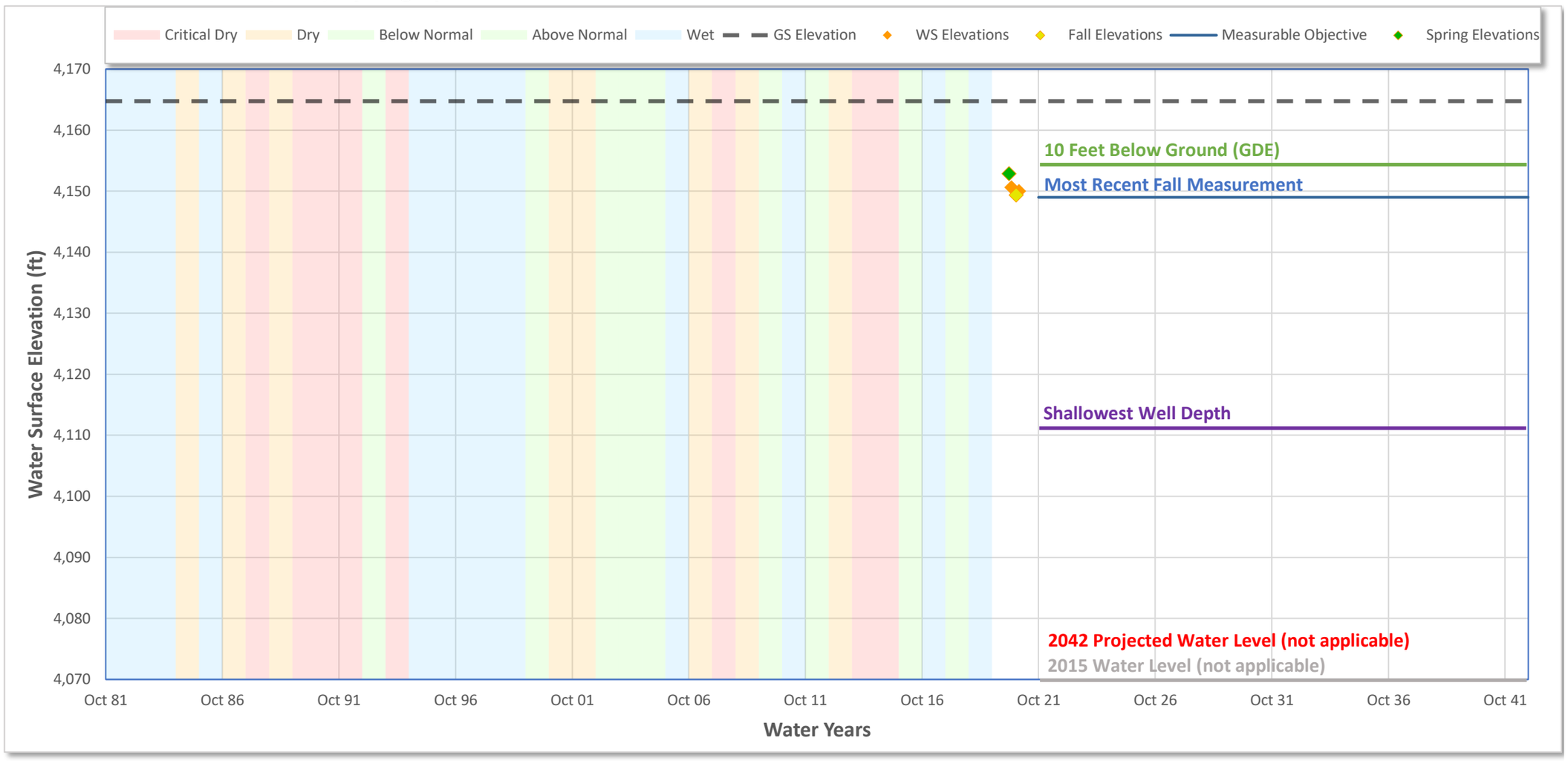
Date: 1/18/2021

Well Information	
Well ID	000155-BVMW 3-1
Alternate Name	BVMW 3-1
State Number	-
CASGEM ID	-
Well Location	
County	Modoc
Basin	BIG VALLEY
Sub-Basin	-
Management Area	-
Proveyor Agency	-
Well Type Information	
Well Type	Monitoring
Well Use	Observation
Completion Type	Single/Cluster

Well Coordinates/Geometry		
Location	Lat:	41.2169
	Long:	-121.1050
Well Depth		470 ft
Ground Surface Elevation		4164.75 ft
Ref. Point Elevation		4167.41 ft
Screen Depth Range		135 to 185 ft
Screen Elevation Range		4032 to 3982 ft
Principal Aquifer		-
Well Period of Record		
Period-of-Record		2020..2021
WS Elev-Range	Min:	4149.4 ft
	Max	4152.9 ft

Trend Analysis		
Seasonal Data Method		Apr1/Oct1
Show Trend 1		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-
Show Trend 2		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-

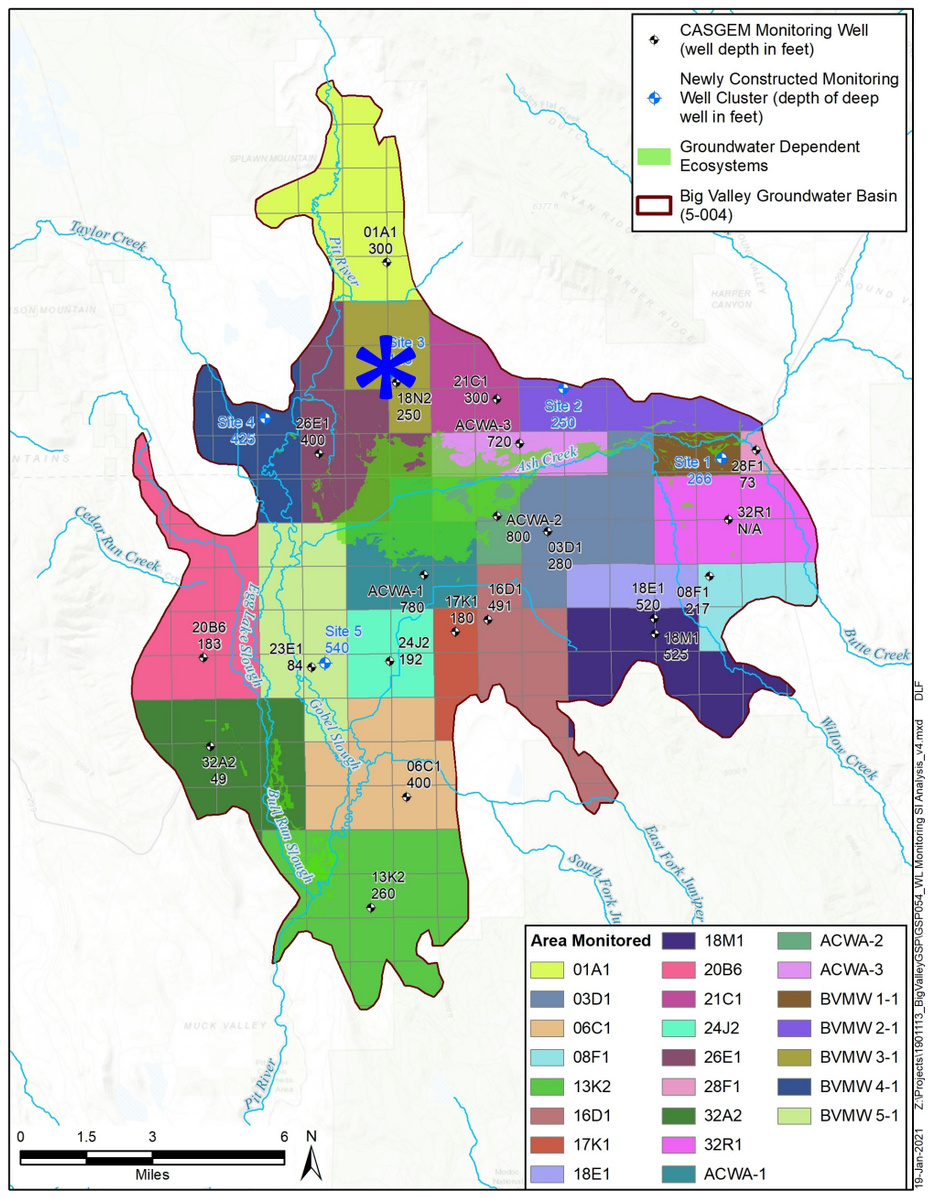
Water Surface Elevation (WSE) Hydrograph



Sustainability Indicator Considerations

Observed WS Elevations		
Parameter		**Value**
WS Elevation Range	Min:	4149 ft
	Max	4153 ft
2015 WS Elevations	Spring:	-
	Fall:	-
Most Recent WS Elev	Spring:	4153 ft
	Fall:	4149 ft

Trend Projections		
Year	**Trend 1-Fall**	**Trend 2-Spring**
2022	-	-
2027	-	-
2032	-	-
2037	-	-
2042	-	-
2047	-	-



Sustainability Indicator Settings

Key	Threshold Type	Effect. Yr.	Value	Description
MO	Measureable Objective	2022	4,149.0 ft	Most recent Fall measurement

Well Depths Within Area

Well Type	Number of Wells	Shallowest Depth (feet bgs)	Shallowest Elevation (feet msl)
Domestic	13	54	4111
Production (Ag)	4	450	3715

Sustainability Indicators to Consider

Water Levels	Yes
Groundwater Storage	Yes
Water Quality	Maybe
Subsidence	No
Surface Water Depletions	No

Notes:

Other Pertinent Information

Distance From Nearest Perennial Stream	1.4 miles
Name of Nearest Perennial Stream	Pit River
Distance From Nearest GDE	1.2 miles
Description of Nearest GDE	Ash Creek Wildlife Area

BVMW 3-2 Sustainability Indicator Analysis

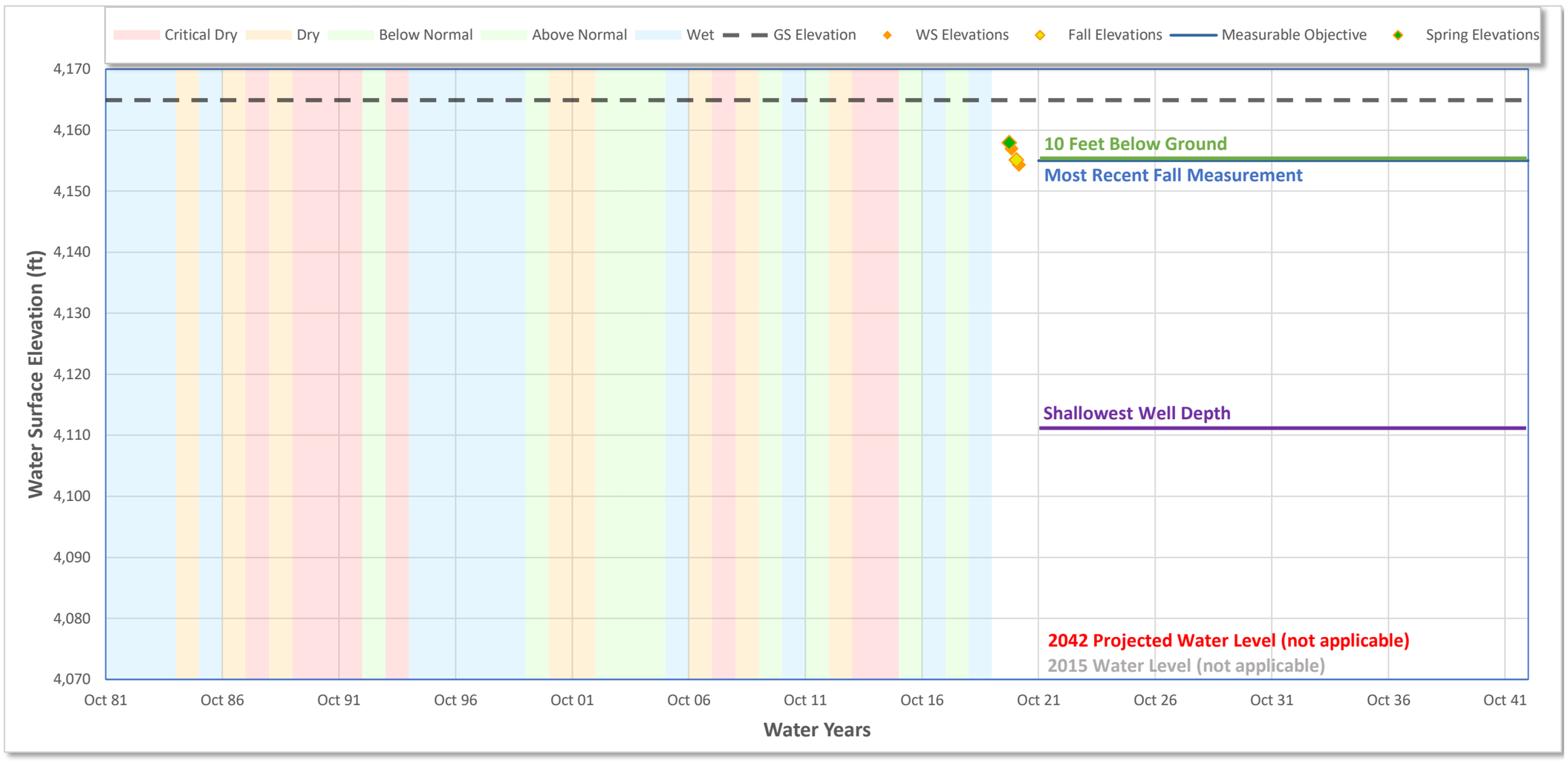
Date: 1/18/2021

Well Information	
Well ID	000156-BVMW 3-2
Alternate Name	BVMW 3-2
State Number	-
CASGEM ID	-
Well Location	
County	Modoc
Basin	BIG VALLEY
Sub-Basin	-
Management Area	-
Proveyor Agency	-
Well Type Information	
Well Type	Monitoring
Well Use	Observation
Completion Type	Single/Cluster

Well Coordinates/Geometry		
Location	Lat:	41.2170
	Long:	-121.1050
Well Depth		45 ft
Ground Surface Elevation		4164.92 ft
Ref. Point Elevation		4167.58 ft
Screen Depth Range		25 to 40 ft
Screen Elevation Range		4142 to 4127 ft
Principal Aquifer		-
Well Period of Record		
Period-of-Record		2020..2021
WS Elev-Range	Min:	4154.3 ft
	Max	4158.0 ft

Trend Analysis		
Seasonal Data Method		Apr1/Oct1
Show Trend 1		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-
Show Trend 2		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-

Water Surface Elevation (WSE) Hydrograph



Sustainability Indicator Considerations

Observed WS Elevations		
Parameter		**Value**
WS Elevation Range	Min:	4154 ft
	Max	4158 ft
2015 WS Elevations	Spring:	-
	Fall:	-
Most Recent WS Elev	Spring:	4158 ft
	Fall:	4155 ft

Trend Projections		
Year	**Trend 1-Fall**	**Trend 2-Spring**
2022	-	-
2027	-	-
2032	-	-
2037	-	-
2042	-	-
2047	-	-

Sustainability Indicator Settings

Key	Threshold Type	Effect. Yr.	Value	Description
MO	Measureable Objective	2022	4,155.0 ft	Most recent Fall measurement

Well Depths Within Area

Well Type	Number of Wells	Shallowest Depth (feet bgs)	Shallowest Elevation (feet msl)
Domestic	13	54	4111
Production (Ag)	4	450	3715

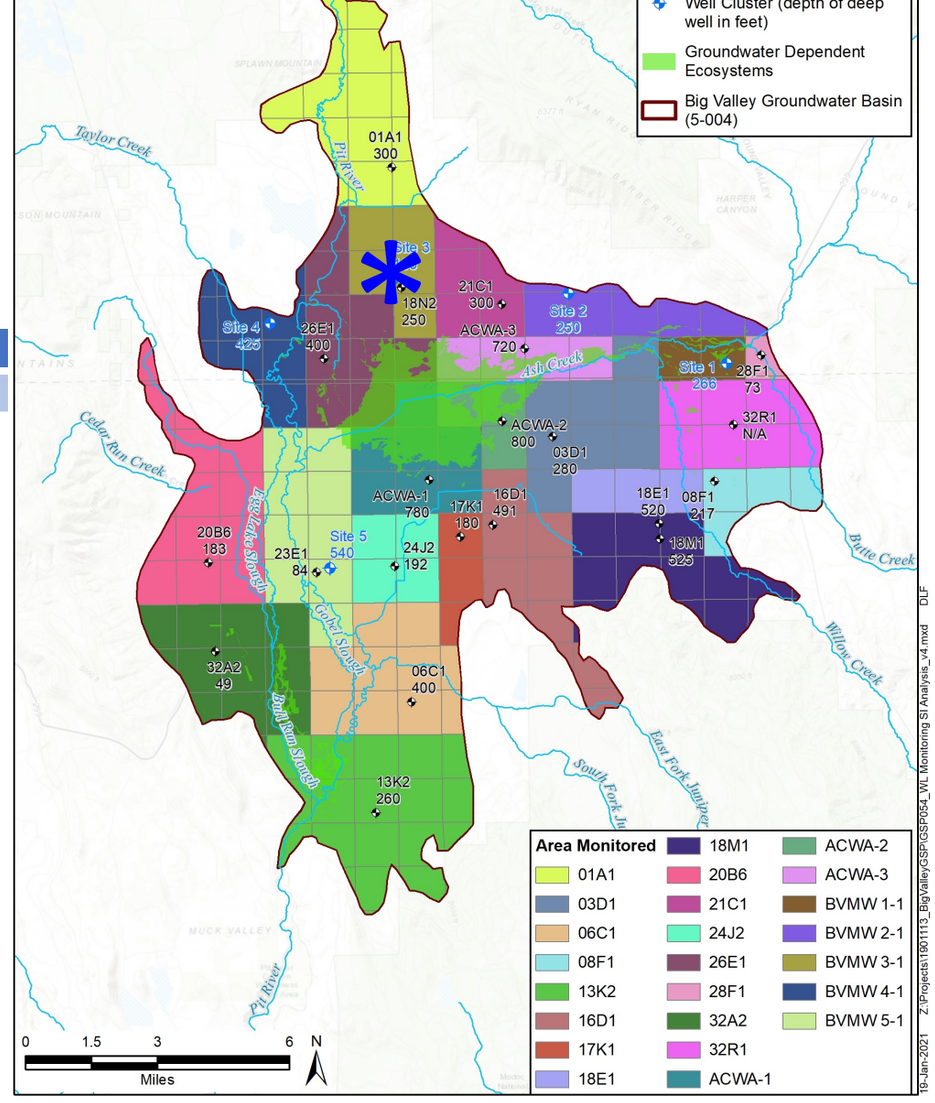
Sustainability Indicators to Consider

Water Levels	Yes
Groundwater Storage	Yes
Water Quality	Maybe
Subsidence	No
Surface Water Depletions	No

Notes:

Other Pertinent Information

Distance From Nearest Perennial Stream	1.4 miles
Name of Nearest Perennial Stream	Pit River
Distance From Nearest GDE	1.2 miles
Description of Nearest GDE	Ash Creek Wildlife Area



BVMW 3-3 Sustainability Indicator Analysis

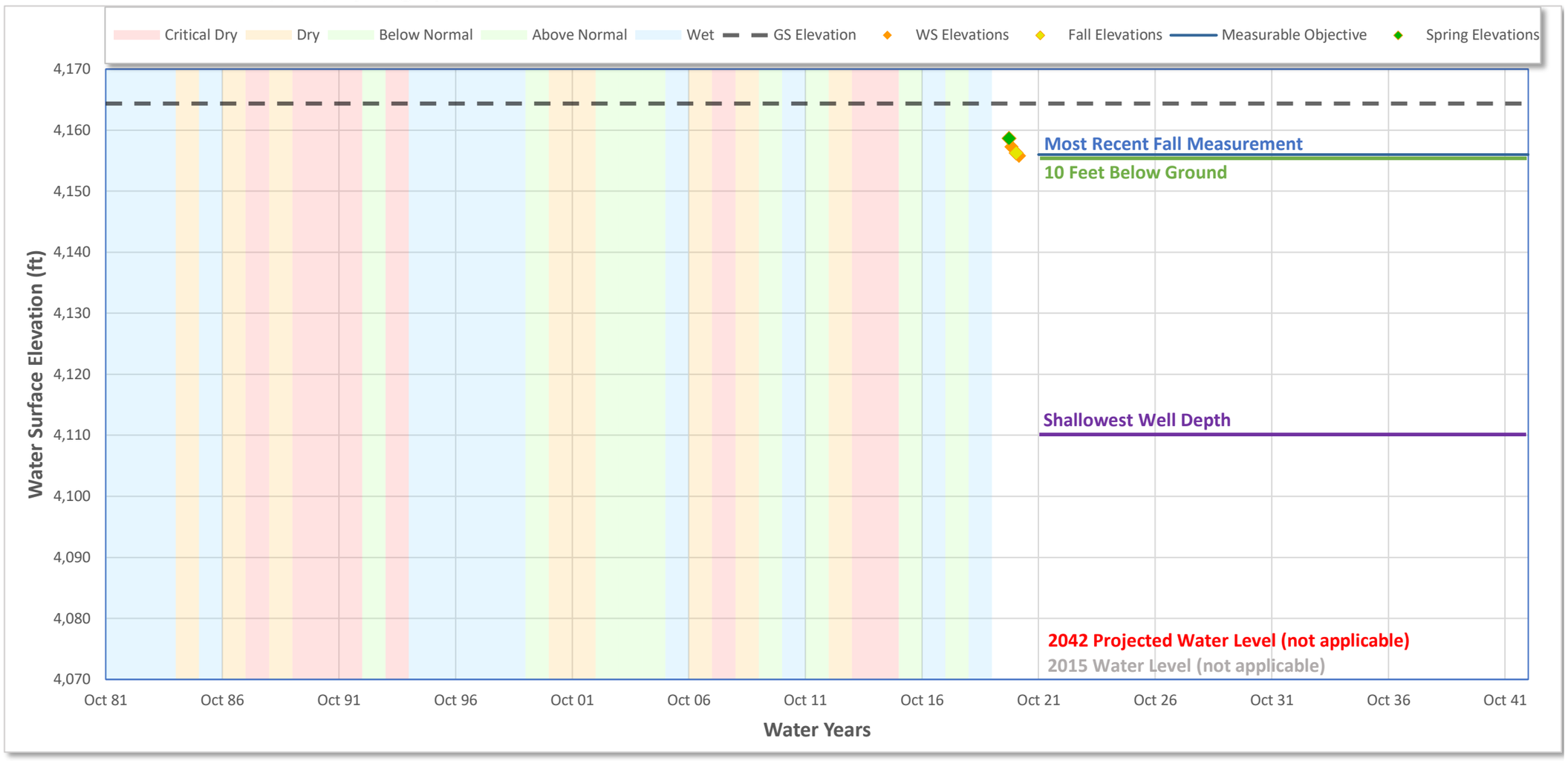
Date: 1/18/2021

Well Information	
Well ID	000157-BVMW 3-3
Alternate Name	BVMW 3-3
State Number	-
CASGEM ID	-
Well Location	
County	Modoc
Basin	BIG VALLEY
Sub-Basin	-
Management Area	-
Proveyor Agency	-
Well Type Information	
Well Type	Monitoring
Well Use	Observation
Completion Type	Single/Cluster

Well Coordinates/Geometry		
Location	Lat:	41.2157
	Long:	-121.1051
Well Depth		55 ft
Ground Surface Elevation		4164.36 ft
Ref. Point Elevation		4164.02 ft
Screen Depth Range		25 to 50 ft
Screen Elevation Range		4143 to 4118 ft
Principal Aquifer		-
Well Period of Record		
Period-of-Record		2020..2021
WS Elev-Range	Min:	4155.8 ft
	Max	4158.7 ft

Trend Analysis		
Seasonal Data Method		Apr1/Oct1
Show Trend 1		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-
Show Trend 2		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-

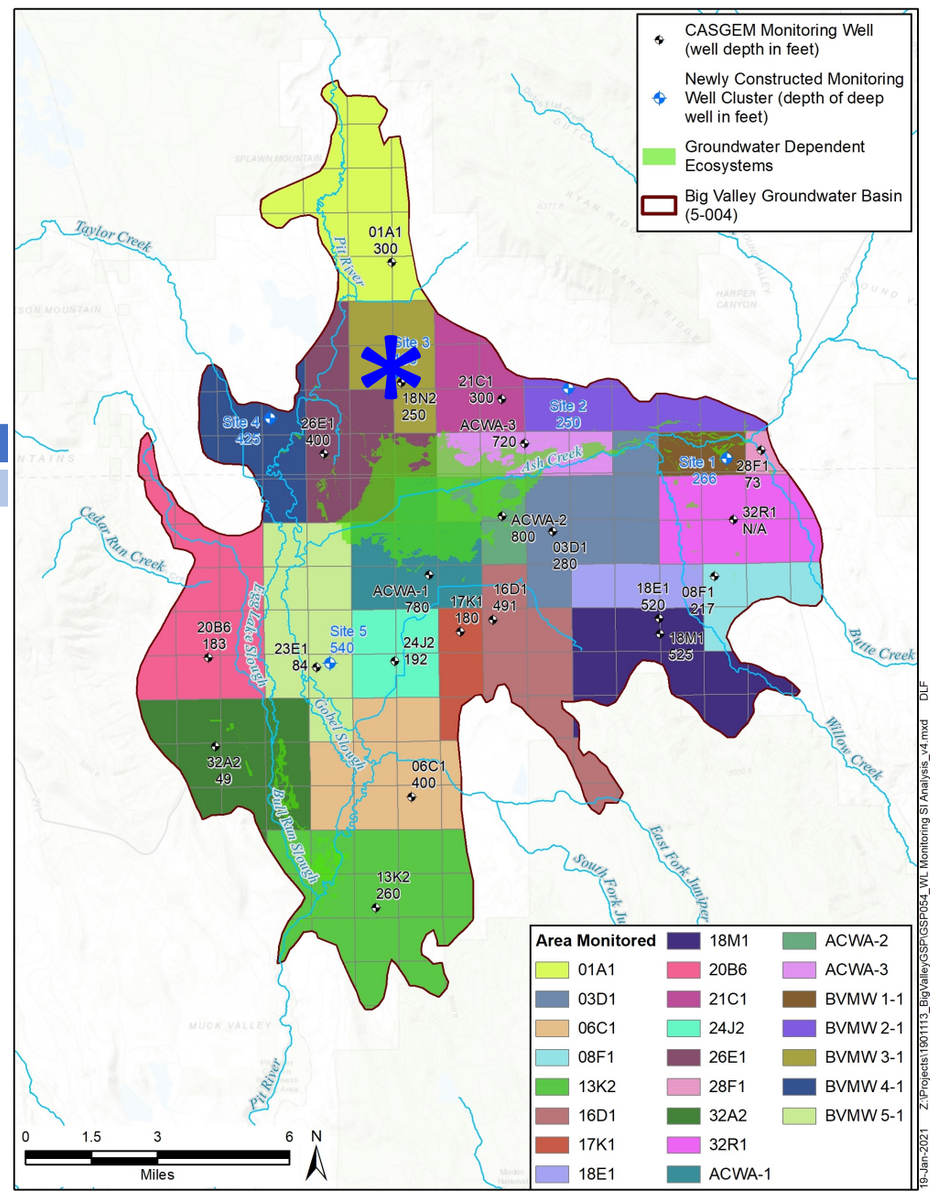
Water Surface Elevation (WSE) Hydrograph



Sustainability Indicator Considerations

Observed WS Elevations		
Parameter		**Value**
WS Elevation Range	Min:	4156 ft
	Max	4159 ft
2015 WS Elevations	Spring:	-
	Fall:	-
Most Recent WS Elev	Spring:	4159 ft
	Fall:	4156 ft

Trend Projections		
Year	**Trend 1-Fall**	**Trend 2-Spring**
2022	-	-
2027	-	-
2032	-	-
2037	-	-
2042	-	-
2047	-	-



Sustainability Indicator Settings

Key	Threshold Type	Effect. Yr.	Value	Description
MO	Measureable Objective	2022	4,156.0 ft	Most recent Fall measurement

Well Depths Within Area

Well Type	Number of Wells	Shallowest Depth (feet bgs)	Shallowest Elevation (feet msl)
Domestic	13	54	4110
Production (Ag)	4	450	3714

Sustainability Indicators to Consider

Water Levels	No
Groundwater Storage	No
Water Quality	No
Subsidence	No
Surface Water Depletions	Maybe

Notes:

Other Pertinent Information

Distance From Nearest Perennial Stream	1.4 miles
Name of Nearest Perennial Stream	Pit River
Distance From Nearest GDE	1.2 miles
Description of Nearest GDE	Ash Creek Wildlife Area

BVMW 3-4 Sustainability Indicator Analysis

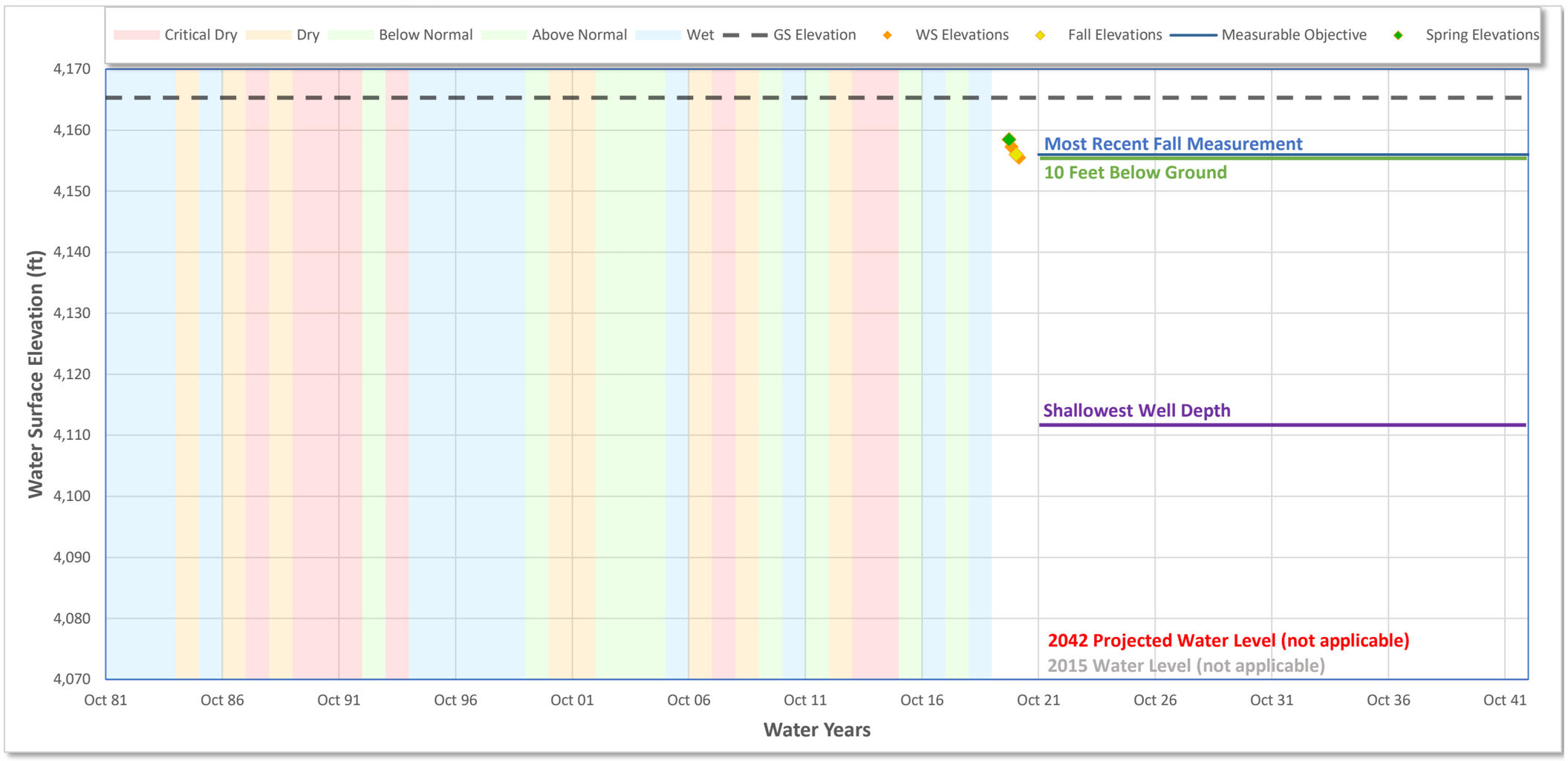
Date: 1/18/2021

Well Information	
Well ID	000158-BVMW 3-4
Alternate Name	BVMW 3-4
State Number	-
CASGEM ID	-
Well Location	
County	Modoc
Basin	BIG VALLEY
Sub-Basin	-
Management Area	-
Proveyor Agency	-
Well Type Information	
Well Type	Monitoring
Well Use	Observation
Completion Type	Single/Cluster

Well Coordinates/Geometry		
Location	Lat:	41.2157
	Long:	-121.1054
Well Depth		100 ft
Ground Surface Elevation		4165.31 ft
Ref. Point Elevation		4164.97 ft
Screen Depth Range		25 to 50 ft
Screen Elevation Range		4139 to 4114 ft
Principal Aquifer		-
Well Period of Record		
Period-of-Record		2020..2021
WS Elev-Range	Min:	4155.5 ft
	Max	4158.5 ft

Trend Analysis		
Seasonal Data Method		Apr1/Oct1
Show Trend 1		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-
Show Trend 2		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-

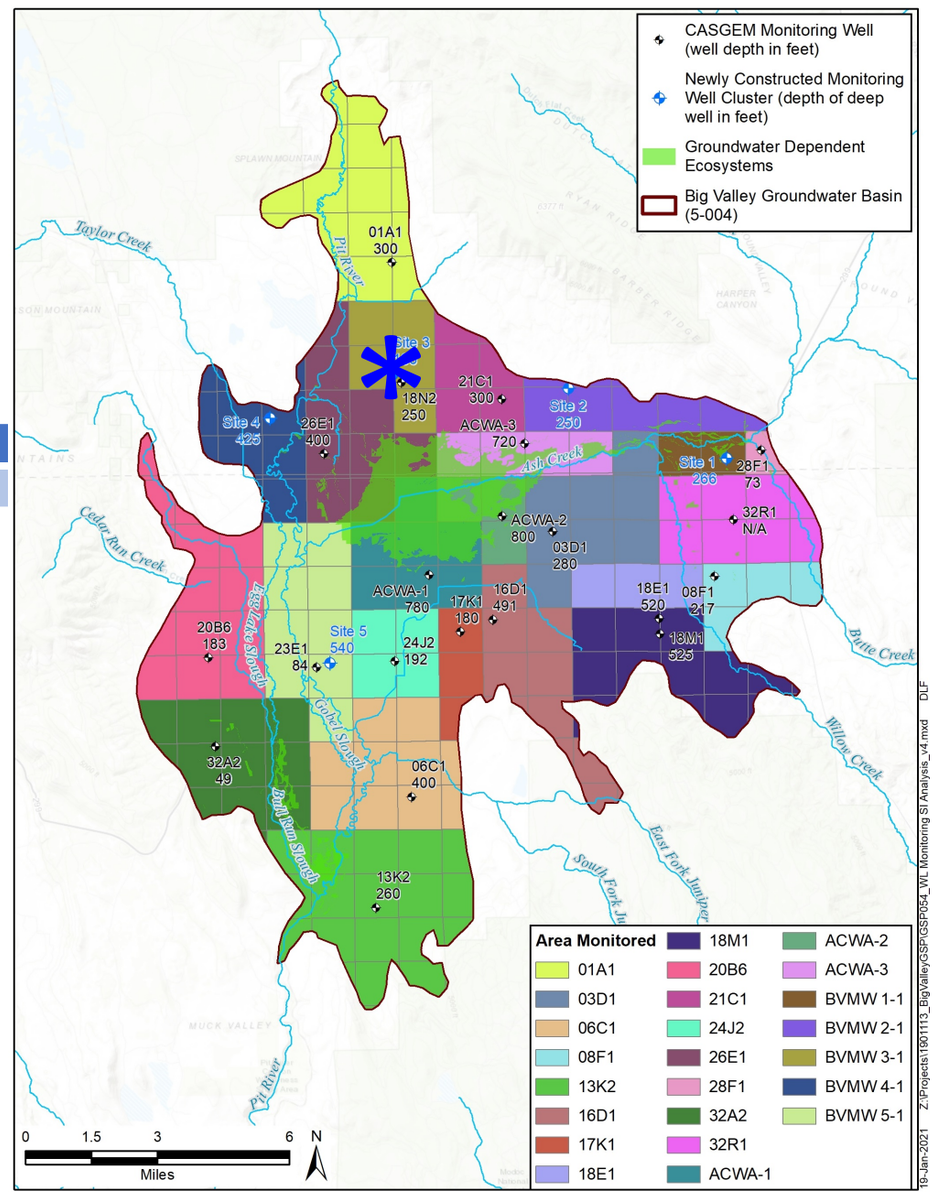
Water Surface Elevation (WSE) Hydrograph



Sustainability Indicator Considerations

Observed WS Elevations		
Parameter		**Value**
WS Elevation Range	Min:	4156 ft
	Max	4158 ft
2015 WS Elevations	Spring:	-
	Fall:	-
Most Recent WS Elev	Spring:	4158 ft
	Fall:	4156 ft

Trend Projections		
Year	**Trend 1-Fall**	**Trend 2-Spring**
2022	-	-
2027	-	-
2032	-	-
2037	-	-
2042	-	-
2047	-	-



Sustainability Indicator Settings

Key	Threshold Type	Effect. Yr.	Value	Description
MO	Measureable Objective	2022	4,156.0 ft	Most recent Fall measurement

Well Depths Within Area

Well Type	Number of Wells	Shallowest Depth (feet bgs)	Shallowest Elevation (feet msl)
Domestic	13	54	4111
Production (Ag)	4	450	3715

Sustainability Indicators to Consider

Water Levels	No
Groundwater Storage	No
Water Quality	No
Subsidence	No
Surface Water Depletions	Maybe

Notes:

Other Pertinent Information

Distance From Nearest Perennial Stream	1.4 miles
Name of Nearest Perennial Stream	Pit River
Distance From Nearest GDE	1.2 miles
Description of Nearest GDE	Ash Creek Wildlife Area

BVMW 4-1 Sustainability Indicator Analysis

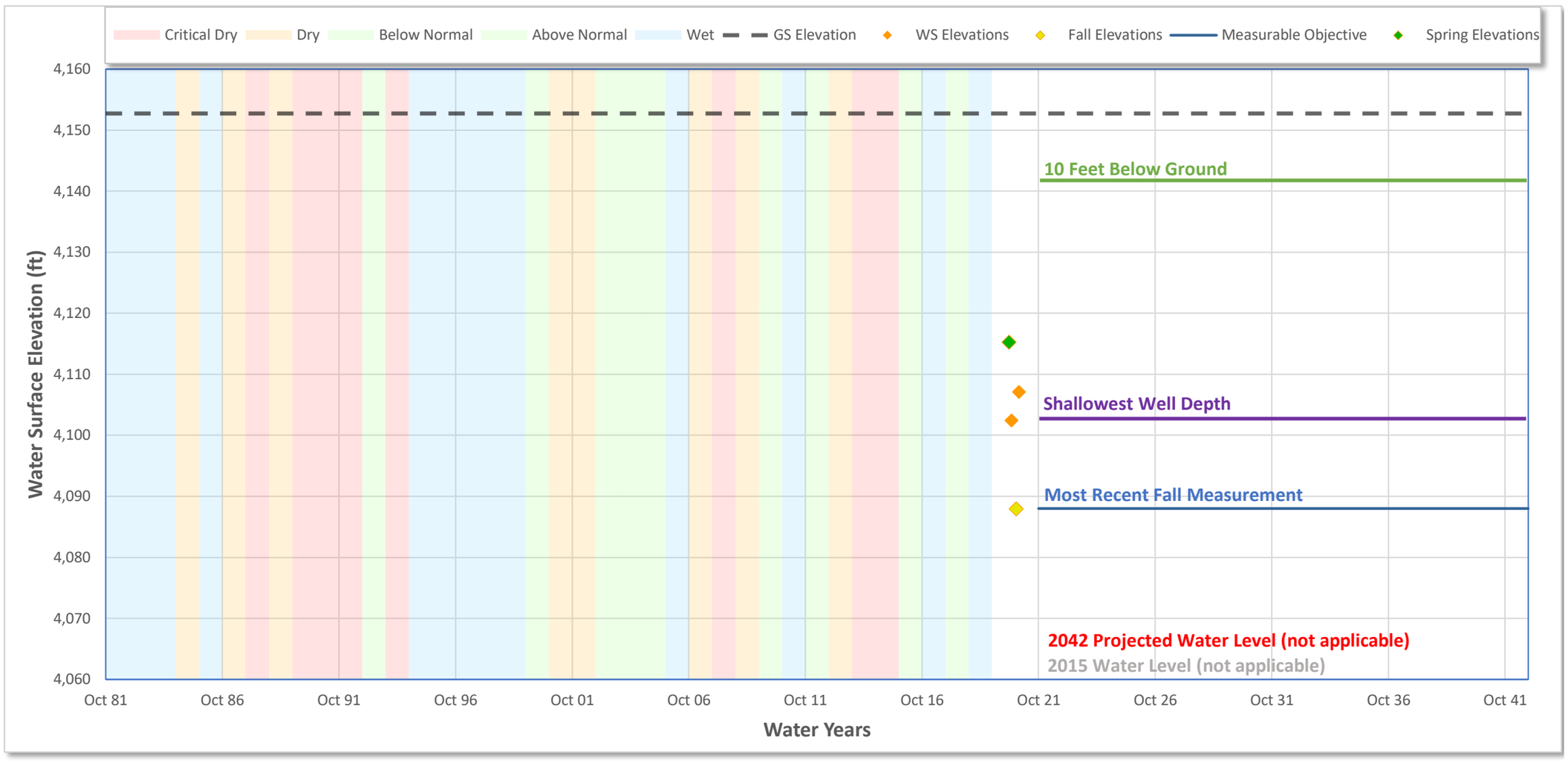
Date: 1/18/2021

Well Information	
Well ID	000159-BVMW 4-1
Alternate Name	BVMW 4-1
State Number	-
CASGEM ID	-
Well Location	
County	Modoc
Basin	BIG VALLEY
Sub-Basin	-
Management Area	-
Proveyor Agency	-
Well Type Information	
Well Type	Monitoring
Well Use	Observation
Completion Type	Single/Cluster

Well Coordinates/Geometry		
Location	Lat:	41.2029
	Long:	-121.1587
Well Depth		500 ft
Ground Surface Elevation		4152.73 ft
Ref. Point Elevation		4152.40 ft
Screen Depth Range		385 to 415 ft
Screen Elevation Range		3767 to 3737 ft
Principal Aquifer		-
Well Period of Record		
Period-of-Record		2020..2021
WS Elev-Range	Min:	4088.0 ft
	Max	4115.3 ft

Trend Analysis		
Seasonal Data Method		Apr1/Oct1
Show Trend 1		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-
Show Trend 2		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-

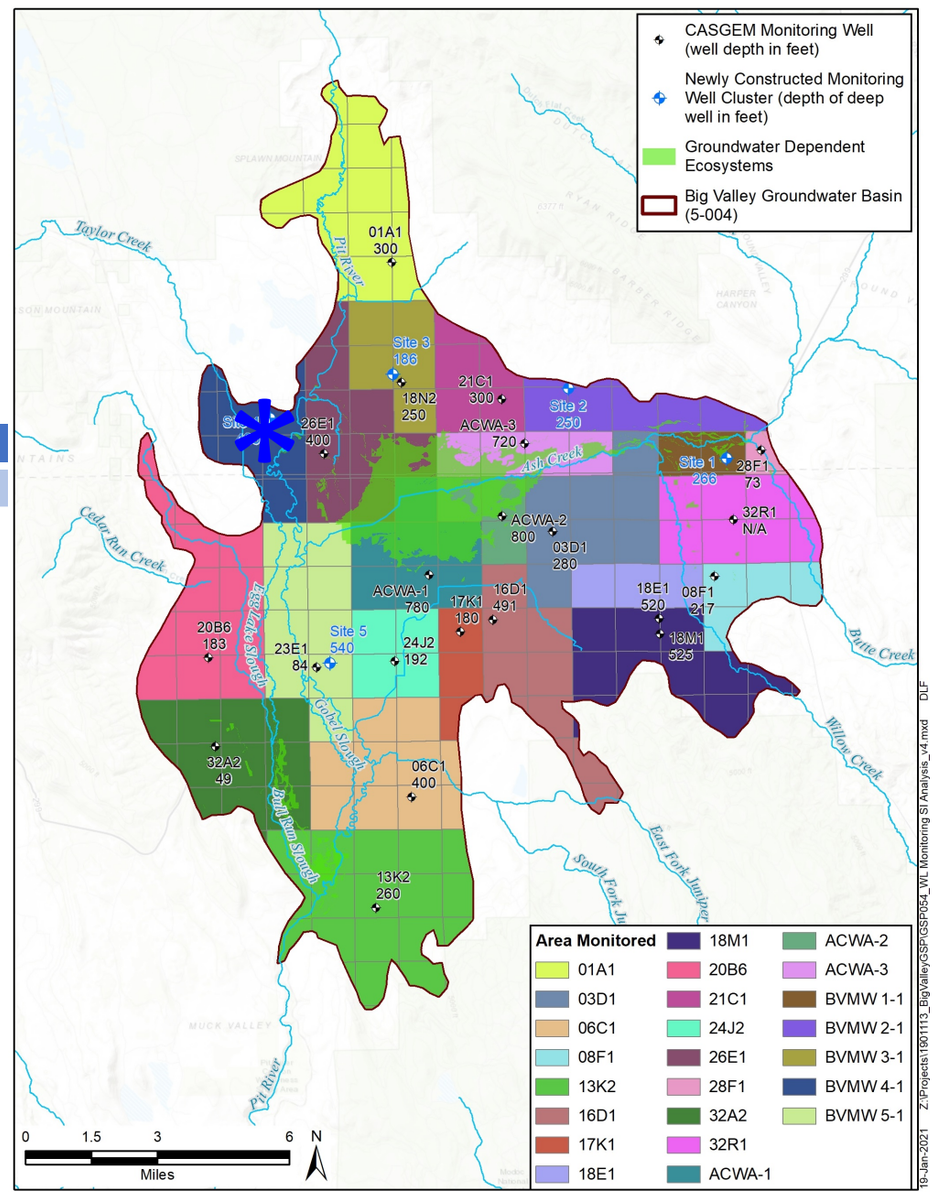
Water Surface Elevation (WSE) Hydrograph



Sustainability Indicator Considerations

Observed WS Elevations		
Parameter		**Value**
WS Elevation Range	Min:	4088 ft
	Max	4115 ft
2015 WS Elevations	Spring:	-
	Fall:	-
Most Recent WS Elev	Spring:	4115 ft
	Fall:	4088 ft

Trend Projections		
Year	**Trend 1-Fall**	**Trend 2-Spring**
2022	-	-
2027	-	-
2032	-	-
2037	-	-
2042	-	-
2047	-	-



Sustainability Indicator Settings

Key	Threshold Type	Effect. Yr.	Value	Description
MO	Measureable Objective	2022	4,088.0 ft	Most recent Fall measurement

Well Depths Within Area

Well Type	Number of Wells	Shallowest Depth (feet bgs)	Shallowest Elevation (feet msl)
Domestic	22	50	4103
Production (Ag)	8	305	3848

Sustainability Indicators to Consider

Water Levels	Yes
Groundwater Storage	Yes
Water Quality	Maybe
Subsidence	No
Surface Water Depletions	No

Notes:

Other Pertinent Information

Distance From Nearest Perennial Stream	0.6 miles
Name of Nearest Perennial Stream	Pit River
Distance From Nearest GDE	0.6 miles
Description of Nearest GDE	Pit River

BVMW 4-2 Sustainability Indicator Analysis

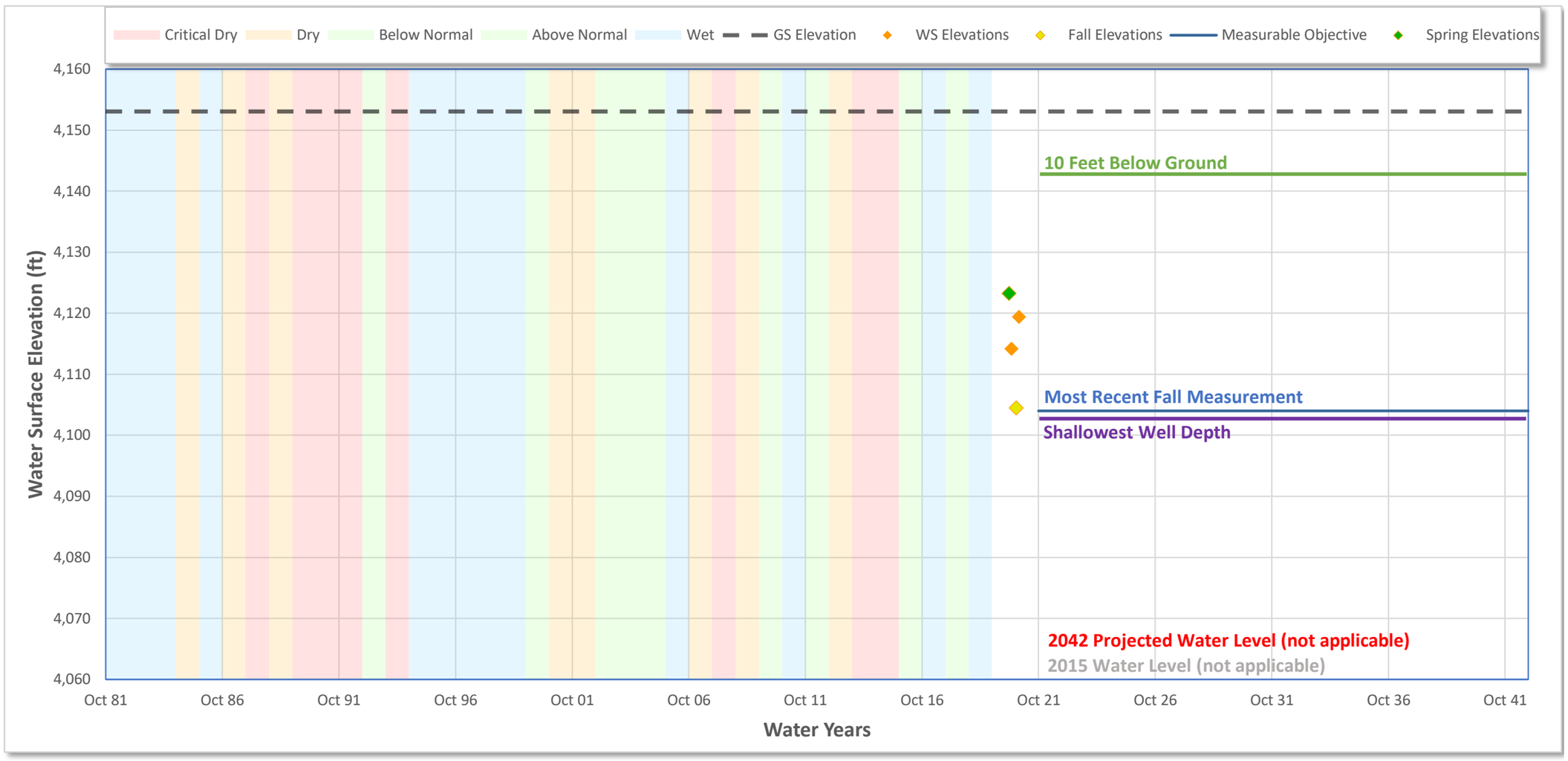
Date: 1/18/2021

Well Information	
Well ID	000160-BVMW 4-2
Alternate Name	BVMW 4-2
State Number	-
CASGEM ID	-
Well Location	
County	Modoc
Basin	BIG VALLEY
Sub-Basin	-
Management Area	-
Proveyor Agency	-
Well Type Information	
Well Type	Monitoring
Well Use	Observation
Completion Type	Single/Cluster

Well Coordinates/Geometry		
Location	Lat:	41.2029
	Long:	-121.1588
Well Depth		79 ft
Ground Surface Elevation		4153.06 ft
Ref. Point Elevation		4152.73 ft
Screen Depth Range		54 to 74 ft
Screen Elevation Range		4098 to 4078 ft
Principal Aquifer		-
Well Period of Record		
Period-of-Record		2020..2021
WS Elev-Range	Min:	4104.5 ft
	Max	4123.3 ft

Trend Analysis		
Seasonal Data Method		Apr1/Oct1
Show Trend 1		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-
Show Trend 2		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-

Water Surface Elevation (WSE) Hydrograph



Sustainability Indicator Considerations

Observed WS Elevations		
Parameter		**Value**
WS Elevation Range	Min:	4104 ft
	Max	4123 ft
2015 WS Elevations	Spring:	-
	Fall:	-
Most Recent WS Elev	Spring:	4123 ft
	Fall:	4104 ft

Trend Projections		
Year	**Trend 1-Fall**	**Trend 2-Spring**
2022	-	-
2027	-	-
2032	-	-
2037	-	-
2042	-	-
2047	-	-

Sustainability Indicator Settings

Key	Threshold Type	Effect. Yr.	Value	Description
MO	Measureable Objective	2022	4,104.0 ft	Most recent Fall measurement

Well Depths Within Area

Well Type	Number of Wells	Shallowest Depth (feet bgs)	Shallowest Elevation (feet msl)
Domestic	22	50	4103
Production (Ag)	8	305	3848

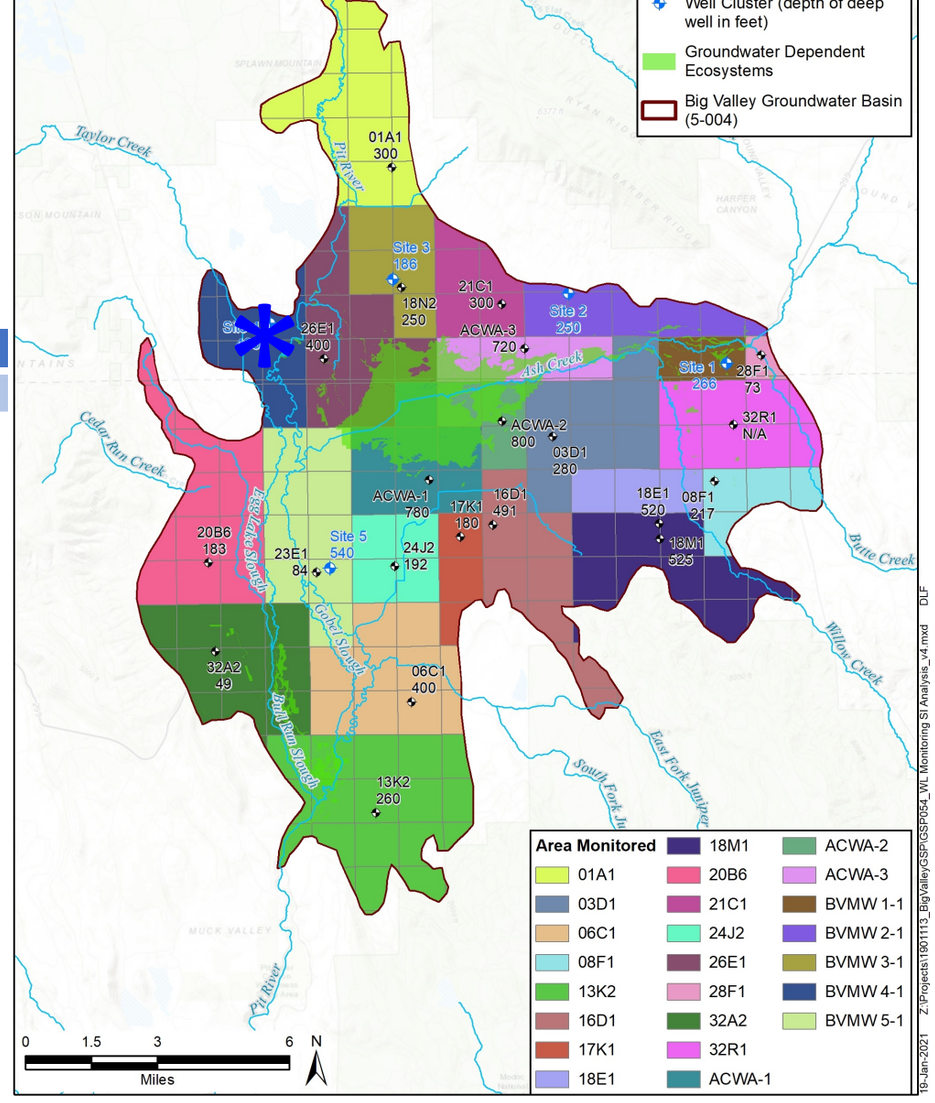
Sustainability Indicators to Consider

Water Levels	No
Groundwater Storage	No
Water Quality	No
Subsidence	No
Surface Water Depletions	Yes

Notes:

Other Pertinent Information

Distance From Nearest Perennial Stream	0.6 miles
Name of Nearest Perennial Stream	Pit River
Distance From Nearest GDE	0.6 miles
Description of Nearest GDE	Pit River



BVMW 4-3 Sustainability Indicator Analysis

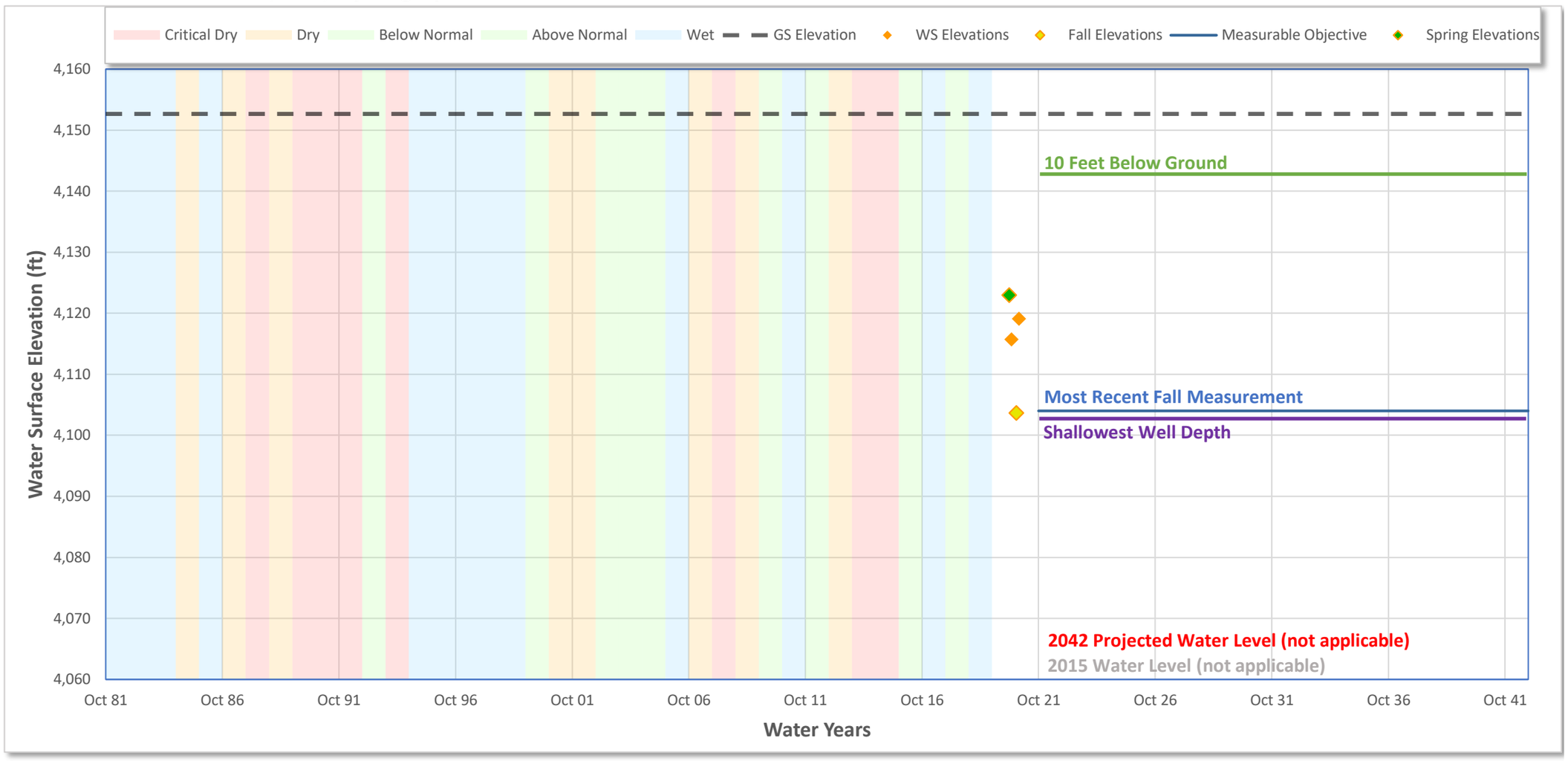
Date: 1/18/2021

Well Information	
Well ID	000161-BVMW 4-3
Alternate Name	BVMW 4-3
State Number	-
CASGEM ID	-
Well Location	
County	Modoc
Basin	BIG VALLEY
Sub-Basin	-
Management Area	-
Proveyor Agency	-
Well Type Information	
Well Type	Monitoring
Well Use	Observation
Completion Type	Single/Cluster

Well Coordinates/Geometry		
Location	Lat:	41.2030
	Long:	-121.1579
Well Depth		101 ft
Ground Surface Elevation		4152.66 ft
Ref. Point Elevation		4152.33 ft
Screen Depth Range		60 to 80 ft
Screen Elevation Range		4093 to 4073 ft
Principal Aquifer		-
Well Period of Record		
Period-of-Record		2020..2021
WS Elev-Range	Min:	4103.7 ft
	Max	4123.0 ft

Trend Analysis		
Seasonal Data Method		Apr1/Oct1
Show Trend 1		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-
Show Trend 2		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-

Water Surface Elevation (WSE) Hydrograph



Sustainability Indicator Considerations

Observed WS Elevations		
Parameter		**Value**
WS Elevation Range	Min:	4104 ft
	Max	4123 ft
2015 WS Elevations	Spring:	-
	Fall:	-
Most Recent WS Elev	Spring:	4123 ft
	Fall:	4104 ft

Trend Projections		
Year	**Trend 1-Fall**	**Trend 2-Spring**
2022	-	-
2027	-	-
2032	-	-
2037	-	-
2042	-	-
2047	-	-

Sustainability Indicator Settings

Key	Threshold Type	Effect. Yr.	Value	Description
MO	Measureable Objective	2022	4,104.0 ft	Most recent Fall measurement

Well Depths Within Area

Well Type	Number of Wells	Shallowest Depth (feet bgs)	Shallowest Elevation (feet msl)
Domestic	22	50	4103
Production (Ag)	8	305	3848

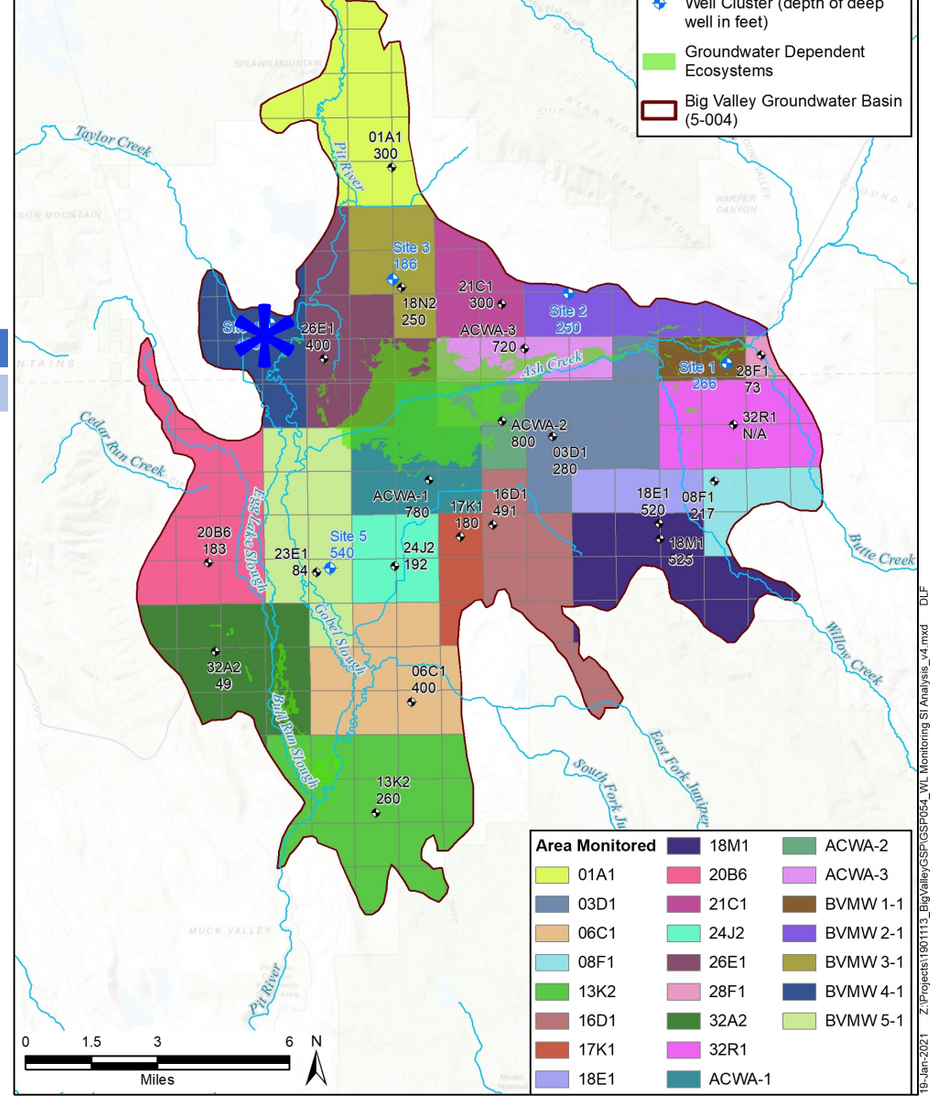
Sustainability Indicators to Consider

Water Levels	No
Groundwater Storage	No
Water Quality	No
Subsidence	No
Surface Water Depletions	Yes

Notes:

Other Pertinent Information

Distance From Nearest Perennial Stream	0.6 miles
Name of Nearest Perennial Stream	Pit River
Distance From Nearest GDE	0.6 miles
Description of Nearest GDE	Pit River



BVMW 4-4 Sustainability Indicator Analysis

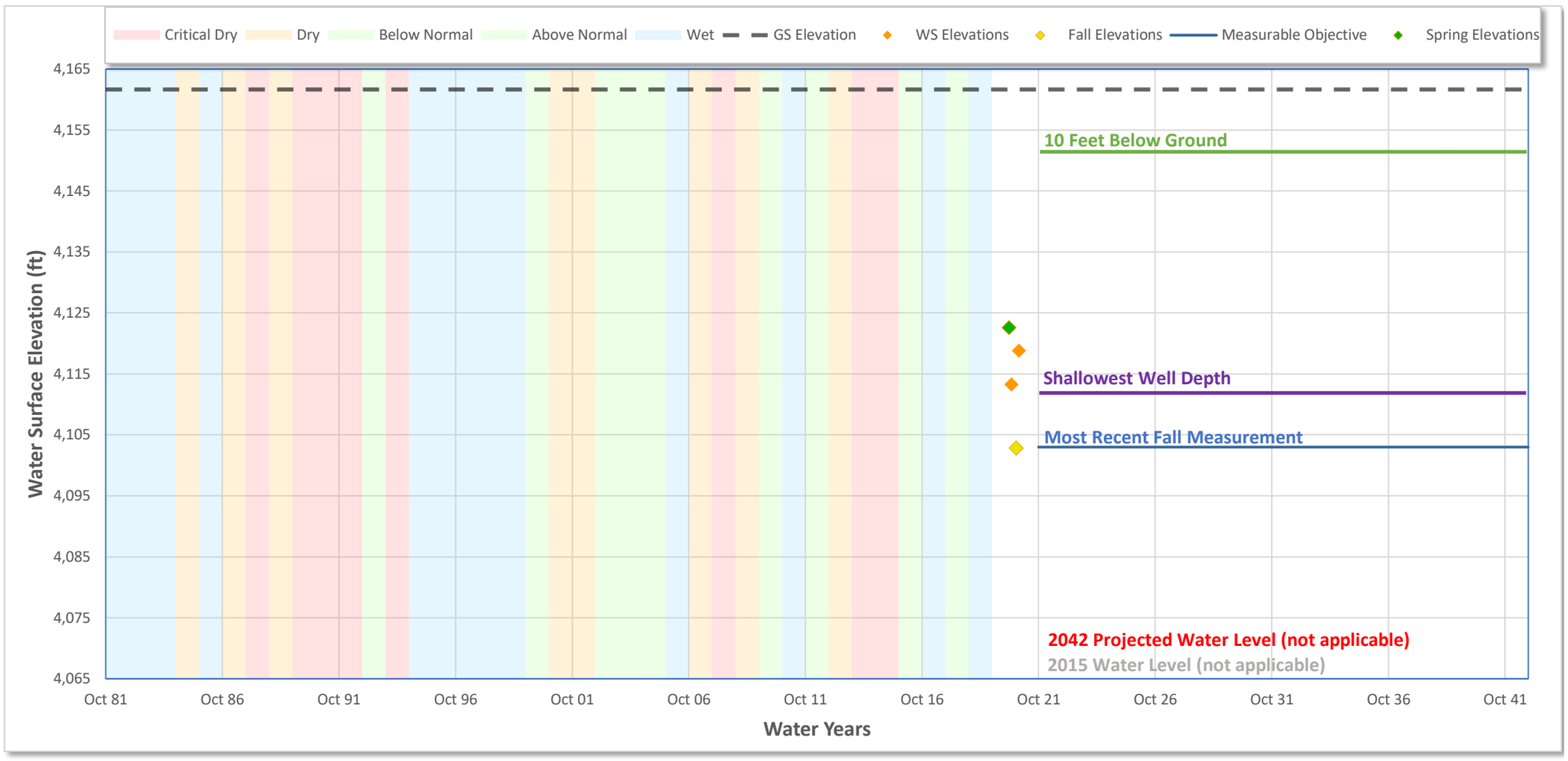
Date: 1/18/2021

Well Information	
Well ID	000162-BVMW 4-4
Alternate Name	BVMW 4-4
State Number	-
CASGEM ID	-
Well Location	
County	Modoc
Basin	BIG VALLEY
Sub-Basin	-
Management Area	-
Proveyor Agency	-
Well Type Information	
Well Type	Monitoring
Well Use	Observation
Completion Type	Single/Cluster

Well Coordinates/Geometry		
Location	Lat:	41.2035
	Long:	-121.1578
Well Depth		100 ft
Ground Surface Elevation		4161.65 ft
Ref. Point Elevation		4161.32 ft
Screen Depth Range		73 to 93 ft
Screen Elevation Range		4088 to 4068 ft
Principal Aquifer		-
Well Period of Record		
Period-of-Record		2020..2021
WS Elev-Range	Min:	4102.9 ft
	Max	4122.6 ft

Trend Analysis		
Seasonal Data Method		Apr1/Oct1
Show Trend 1		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-
Show Trend 2		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-

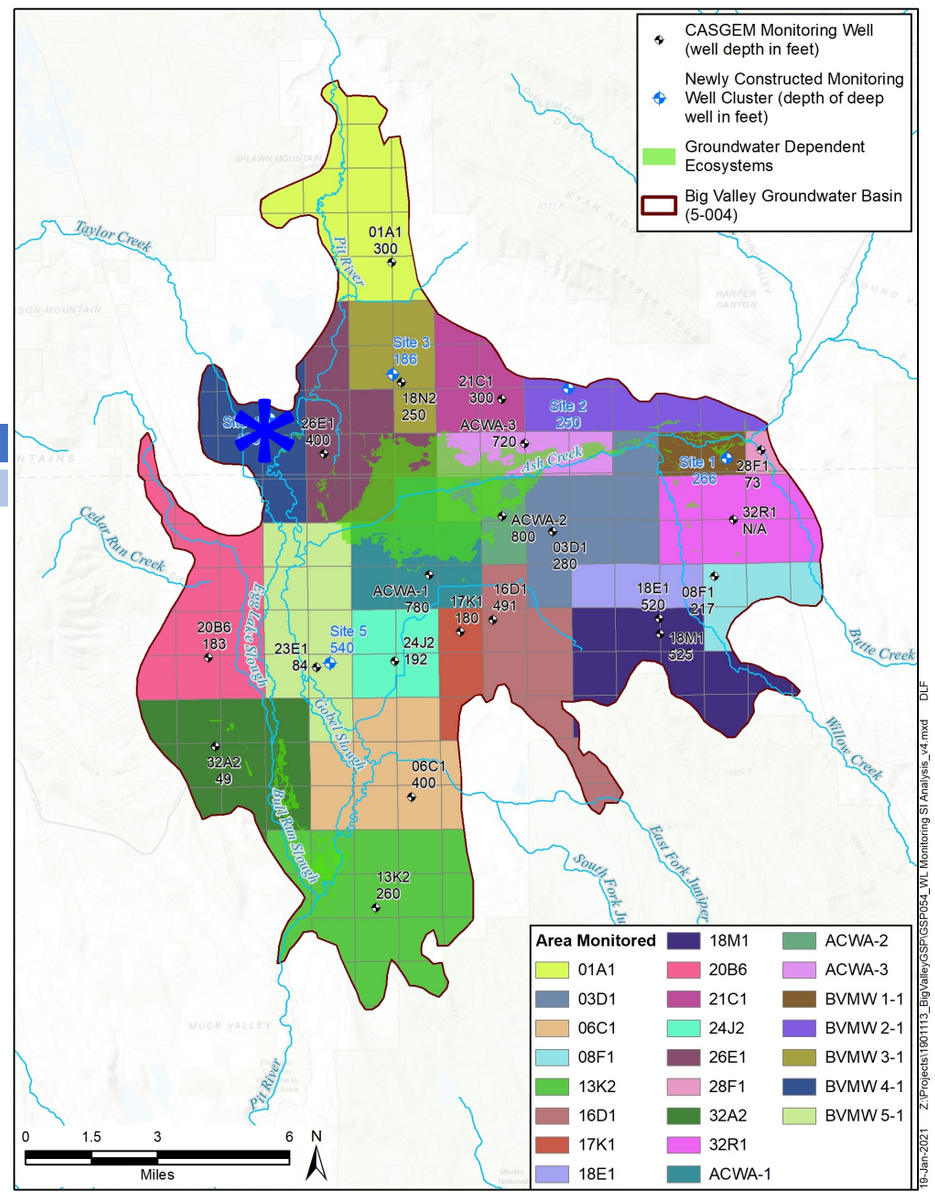
Water Surface Elevation (WSE) Hydrograph



Sustainability Indicator Considerations

Observed WS Elevations		
Parameter		**Value**
WS Elevation Range	Min:	4103 ft
	Max	4123 ft
2015 WS Elevations	Spring:	-
	Fall:	-
Most Recent WS Elev	Spring:	4123 ft
	Fall:	4103 ft

Trend Projections		
Year	**Trend 1-Fall**	**Trend 2-Spring**
2022	-	-
2027	-	-
2032	-	-
2037	-	-
2042	-	-
2047	-	-



Sustainability Indicator Settings

Key	Threshold Type	Effect. Yr.	Value	Description
MO	Measureable Objective	2022	4,103.0 ft	Most recent Fall measurement

Well Depths Within Area

Well Type	Number of Wells	Shallowest Depth (feet bgs)	Shallowest Elevation (feet msl)
Domestic	22	50	4112
Production (Ag)	8	305	3857

Sustainability Indicators to Consider

Water Levels	No
Groundwater Storage	No
Water Quality	No
Subsidence	No
Surface Water Depletions	Yes

Notes:

Other Pertinent Information

Distance From Nearest Perennial Stream	0.6 miles
Name of Nearest Perennial Stream	Pit River
Distance From Nearest GDE	0.6 miles
Description of Nearest GDE	Pit River

BVMW 5-1 Sustainability Indicator Analysis

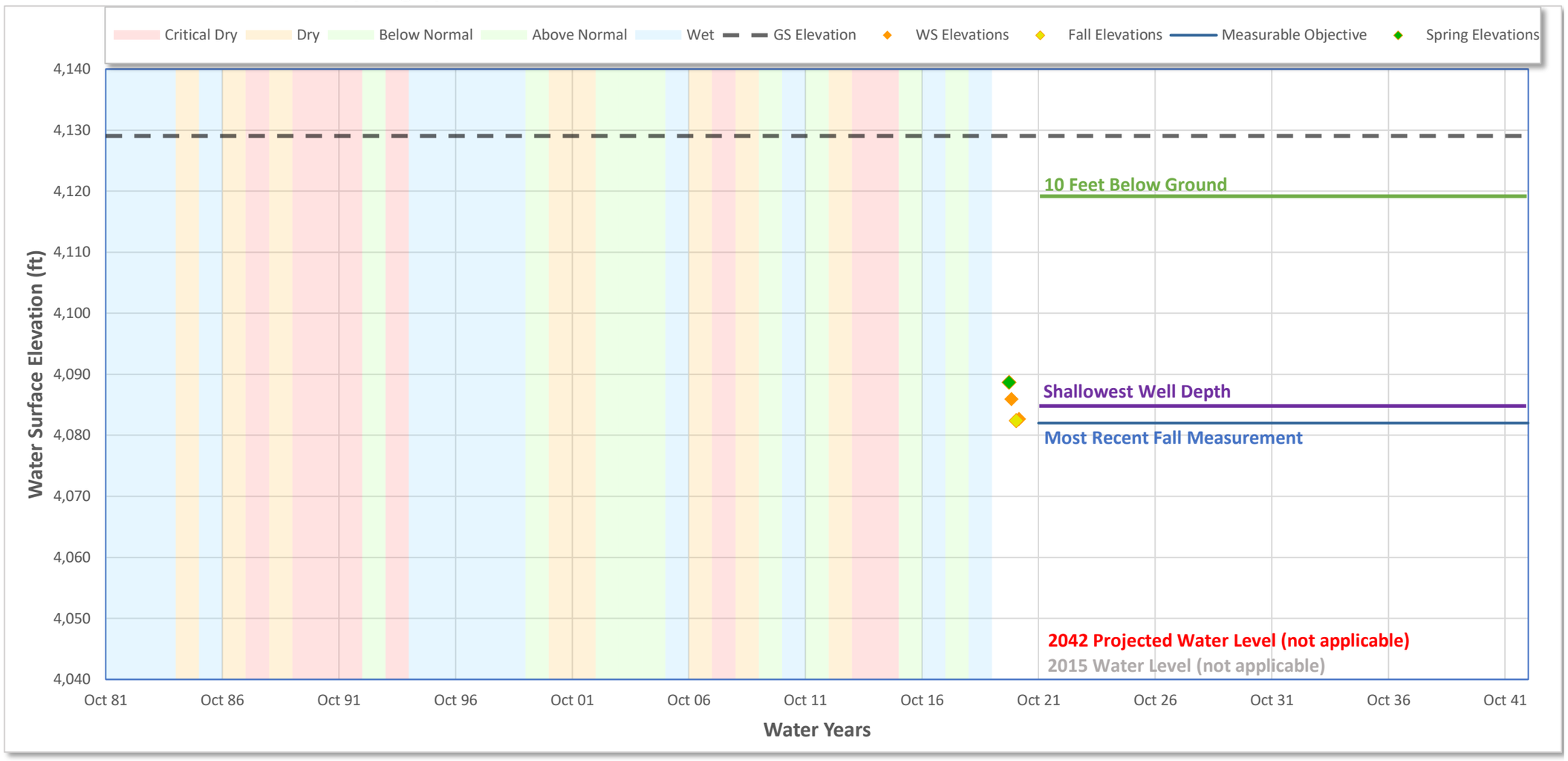
Date: 1/18/2021

Well Information	
Well ID	000143-BVMW 5-1
Alternate Name	BVMW 5-1
State Number	-
CASGEM ID	411219N1211339W001
Well Location	
County	Lassen
Basin	BIG VALLEY
Sub-Basin	-
Management Area	-
Proveyor Agency	-
Well Type Information	
Well Type	Monitoring
Well Use	Observation
Completion Type	Single/Cluster

Well Coordinates/Geometry		
Location	Lat:	41.1219
	Long:	-121.1339
Well Depth		540 ft
Ground Surface Elevation		4129.05 ft
Ref. Point Elevation		4129.05 ft
Screen Depth Range		485 to 535 ft
Screen Elevation Range		3644 to 3594 ft
Principal Aquifer		-
Well Period of Record		
Period-of-Record		2020..2021
WS Elev-Range	Min:	4082.4 ft
	Max	4088.7 ft

Trend Analysis		
Seasonal Data Method		Apr1/Oct1
Show Trend 1		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-
Show Trend 2		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-

Water Surface Elevation (WSE) Hydrograph



Sustainability Indicator Considerations

Observed WS Elevations		
Parameter		**Value**
WS Elevation Range	Min:	4082 ft
	Max	4089 ft
2015 WS Elevations	Spring:	-
	Fall:	-
Most Recent WS Elev	Spring:	4089 ft
	Fall:	4082 ft

Trend Projections		
Year	**Trend 1-Fall**	**Trend 2-Spring**
2022	-	-
2027	-	-
2032	-	-
2037	-	-
2042	-	-
2047	-	-

Sustainability Indicator Settings

Key	Threshold Type	Effect. Yr.	Value	Description
MO	Measureable Objective	2022	4,082.0 ft	Most recent Fall measurement

Well Depths Within Area

Well Type	Number of Wells	Shallowest Depth (feet bgs)	Shallowest Elevation (feet msl)
Domestic	24	44	4085
Production (Ag)	10	120	4009

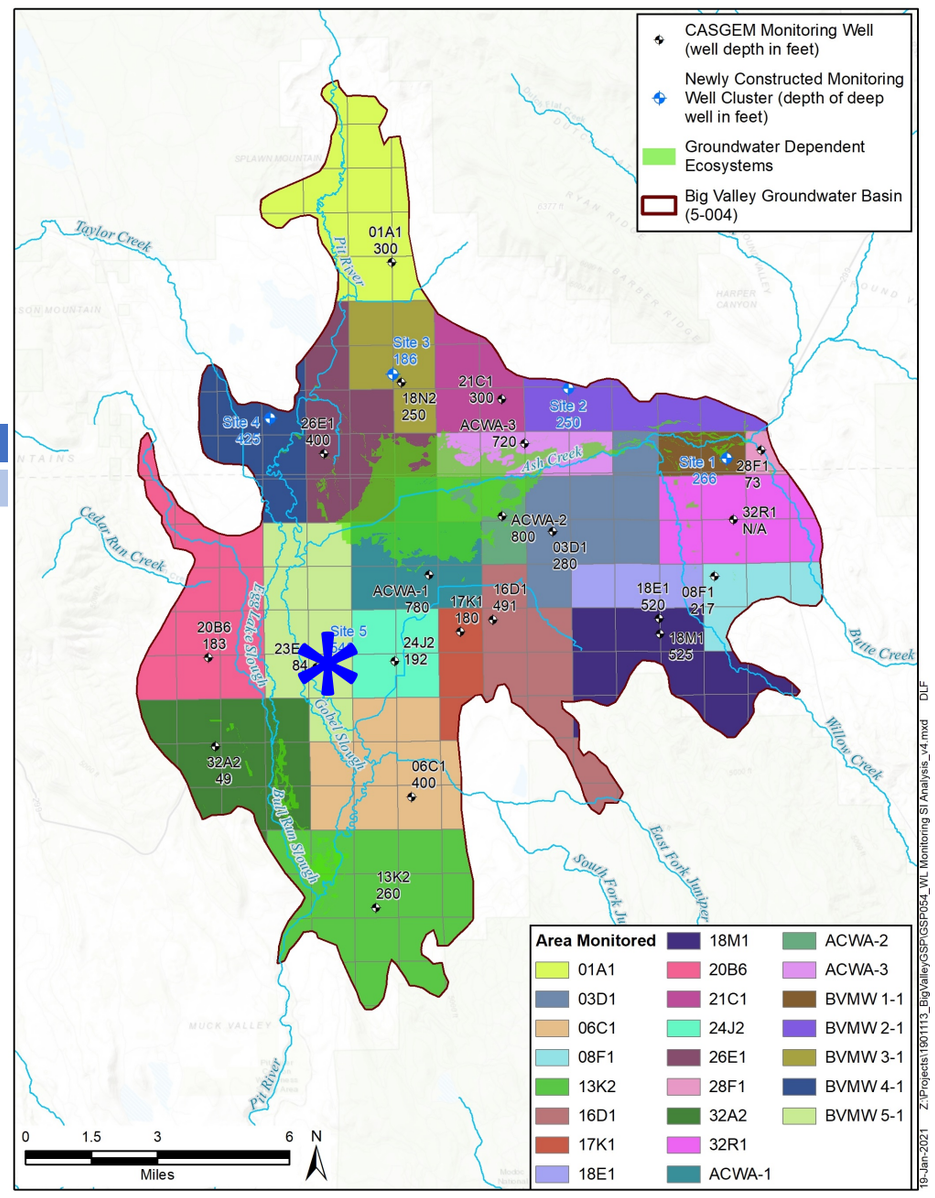
Sustainability Indicators to Consider

Water Levels	Yes
Groundwater Storage	Yes
Water Quality	Maybe
Subsidence	No
Surface Water Depletions	No

Notes:

Other Pertinent Information

Distance From Nearest Perennial Stream	0.6 miles
Name of Nearest Perennial Stream	Pit River
Distance From Nearest GDE	2 miles
Description of Nearest GDE	Pit River/Bull Run Slough



BVMW 5-2 Sustainability Indicator Analysis

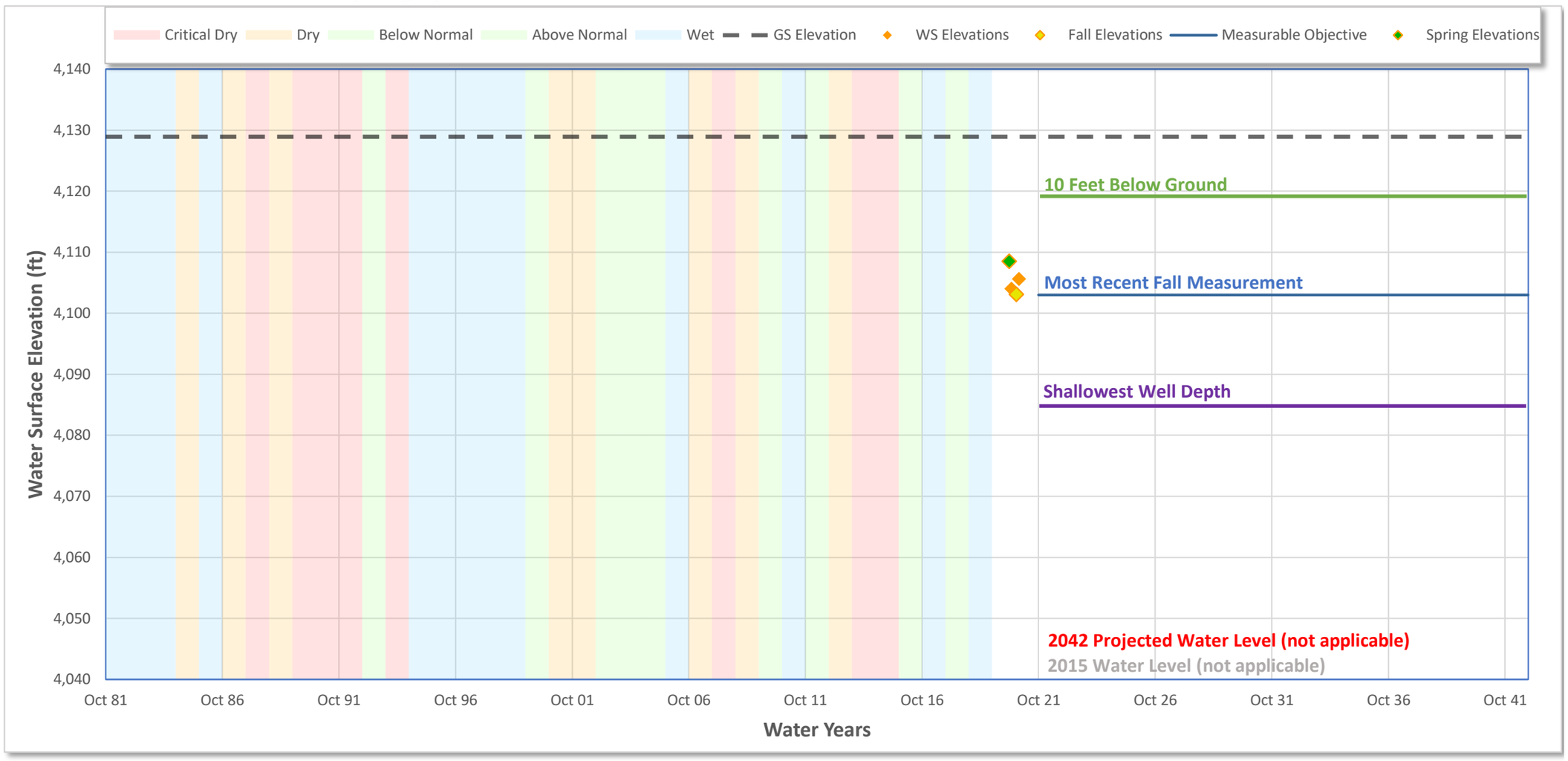
Date: 1/18/2021

Well Information	
Well ID	000144-BVMW 5-2
Alternate Name	BVMW 5-2
State Number	-
CASGEM ID	411220N1211339W001
Well Location	
County	Lassen
Basin	BIG VALLEY
Sub-Basin	-
Management Area	-
Proveyor Agency	-
Well Type Information	
Well Type	Monitoring
Well Use	Observation
Completion Type	Single/Cluster

Well Coordinates/Geometry		
Location	Lat:	41.1220
	Long:	-121.1339
Well Depth		115 ft
Ground Surface Elevation		4128.92 ft
Ref. Point Elevation		4128.92 ft
Screen Depth Range		65 to 115 ft
Screen Elevation Range		4064 to 4014 ft
Principal Aquifer		-
Well Period of Record		
Period-of-Record		2020..2021
WS Elev-Range	Min:	4103.1 ft
	Max	4108.5 ft

Trend Analysis		
Seasonal Data Method		Apr1/Oct1
Show Trend 1		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-
Show Trend 2		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-

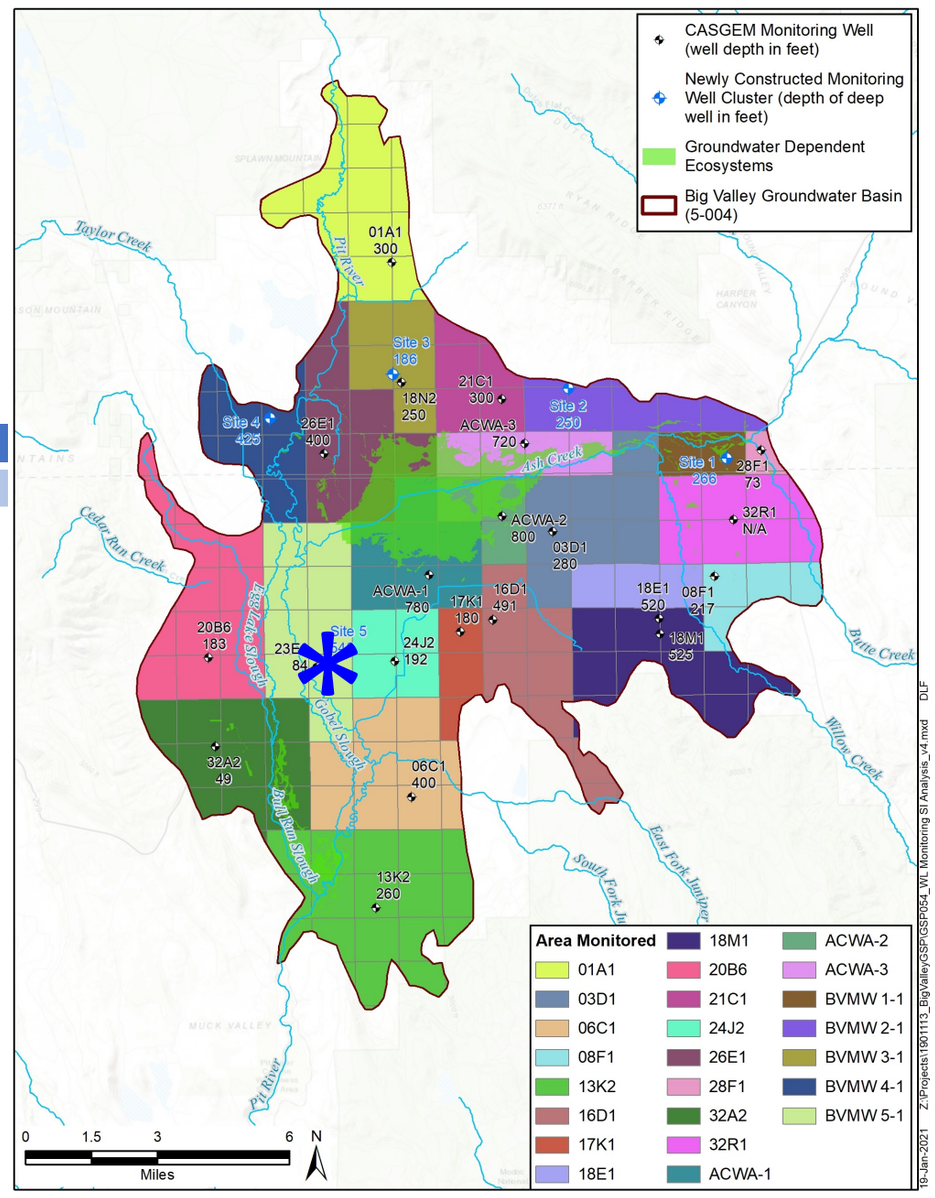
Water Surface Elevation (WSE) Hydrograph



Sustainability Indicator Considerations

Observed WS Elevations		
Parameter		**Value**
WS Elevation Range	Min:	4103 ft
	Max	4109 ft
2015 WS Elevations	Spring:	-
	Fall:	-
Most Recent WS Elev	Spring:	4109 ft
	Fall:	4103 ft

Trend Projections		
Year	**Trend 1-Fall**	**Trend 2-Spring**
2022	-	-
2027	-	-
2032	-	-
2037	-	-
2042	-	-
2047	-	-



Sustainability Indicator Settings

Key	Threshold Type	Effect. Yr.	Value	Description
MO	Measureable Objective	2022	4,103.0 ft	Most recent Fall measurement

Well Depths Within Area

Well Type	Number of Wells	Shallowest Depth (feet bgs)	Shallowest Elevation (feet msl)
Domestic	24	44	4085
Production (Ag)	10	120	4009

Sustainability Indicators to Consider

Water Levels	No
Groundwater Storage	No
Water Quality	No
Subsidence	No
Surface Water Depletions	Yes

Notes:

Other Pertinent Information

Distance From Nearest Perennial Stream	0.6 miles
Name of Nearest Perennial Stream	Pit River
Distance From Nearest GDE	2 miles
Description of Nearest GDE	Pit River/Bull Run Slough

BVMW 5-3 Sustainability Indicator Analysis

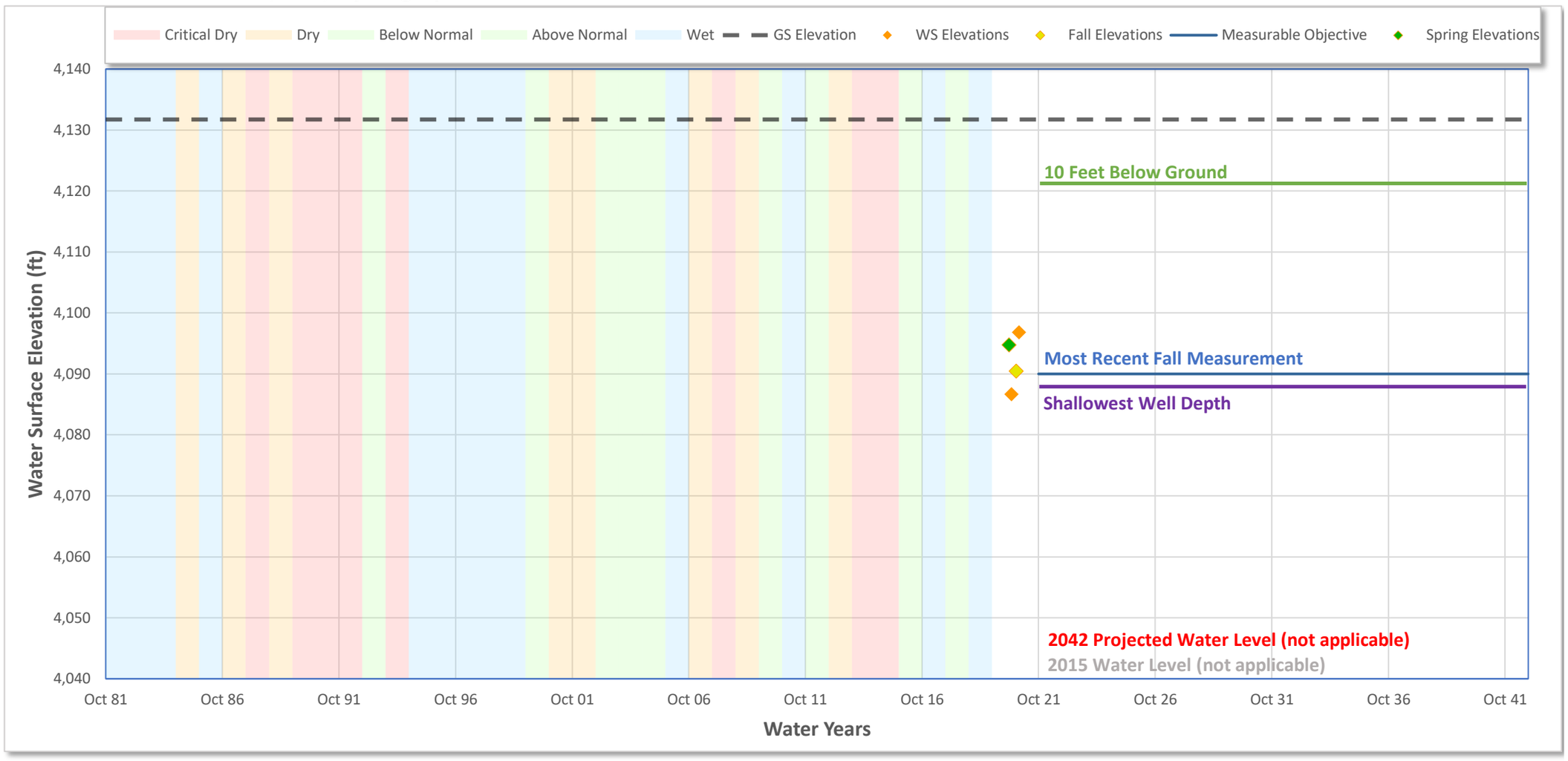
Date: 1/18/2021

Well Information	
Well ID	000145-BVMW 5-3
Alternate Name	BVMW 5-3
State Number	-
CASGEM ID	411212N1211366W001
Well Location	
County	Lassen
Basin	BIG VALLEY
Sub-Basin	-
Management Area	-
Proveyor Agency	-
Well Type Information	
Well Type	Monitoring
Well Use	Observation
Completion Type	Single/Cluster

Well Coordinates/Geometry		
Location	Lat:	41.1212
	Long:	-121.1366
Well Depth		85 ft
Ground Surface Elevation		4131.73 ft
Ref. Point Elevation		4131.73 ft
Screen Depth Range		65 to 85 ft
Screen Elevation Range		4064 to 4044 ft
Principal Aquifer		-
Well Period of Record		
Period-of-Record		2020..2021
WS Elev-Range	Min:	4086.7 ft
	Max	4096.9 ft

Trend Analysis		
Seasonal Data Method		Apr1/Oct1
Show Trend 1		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-
Show Trend 2		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-

Water Surface Elevation (WSE) Hydrograph



Sustainability Indicator Considerations

Observed WS Elevations		
Parameter		**Value**
WS Elevation Range	Min:	4087 ft
	Max	4097 ft
2015 WS Elevations	Spring:	-
	Fall:	-
Most Recent WS Elev	Spring:	4095 ft
	Fall:	4090 ft

Trend Projections		
Year	**Trend 1-Fall**	**Trend 2-Spring**
2022	-	-
2027	-	-
2032	-	-
2037	-	-
2042	-	-
2047	-	-

Sustainability Indicator Settings

Key	Threshold Type	Effect. Yr.	Value	Description
MO	Measureable Objective	2022	4,090.0 ft	Most recent Fall measurement

Well Depths Within Area

Well Type	Number of Wells	Shallowest Depth (feet bgs)	Shallowest Elevation (feet msl)
Domestic	24	44	4088
Production (Ag)	10	120	4012

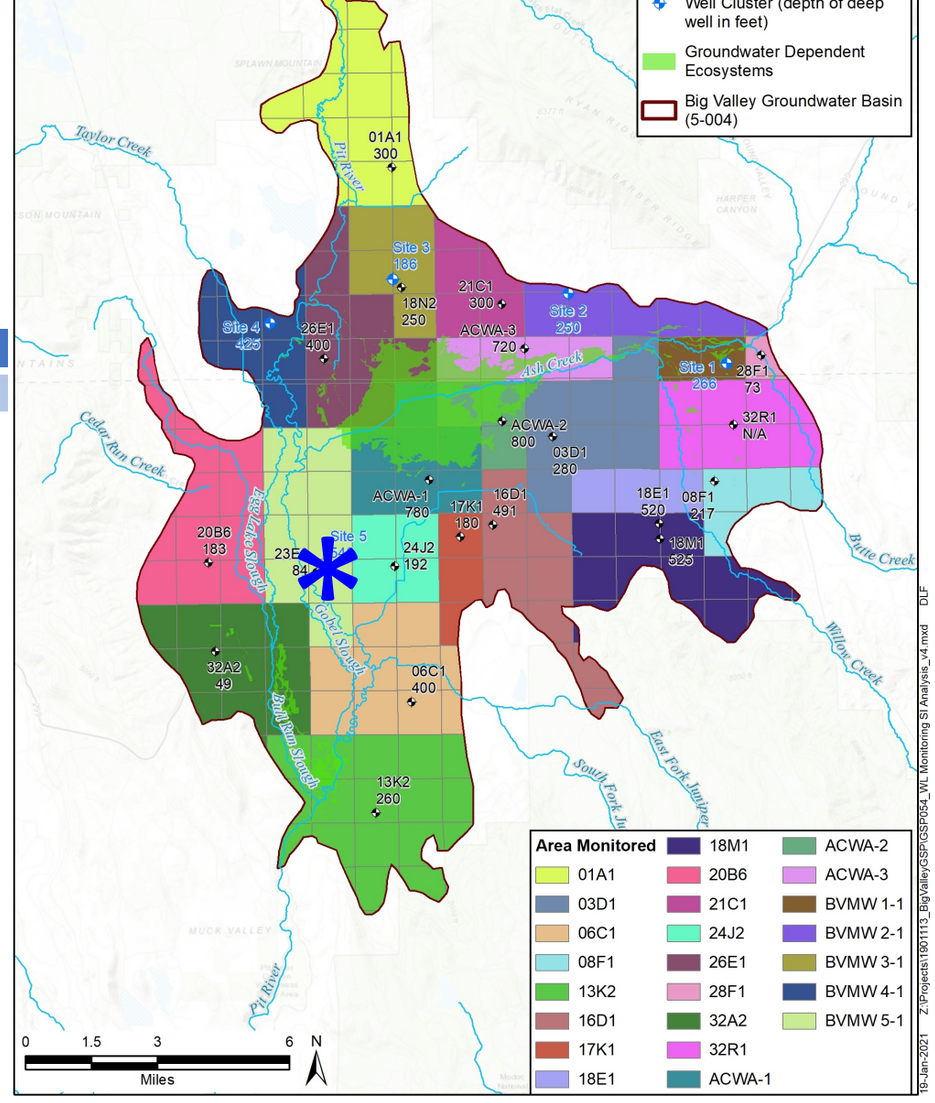
Sustainability Indicators to Consider

Water Levels	No
Groundwater Storage	No
Water Quality	No
Subsidence	No
Surface Water Depletions	Yes

Notes:

Other Pertinent Information

Distance From Nearest Perennial Stream	0.6 miles
Name of Nearest Perennial Stream	Pit River
Distance From Nearest GDE	2 miles
Description of Nearest GDE	Pit River/Bull Run Slough



BVMW 5-4 Sustainability Indicator Analysis

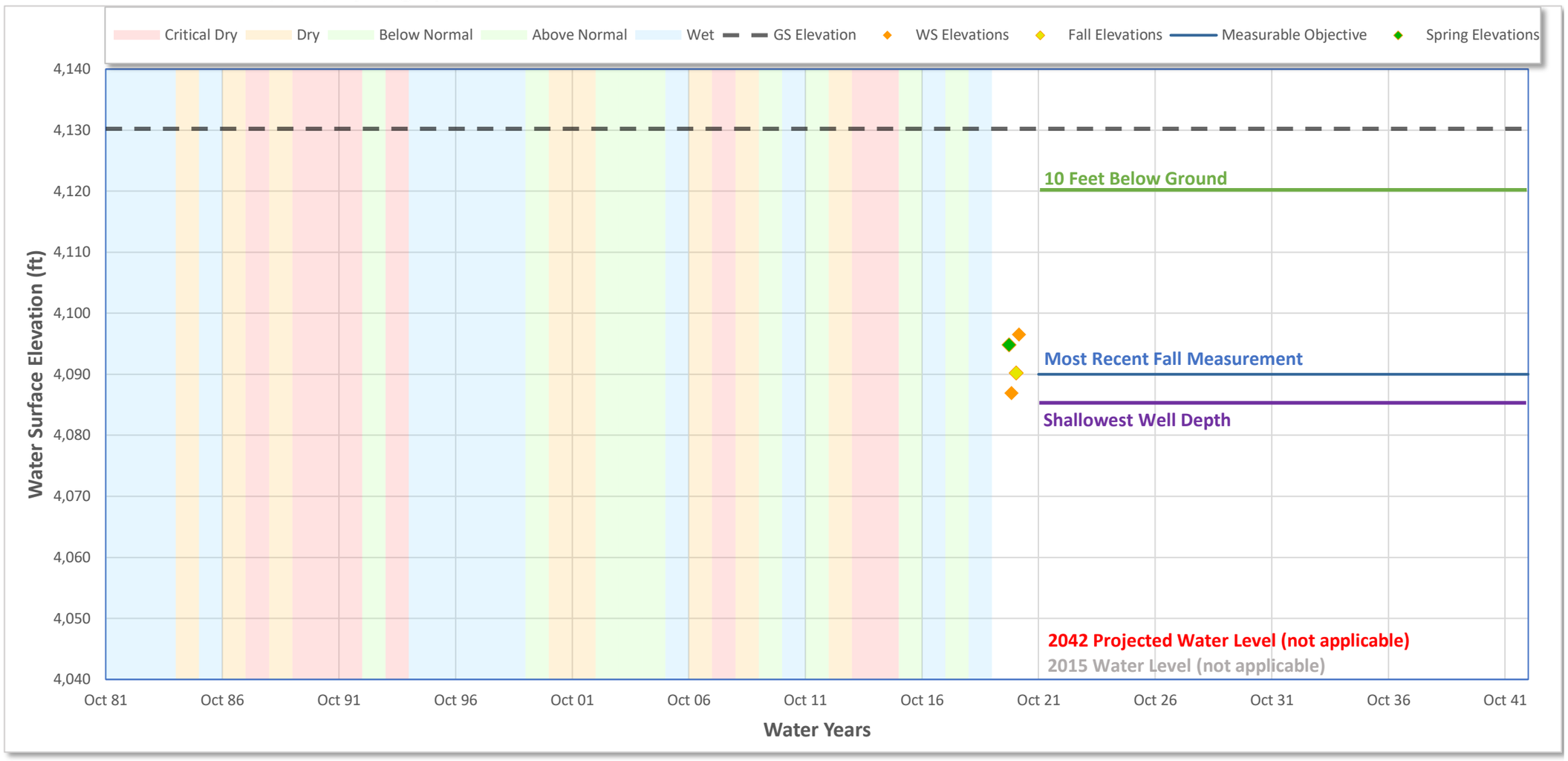
Date: 1/18/2021

Well Information	
Well ID	000146-BVMW 5-4
Alternate Name	BVMW 5-4
State Number	-
CASGEM ID	411206N1211340W001
Well Location	
County	Lassen
Basin	BIG VALLEY
Sub-Basin	-
Management Area	-
Proveyor Agency	-
Well Type Information	
Well Type	Monitoring
Well Use	Observation
Completion Type	Single/Cluster

Well Coordinates/Geometry		
Location	Lat:	41.1206
	Long:	-121.1340
Well Depth		90 ft
Ground Surface Elevation		4130.23 ft
Ref. Point Elevation		4130.23 ft
Screen Depth Range		70 to 90 ft
Screen Elevation Range		4062 to 4042 ft
Principal Aquifer		-
Well Period of Record		
Period-of-Record		2020..2021
WS Elev-Range	Min:	4087.0 ft
	Max	4096.6 ft

Trend Analysis		
Seasonal Data Method		Apr1/Oct1
Show Trend 1		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-
Show Trend 2		None
Date Range	Start WY:	2000
	End WY:	2021
Extend Trend Line		Yes
Trend Results	Slope	-

Water Surface Elevation (WSE) Hydrograph



Sustainability Indicator Considerations

Observed WS Elevations		
Parameter		**Value**
WS Elevation Range	Min:	4087 ft
	Max	4097 ft
2015 WS Elevations	Spring:	-
	Fall:	-
Most Recent WS Elev	Spring:	4095 ft
	Fall:	4090 ft

Trend Projections		
Year	**Trend 1-Fall**	**Trend 2-Spring**
2022	-	-
2027	-	-
2032	-	-
2037	-	-
2042	-	-
2047	-	-

Sustainability Indicator Settings

Key	Threshold Type	Effect. Yr.	Value	Description
MO	Measureable Objective	2022	4,090.0 ft	Most recent Fall measurement

Well Depths Within Area

Well Type	Number of Wells	Shallowest Depth (feet bgs)	Shallowest Elevation (feet msl)
Domestic	24	44	4086
Production (Ag)	10	120	4010

Sustainability Indicators to Consider

Water Levels	No
Groundwater Storage	No
Water Quality	No
Subsidence	No
Surface Water Depletions	Yes

Notes:

Other Pertinent Information

Distance From Nearest Perennial Stream	0.6 miles
Name of Nearest Perennial Stream	Pit River
Distance From Nearest GDE	2 miles
Description of Nearest GDE	Pit River/Bull Run Slough